



## CLOSING THE DIGITAL DIVIDE IN LOW-INCOME URBAN COMMUNITIES: A DOMESTICATION APPROACH

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### ABSTRACT

Aim/Purpose	Significant urban digital divide exists in Nairobi County where low income households lack digital literacy skills and do not have access to the internet. The study was undertaken as an intervention, designed to close the digital divide among low income households in Nairobi by introducing internet access using the domestication framework.
Background	Information and Communication Technologies (ICTs) have the potential to help reduce social inequality and have been hailed as critical to the achievement of the Sustainable Development goals (SDGs). Skills in use of ICTs have also become a prerequisite for almost all forms of employment and in accessing government services, hence, the need for digital inclusion for all.
Methodology	In this research study, I employed a mixed methods approach to investigate the problem. This was achieved through a preliminary survey to collect data on the existence of urban digital divide in Nairobi and a contextual analysis of the internet domestication process among the eighteen selected case studies.
Contribution	While there have been many studies on digital divide between Africa and the rest of the world, within the African continent, among genders and between rural and urban areas at national levels, there are few studies exploring urban digital divide and especially among the marginalized communities living in the low-income urban areas.
Findings	Successful domestication of internet and related technologies was achieved among the selected households, and the households appreciated the benefits of having and using the internet for the first time. A number of factors that impede use of internet among the marginalized communities in Nairobi were also identified.
Recommendations for Practitioners	In the study, I found that use of differentiated costs internet services targeting specific demographic groups is possible and that use of such a service could help the marginalized urban communities' access the internet. Therefore, ISPs should offer special internet access packages for the low-income households.

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Recommendation for Researchers	In this research study, I found that the urban digital divide in Nairobi is an indication of social economic development problems. Therefore, researchers should carryout studies involving multipronged strategies to address the growing digital divide among the marginalized urban communities.
Impact on Society	The absence of an Information and Communication Technology (ICT) inclusion policy is a huge setback to the achievement of the SDGs in Kenya. Digital inclusion policies prioritizing digital literacy training, universal internet access and to elucidate the social-economic benefits of internet access for all Kenyans should be developed.
Future Research	Future studies should explore ways of providing affordable mass internet access solutions among the residents of low-income communities and in eliminating the persistence urban digital divide in Kenya.
Keywords	digital divide, internet domestication, low-income households, digital literacy, Mathare slum

## INTRODUCTION

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Over the last few years, Kenya has witnessed a phenomenal growth in the use of the mobile internet as affordable mobile internet technologies have been made available for home and office users (Wamuyu, 2015). The availability of cyber cafés in residential areas and low-cost fiber optic cable connectivity to the homes have also resulted in increased use of internet services. Statistics from Communications Authority of Kenya (CAK) indicate that Kenya had 37.4 million mobile data/internet subscriptions by March 2016 (CAK, 2016). The availability of 4G networks, cyber cafés and fiber optic cable connectivity in some of the residential areas in Nairobi has allowed many Nairobi residents to access the internet from the comfort of their homes. This has resulted in increasing demand for knowledge-intensive services as the residents take advantage of the opportunities available in this information-based society. For Nairobi as county to fully leverage the availability of the internet services, all her citizens need to be able to access and use the internet and related services.

The Organization for Economic Co-operation and Development (OECD, 2001) defines digital divide as “the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard both to their opportunities to access information and communication technologies and to their use of the internet for a wide variety of activities” (p. 5). Ono and Zavodny (2007) also indicate that digital divide can occur between income groups. Due to the existence of conspicuous social inequalities in Nairobi, and with the absence of any research on the urban digital divide in Kenya, this study started as an open-ended exploration of whether there exists a significant urban digital divide in Nairobi County. Kim (2015) suggests that cities should provide basic infrastructure services such as clean water, sewage, roads, electricity, and telecommunications. Gulyani and Talukdar (2008) studied the infrastructure services available in Nairobi slums including water supply, electricity, drainage, sanitation, and street lighting. Gulyani and Talukdar (2008) concluded that Nairobi slum residents’ access to basic infrastructure is appalling. Such social inequalities are said to be the root of the digital divide (Ragnedda, 2017). Consequently, if access to the telecommunications infrastructure in Nairobi slums is also appalling, then there is a growing digital divide between the low-income slum residents who do not have access to the internet and the wealthy middle-class residents who use the internet. The study by Gulyani and Talukdar (2008) did not investigate the presence of the telecommunications infrastructure in Nairobi slums. Ali (2011) suggests that “we should not dismiss the digital divide simply because other divides exist” (p. 219). Thus, this study tries to fill this gap by investigating the extent of internet use among the residents of Mathare Slum as one of the low-income urban communities in Nairobi.

Shenglin, Simonelli, Ruidong, Bosc, and Wenwei (2017) indicate that the digital divide has two aspects: the supply of digital infrastructures and the levels of internet use and abilities in using Information and Communication Technologies (ICTs) and internet services. Telecommunications infrastructure, personal computers, and digital literacy skills are prerequisites for internet access. Thus, the study posits that “the absence of digital infrastructures can be explained by the levels of internet use and abilities in using ICTs and internet services.” Grounded on this proposition, the study surveyed digital divide in Nairobi.

Nairobi is the capital city of Kenya and has different residential areas, each of which depicts different housing conditions. According to the 2009 population and housing census (Kenya National Bureau of Statistics, 2010), Nairobi County has a population of 3,138,369. Umoja and Mathare were purposely selected as the study locations. Mathare Sub-Location of Nairobi County has a population of 20,463, while Umoja has 50,739 residents. From the city center, Umoja is situated about fourteen kilometers, while Mathare Slum is approximately six kilometers away. These two distinct electoral areas in the Nairobi County have different socioeconomic populations. Umoja is a middle-income housing estate whereas Mathare is a low-income slum area. Currently, 60% of Nairobi residents live in slums (Candiracci & Syrjänen, 2007). Provision of essential public services in Nairobi’s slums is lower compared to what is offered at the County-level. A report by UN-HABITAT (2003) indicates that government agencies see slums as temporary or illegal and, hence, they are reluctant to invest in extending public services such as water supply, electricity, drainage, sewerage, garbage removal, and street lighting.

Digital divide occurs when there is a marked gap in access to or use of ICT devices (Campbell, 2001). The existence of digital divide in Nairobi slums could have an adverse impact on the residents’ prospects as governments (at county and national level) and businesses are increasingly delivering their services online. Studies have also shown that regular computer use is positively correlated with self-esteem, motivation (Reaux, Ehrich, McCreary, Rowland, & Hood, 1998), and problem-solving (Mayer, Quilici, & Moreno, 1999). The success of youths from low-income communities such as Mathare Slum in the labor market is also attributed to their ability to use, adapt, and transfer technology and knowledge-based skills (Harris, 2005). Computer skills are also part of the prerequisites for many jobs in today’s job market (Mor, Laks, & Hershkovitz, 2016). Thus, being on the wrong side of the digital divide can be devastating for any individual, and efforts must be made to achieve digital inclusion for all.

Rao (2005) suggests that any endeavor to reduce digital divide should take care of access, knowledge, and content. To understand how the internet and related technologies could become part of the Nairobi residents’ everyday life, in this research study, I chose to use the domestication approach. This method has been applied in the past to investigate the adoption of households’ media technologies such as the telephone, radio, and television (Pierson, 2006). It has also been proved to take a wider range of variables and application contexts than the other information technology adoption models such as the Davis’s Technology Acceptance Model (TAM) (Davis, 1989) and Roger’s Diffusion of Innovations Theory (Rogers, 2003). Equally, use of the domestication approach suits the study as the domestication model is sensitive towards the technology user, the social conditions, and the environment of use (Hynes, & Richardson, 2009).

In this study, I used a sequential explanatory strategy, which is characterized by the collection and analysis of quantitative data followed by the collection and analysis of qualitative data. Qualitative data was collected through observations, in-depth semi-structured interviews, and the records on internet access and usage by the household members. Quantitative data collection method was a survey using a pre-tested questionnaire.

In this study, my main objective was to investigate the existence of digital divide among the Nairobi residents and to explore how the domestication approach can be used to close the gap. Bhuiyan (2011) indicates that the development of a country can be mainly achieved through the improvement

of the socio-economic circumstances and quality of life of the marginalized and poor citizens. By choosing to close the digital divide, this would improve the living conditions of the Mathare Slum residents and hence the general economic development of Nairobi.

The next section is a review of the literature. The third section describes the study's methods while the fourth section gives the study results. The fifth section discusses the study finding, and the sixth section reflects on the success of the study, its conclusion, and directions for further research.

## LITERATURE

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Over the years, Information and Communications Technologies (ICTs) have become more affordable in most of the developing countries while internet access has become increasingly ubiquitous. The internet has continued to change the way people go about their daily lives, especially in areas such as learning, shopping, and communication. However, the opportunities afforded by these advances in ICTs are only available to a few as the technology access gap between wealthy and poor exists (Collier, 2008; Ochara & Mawela, 2015; Wamuyu, 2017). This Information and Communications Technology (ICT) access gap is commonly referred as the digital divide. The digital divide between the developed and the developing countries has continued to decrease as most developing countries continue to invest in expanding their ICT infrastructure. This increased investment in ICT infrastructure is evidenced by increase in the number of internet and mobile phone users in many developing countries such as Kenya. However, a digital divide between different demographic groups within the developing countries persists.

### *DIGITAL DIVIDE*

The Organization for Economic Co-operation and Development (OECD, 2001) defines digital divide as “the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard both to their opportunities to access ICTs and to their use of the internet for a wide variety of activities” (p. 5). Campbell (2001) defines digital divide as “situations in which there is a marked gap in access to or use of ICT devices” (p. 8) and concludes that there is clear evidence that such a divide exists between and within countries. Ono and Zavodny (2007) indicate that digital divide can also occur between genders, ages, education groups, income groups, racial, and ethnic groups. Wijers (2010) defines digital divide as the inequality in use and ownership of computers and the internet across nations, while Vehovar, Sicherl, Hüsing, and Dolnicar (2006) describe it as the socio-economical difference in the use of ICTs. Rao (2005) suggests that digital divide could be explained by the differences in “access to information, the internet, and other information technologies; in skills, knowledge, and ability to use information and other technologies based on race, gender, geography, economic status and physical ability” (p. 3).

Since the liberalization of the Kenyan ICT sector in 1998, Kenyan economy has had massive ICT infrastructure investments by local and international investors offering a broad range of telecommunication services (Wamuyu, 2015), thus reducing the costs of ICTs access and ownership. The presence of mobile data/internet services has also led to growth in data/internet subscriptions. Statistics from Communications Authority of Kenya (CAK, 2016) indicate that there are 24.8 million internet subscriptions with an estimated figure of the number of data/internet users at 37.4 million. Even though these numbers are estimates using the recommended International Telecommunication Union (ITU) formula, urban internet divide in Nairobi is huge. An initial survey done in February 2016 in the course of this study (see Table 4 later in this paper) showed the existence of urban digital divide in Nairobi. The preliminary study indicated that the number of households accessing the internet in Mathare Slum is very low compared to the households accessing internet in Umoja Estate. Thus, this indicates that urban digital divide exists in Nairobi. Digital technology is known to intensify existing inequalities and to create new inequalities (van Dijk, 2005). Closing this digital divide could open a list of *e-everything* (including e-business, e-learning, e-commerce, e-government, and e-participation) for the residents of the Mathare Slum. It also could promote e-inclusion and an in-

crease in the number of digitally included and digitally empowered people in Nairobi. In this study, I use the term digital divide as defined by Belanger and Carter (2009) as a distinction between individuals that have access to ICTs and skills in ICT use and those without, within various demographic groups.

### ***DIGITAL LITERACY***

Digital literacy is defined as the ability to find, evaluate, utilize, share, and create content using information technologies and the internet (Cornell University's Digital Literacy Resource, 2016). Digital literacy is usually associated with digital competence and computer user self-efficacy. Ferrari (2012) indicates that digital competence is a combination of information skills, communication skills, content creation skills, safety skills, and problem solving skills. Computer user self-efficacy is an individual's judgment of one's capabilities to use computers (Bandura, 1986). Regular computer use has been found to be positively correlated with problem-solving (Mayer et al., 1999). Positive computer self-efficacy has been shown to be related to willingness to choose and participate in computer-based activities (Holcomb, Brown, Kulikowich, & Zheng, 2003). Computer self-efficacy is also essential to access and benefit from the internet. Vaičiūnienė and Mažeikienė (2016) point out that "when people have digital and media literacy competencies, they recognize personal, corporate and political agendas and are empowered to speak out on behalf of the missing voices and omitted perspectives in our communities" (p. 84).

In the context of this study, digital literacy refers to the ability of an individual to create and exploit digital contents to meet the demands of a dynamic digital society. It considers the broader definition by Hobbs (2010) which describes digital literacy as "the ability to use computers, social media, and the internet" (p. 17). Computer literacy skills are crucial to success in today's economy. Tharanganie, Wickremasinghe, and Lakraj (2011) posit that "computer literacy is a mixture of awareness of the computer's importance, knowledge of what computers are and how they work, and ability to interact with computers" (p. 15). The study elected to conduct digital literacy training as Kher, Downey, and Monk (2013) indicate that computer training positively influences computer self-efficacy. Laganá, Oliver, Ainsworth, and Edwards (2011) also suggest that computer self-efficacy is usually increased after computer training.

### ***THE DOMESTICATION APPROACH***

Studies on technology adoption and use falls in three schools of thought: diffusion, adoption, and domestication (Pedersen & Ling, 2002). Domestication is defined as processes whereby people encounter the technologies and deal with them, either rejecting the technologies or fitting them into their everyday routines (Haddon, 2006). Domestication approach focuses on the process in which technology becomes an integral part of a user's everyday habits (Manueli, Latu & Koh, 2007). It emphasizes on the process by which a technology finds its way into individuals' daily lives and becomes part of their day-to-day activities. As opposed to the other technology adoption models, Haddon (2006) indicates that the domestication framework explores adoption, usage, gratifications, and the roles the new technologies come to play in the new user's lives. Fischer (1992) used the domestication approach to analyze how the telephone technology permeated and transformed the essence of daily activities. Silverstone and Haddon (1996) used the same method to study the use of television and personal computers at home.

Y. Chen (2013) used the domestication framework to study tablet computers and e-readers adoption and usage in the United States and Taiwan. Chigona, Chigona, Kausa, and Kayongo (2010) also used this approach when conducting an empirical survey on the domestication of ICTs in schools serving the disadvantaged communities in a developing country context using the case of South Africa. Another study that the researchers have used the domestication approach is by Hijazi-Omari and Ribak (2008) where the approach was used to explain mobile phone usage among Palestinian teenage girls in Israel. Bolin (2010) used the approach to compare the use of voice calls and texting by youths in

Sweden and Estonia. Letsie, Kabanda, and Chigona (2015) applied the methodology to explore how economically disadvantaged families were domesticating mobile devices in South Africa. Kibere (2016) employed the domestication approach in an ethnographic case of how the youth of Kibera appropriate new media and ICT technologies. Using the domestication theory, Hahn and Kibora (2008) found out that there was unexpectedly rapid process of domestication and appropriation of the mobile phone by both rural and urban populations in Burkina Faso. Richardson (2009) used the domestication theory to probe the domestication of ICTs in gendered UK households. Richardson (2009) indicates that “the domestication of ICTs remains a neglected area of academic research” (p. 607). Therefore, this study is an endeavor to add to the literature on technology domestication.

Frissen (2000) describes the domestication approach as a three stage model including Commodification, Appropriation, and Conversion, while Habib (2005) suggests a four stage process by splitting the appropriation stage into objectification and incorporation stages. Silverstone (1994) identifies six moments of domestication: commodification: imagination, appropriation, objectification, incorporation, and conversion. These six stages are described in Table 1.

**Table 1. Six Stages of the domestication approach**

Stage		Definition
Pre-domestication	Commodification	The industrial and commercial processes of bringing products to market
	Imagination	The work of advertising in rendering commodities as objects of desire and the way a product enters the consciousness of consumers
Appropriation		The product comes into the home and is adapted to the household – Actual usage
Objectification		How the product is used in the household
Incorporation		How the product is used as it becomes embedded into daily routines of the household
Conversion		How the product fits into the household and family

**Source:** Habib & Cornford, 2001; Silverstone, 1994; Silverstone, Hirsch, & Morley, 1992.

Domestication theory has not been applied in studies on narrowing the digital divide among the low-income urban communities. By studying the introduction of computers and the internet using the domestication model, I will be helping in the understanding of how these technologies could get into a low-income household, become embedded into the household’s daily routines, and be adopted by the low-income urban communities. I will also be contributing in identifying the impacts of the household internet domestication among the low-income urban communities.

### ***HOUSEHOLDS***

For the purpose of the study, a household as a whole was the focus of the analysis. Scott (1997) defines a household as “a group of people living together under the same roof and sharing basic accommodation facilities” (p. 593). The choice of a household as the study object was guided by Aarsand, (2007) and Mesch (2006), where it is suggested that ICTs are known to have a positive impact on households’ relationships by uniting and bringing family members together, an indication that ICTs can help to develop resilience in a family unit. Each study household was provided with a laptop, offered digital literacy training and unlimited internet access.

Use of computers, social media, and the internet is essential for everyday work and life in our connected, globalized and digitalized world. Abuiyada, Rauff, and Eteiw (2016) indicate that most families use home internet for e-mail, entertainment, education, news, and online discussions. Hence, to get a snapshot of the household's use of the internet, each household was requested to record its members' online activities and the duration of their everyday online events. The activities to be registered included the time spent online, a number of domains visited, social networking sites used and sending e-mail messages.

In this paper, I seek to contribute to the dialogue about digital divide in developing countries and how internet domestication among marginalized communities living in the urban slums can be used in addressing the persistent digital divide in most developing countries' cities.

## **METHODOLOGY**

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In this research study, my main objective was to investigate the existence of digital divide among the Nairobi residents and to explore how the domestication approach could be used to bridge the digital divide. The researcher used a mixed study approach, which involved collecting both quantitative and qualitative data in two-phases. This was achieved through a preliminary survey to collect data on the existence of digital divide and use of the domestication approach to narrowing the divide using multiple descriptive case studies. The use of multiple case studies was to have a context analysis of the internet domestication process in a contemporary real-life situation among the selected study households. The decision to use the case study approach is because the case study methodology is considered a robust research method, particularly when a holistic, in-depth investigation on community-based problems such as poverty, unemployment, drug addiction, and illiteracy is required (Johnson, 2006). In this study, I would like to have an in-depth investigation on the digital divide among the Mathare community.

### ***PRELIMINARY STUDY***

The preliminary survey was accomplished using a hand-delivered questionnaire (Appendix A). The questionnaire was developed to collect data on the computer proficiency skills and use of the internet based on the basic computer literacy guide by Tharanganic et al. (2011). The questionnaire was modified to match the objectives of this research study. To enhance the validity of the questionnaire, a pilot study was conducted. The pilot study was a try-out of the questionnaire to identify any unclear or ambiguous statements in the questions. During the pilot study, a pre-tested survey questionnaire was hand-delivered to twenty respondents selected randomly from the two study locations. Sixteen questionnaires out of the twenty delivered during the pilot study were filled out properly and were used for piloting the questionnaire. After the pilot study, the respondents from Mathare Slum and Umoja were approached and informed about the purpose of the survey, and they were given the questionnaires. Two hundred and forty questionnaires were delivered to the residents in the two study sites.

### ***CASE STUDY***

Any endeavor to reduce digital divide should take care of access, knowledge, and content (Rao, 2005). To achieve this, the study was to provide the households with the necessary ICT resources, including internet access devices, digital literacy skills training, and free internet access. For the context analysis of the internet domestication process, data was collected through record keeping, observations, and in-depth semi-structured interviews. The case study households were selected based on the data collected during the preliminary study and was based on the following criteria.

- The household did not have a mobile phone that could access the internet;
- The household did not have anyone accessing the internet;
- The household did not have anyone with an email address;

- The household did not have anyone using social media;
- The household did not have a computer;
- The household had someone interested and willing to undertake the digital literacy training;
- The household was willing to participate in the study voluntarily.

From the Mathare Slum's preliminary survey questionnaires that were properly filled out by the respondents, seventy-eight households met the above-specified criteria. Eighteen households were randomly selected as the case study households. The empirical data was collected from the eighteen case studies using record keeping, observations, and in-depth semi-structured interviews over a period of three months. The interview guide is attached as Appendix B. Voluntary participation forms were provided as "informed consent" from the participants was required as several visits were to be made to the participants' private settings in their households. During the study period, the research team were overt participants as described in Silverman (2007). The subjects were informed prior to the study that they had the option to decide on whether to participate in the study or not. The participating households were then allowed to choose one of the family members to take part in the five weeks' digital literacy training. Throughout the study process, research ethics and regulations provided by the study team's University were adhered to. The participants were also informed of the purpose and significance of the study to the marginalized communities in Nairobi. Table 2 gives the compositions of the eighteen households selected as case studies.

**Table 2. Characteristics of the eighteen selected households**

Household	Ages: Lowest to the High- est	No. of Males	No. of Females	Household Composition	Digital Literacy Trainee
Household 1	15 – 52	3	5	2 Parents, a Grandmother, 5 Adult Children	Son
Household 2	6 - 45	2	3	2 Parents and 1 Adult Child and 2 Children	Daughter
Household 3	2 – 28	1	2	2 Parents and 1 Child	Mother
Household 4	8 – 38	1	4	2 Parents and 3 Children	Father
Household 5	18 – 58	1	3	1 Parent, a Grandmother, and 2 Adult Children	Daughter
Household 6	7 – 45	3	3	2 Parents, 2 Adult Chil- dren, and 2 Children	Son
Household 7	8 – 47	2	2	2 Parents and 2 Children	Mother
Household 8	9 - 48	5	1	2 Parents and 3 Adult Children and 1 Child	Cousin
Household 9	22 – 59	3	2	2 Parents and 3 Adult Children	Son
Household 10	17 – 64	2	5	1 Parent, a Grandmother, and 5 Adult Children	Daughter



Household	Ages: Lowest to the High- est	No. of Males	No. of Females	Household Composition	Digital Literacy Trainee
Household 11	12 – 48	2	2	2 Parents, 1 Adult Child and 1 Child	Daughter
Household 12	17 – 65	4	2	2 Parents, a Grandmother, and 3 Adult Children	Father
Household 13	4 – 30	2	2	2 Parents and 2 Children	Mother
Household 14	24 - 60	1	3	2 Parents and 2 Adult Children	Daughter
Household 15	2 – 28	2	3	2 Parents and 3 Children	Mother
Household 16	1 – 31	1	2	2 Parents and 1 Child	Mother
Household 17	19 – 52	1	3	1 Parent and 3 Adult Chil- dren	Son
Household 18	8 – 46	3	3	2 Parents, 2 Adult Chil- dren, and 2 Children	Daughter

### ***PROCEDURE***

The study participants were provided with the necessary ICT resources, including internet access devices, digital literacy skills training, and free internet connectivity. The selected households were supplied with the following resources:

- 1 Laptop (Google Chromebook)
- 1 Internet access dongle (Telkom Modem) with unlimited internet
- 1 Logbook to record their overall daily internet use (household internet usage record book)

Due to the challenges of lack of adequate requisite infrastructures such as electricity, arrangements were made to collect the laptops every morning for charging and returning them to the households early afternoon when fully charged. The digital literacy trainees were provided with a five-week digital literacy training program. The training program was guided by the following Learning Outcomes, Table 3.

**Table 3. Digital literacy training outcomes**

No.	Description
1	Describe the role of computers and the internet in today's society and provide examples of their impact on businesses, communities and individuals.
2	Identify different internal and external components of computer hardware.
3	Demonstrate the use of Word-processing (Microsoft Word Online and Google Docs).

No.	Description
4	Demonstrate the use of Spreadsheets (Microsoft Excel Online and Google Sheets).
5	Discuss the importance of internet privacy and security.
6	Demonstrate the use of Presentations (Microsoft PowerPoint Online and Google Slides).
7	Demonstrate the use of Social Media (LinkedIn, Google +, Facebook, Twitter) and blogging (to build a <i>blog</i> ).
8	Demonstrate use of Calendar to organize appointments, update agenda, plan events, and stay on time.

The learning outcomes were meant for the trainees to acquire five of the six key skills of computer literacy as defined by Tharanganie et al. (2011). These six skills are:

1. Skills in basic hardware and basic operating system functions – Identifying computer parts, powering up and powering down the computer, open/save files, recognize different file types
2. Skills in word processing – Create/save/print documents, insert tables/charts/ labels/symbols, format page layout (margins, page numbers, page borders)
3. Skills in spreadsheets – Create/save/print spreadsheets, insert tables/charts, insert functions/formulas
4. Skills in presentation graphics – Create/save/print slide shows, insert new slide/layout/tables/charts, create animations
5. Skills in databases – Design basic databases with queries and reports/forms
6. Skills in internet and e-mail – Surfing the internet and sending e-mail messages.

The skill number five (5) was deemed an advanced proficiency which would require extra training lessons. Instead, use of social media and personal information management using Social networks sites and calendar respectively was taught. This included training on the benefits and uses of social media in participants’ daily lives, awareness on how users of social networks share their personal information consciously or unconsciously, and how to use calendars to coordinate and schedule activities.

### ***CLOSING THE DIGITAL DIVIDE***

After the five weeks’ digital literacy training program and another extra three months in which the members of each participating household had the internet access resources to use the internet, semi-structured interviews were used to collect data. This was done at the end of the intervention through the domestication process. Since the study adopted the Hobbs (2010) definition of digital literacy as “the ability to use computers, social media, and the internet” (p. 17), the interviews were used to measure the use of digital literacy skills, internet access, and use of social media. Use of these three measurements was to assist in assessing digital and media literacy competencies of the members in each of the particular household.

### ***HOUSEHOLDS INTENTIONS TO CONTINUE USING THE INTERNET***

Bhattacharjee (2001) suggests that continuance intention is influenced by user satisfaction and post-acceptance usefulness perceptions. The study did interrogate the intentions of the household mem-

bers to continue using the internet beyond the project. Successful reduction in the urban digital divide in Nairobi would occur if the study household members continued to use the internet when the ICT resources provided for by the project were removed from their homes. Therefore, the study examined the challenges that could impede the members of the study households' use of the internet outside the study project.

## FINDINGS

### *DESCRIPTIVE ANALYSIS*

In this study, descriptive data were collected using a questionnaire during the preliminary survey. Record keeping, observations, and in-depth semi-structured interviews with the members of the participating households were used to collect data for the duration of the internet domestication process. During the internet domestication procedures, the interviewers provided an opportunity for the participants to amend their responses and provide feedback if needed.

#### **Preliminary survey**

Two hundred and eight questionnaires were properly filled out by the respondents, yielding an 87% response rate. This included one hundred and one duly filled responses from Mathare Slum and one hundred and seven properly filled responses from Umoja. One hundred properly filled-out questionnaires were randomly selected for use in the data analysis for each of the study sites.

The preliminary study indicated that the number of households accessing the internet in Mathare slum was very low compared to the households accessing internet in Umoja. Table 4 shows the number of households with a household member accessing the internet, while Table 5 indicates the presence of digital literacy skills in the households. Table 4 indicates that in all the households in Umoja, there was a household member accessing the internet using one of the many internet options available, while in Mathare, inadequate digital infrastructures such as lack of electricity installations and broadband connectivity limit the choice of internet subscriptions the residents can access. Only sixteen households in Mathare Slum had a member accessing the internet. Use of cyber café was included as an internet connectivity option as accessing the internet in cyber cafés is probably still more economical than acquiring domestic facilities for some people. Internet access at cyber-café is also a way of sharing the cost of internet access amongst several users (Wamuyu, 2015). Therefore, the study results indicate that the existence of internet divide in Nairobi is characterized by lack of computer literacy skills, low internet access, and inadequate ICTs and related infrastructure.

**Table 4. Internet Access Divide in Nairobi**

Type of internet Access	Umoja n=100	Mathare n=100
Home Mobile Data	100	12
Home Fixed Wireless Data Subscriptions	36	0
Home Fixed Fiber Optic Data Subscriptions	44	0
Cyber Café	72	4

The preliminary study found existence of low digital literacy skills and very little post-secondary school education or training among the members of the households in Mathare slum as indicated in Table 5. It was noted that in Umoja estate the number of households using fiber data connection was 44%. This could be attributed to the fact that an Internet Service Provider (ISP) is offering a cost differentiated internet access service at the cost of one thousand Kenya shillings per month per household (approximately, nine US dollars) for 1Mbps service to the residents. Some respondents

were also using social media without necessarily having to connect to the internet. They were using a service provided by a telecommunication company which allows the use of “UNLIMITED SMS service” to access Facebook and Twitter SMS services.

**Table 5. Digital literacy skills**

Residence	Households with a family member with digital literacy skills n=100	Households without a family member with digital literacy skills n=100
Mathare	22	78
Umoja	100	0

### Case study results

Each household was considered as a separate unit of investigation. A total of eighty-nine respondents were interviewed from the eighteen participating households. The cumulative internet usage of the members of each participating household during the study period is shown in Table 6. Four measures of internet use were continuously recorded for five days a week over a period of three months in each participating household including the time spent online every evening the house had the Chromebook (hours per day), number of domains visited, social networking sites used, and number of emails sent (per day). To allow participation from every family member of a household, in-depth semi-structured interviews were conducted with the family as a group. Similar to Abuiyada et al. (2016), most of the study households spent more than three hours online as shown in Table 6. The households were also using the internet for online communication, with most households using the internet to visit different social internet websites and for sending and receiving e-mail messages as presented in Table 6.

**Table 6. Members of the participating households' ICT resources usage per day**

Measure	Frequency	
Time spent online hours per day	>=3 Hours	14
	<3 Hours	4
Average Number of domains visited per day	>=3	11
	<3	7
Social networking sites used per day	3>=	16
	<3	2
Number of e-mails sent per day	>=3	12
	<3	6

At the end of the intervention, the study measured, the types of activities for which the participants were using the internet. Table 7 summarizes the online activities of the study participants. The study found that most of the study participating households were using the internet for getting the local news, social communication, entertainment, and information search.

**Table 7. Household Internet uses**

Measure	Frequency
Watching news on the internet	18
Chatted online and Social Communication	18
Citizen participation (Comments on newspaper websites, political forums, open debates)	15
Contacting government agencies (e-government)	10
Online Shopping	4
Information Search	16
Games and Entertainment	18
Use of e-mails	18
Education	5

There is an array of benefits in having fast and affordable internet access. The members of the participating households were asked their opinion of whether they thought that using the internet could enhance their family life. All the participants indicated that internet usage would impact their family lives positively as they were now aware that using the internet means access to information, entertainment, and communication networks.

The individual household members who participated in the digital literacy training program were then assessed on their perceptions of their digital literacy skills level associated with the use of computers and the internet, and the results are given in Table 8. With the exception of creating a blog and using an online calendar, the study participants indicated that they had acquired the requisite digital literacy skills and could now independently use internet and computers. Two of the participants indicated that the training had *enhanced their potential for employment and future career prospects*.

**Table 8. Digital Literacy skills**

How would you describe your proficiency in the following activities	I cannot do this	I can do this with some assistance	I can do this independently	I can teach others how to do this
Using search engines such as Google, Bing, to search for information on the web	0	0	6	12
Creating a blog	1	3	10	4
Video streaming	0	0	12	6
Using a Word-processor	0	0	10	8
Using Spreadsheets	0	2	12	4
Using Presentations	0	1	10	7
Using Calendar	0	3	13	2
Describe components of a computer	0	1	1	16
Use of social media such as Twitter, Facebook, or Instagram	0	0	4	14

## ***DOMESTICATION OF INTERNET AND INTERNET ACCESS RESOURCE TOOLS***

To collect the qualitative data on the internet domestication processes, multiple informal visits to the homes of the participating families and their neighbors were done. During the visits, the interviewer would use the records documented in the *household internet usage record book*, one-on-one individual interviews, and group interviews with the family members and their neighbors to explore how the internet usage was spreading through each household and its neighborhood. To analyse how the internet usage had spread through each household, the interviewer gave the participants the opportunity to talk about the information recorded in the household internet usage record book and to share their experiences in the use of the internet. This section gives the results of how the members of the participating households domesticated the internet resources that were provided to them by the study team. The section uses the four phases of the domestication methodology, namely, appropriation, objectification, incorporation, and conversion.

### **Appropriation**

According to Silverstone et al. (1992), an artifact is appropriated at the point at which it is sold, leaves the world of production, and is taken possession of by an individual or household and owned. The study team did spark the households' desire to use the internet access resource tools by introducing the project to the members of the households through the distribution of information on the purpose and benefits of the study to the Mathare Slum community. The households did appropriate the devices by accepting to have them in their homes with the perception that the tools will help the participants achieve something new and, hence, the need to have the technology integrated into the daily habits of their homes. The family in Household 6 was excited to have a computer with internet connectivity at home. The father excitedly said, "My children have a chance to be like my employer's kids." He had over the years seen the children of his employer using computers in one of the affluent neighborhoods in Nairobi where he has been working as a gardener for 12 years.

Prior to the Mathare Slum internet domestication project, the selected study households did not have access to the internet or any of their family members using the internet. Most of the households had only remote knowledge of uses and applications of the internet. The grandmother in Household 5 said, "I can't believe that I will have this device at home, I have only touched it once, and that is during the last general election registration exercise." The young adults in Household 10 were very excited and enthusiastically accepted the ICT resources and were eager to use the internet. However, their grandmother was very hesitant. The grandmother had to be convinced that the internet is useful, has a number of advantages, and those without access to it are missing out educationally and socially. The respective study households' members were trained on how to use the computers, access the internet, and social media fundamentals. Training and counseling were done to reduce the anxiety and ageism stress associated with the introduction of the ICT resources to individuals who were less technologically literate among the study households. Appropriation of the technology was achieved when the study households started to objectify the ICT resources delivered to them.

### **Objectification**

This is the stage where the internet access resource tools were placed within the homes and the study households encouraged to get used to them. For example, instead of listening to the radio, Household 17 could now stream live prime time news. Enthusiasm and excitement were evident, and the members of the household were eager to share their experiences with the ICT resources. The households' members recognized that they were spending most of their evenings using the internet productively.

Most household in Mathare Slum cannot afford the ICT resources necessary to access the internet. Therefore, having the ICT resources at home gave the household members something more than just the functional significance of the ICT resources. The young man from household 17 said, "It is cool to have the internet at home. I now think that I should pursue a career in computer science. I

am really enjoying the digital literacy training.” This was an indication that the presence of the ICT resources at home was giving a sense of academic optimism among the young study participants. It also shows the perceived social status attached to owning ICT resources among the marginalized communities. A teenage daughter from Household 5 was happy to have internet access as she was planning on starting a career in modeling and performing arts. She said, “I am using the internet to search information on how to pursue a professional modeling career. I have even sent emails to modelling agencies and am now learning new modelling skills online. I am also using the internet to grow my talent through videos and motivation talks from other fashion models. I am even considering having my own ‘slums fashion blog.’” This is an indication that the participants were proud of themselves and their households.

### **Incorporation**

At this stage the participants were actively using the internet every evening that they had the internet access resources at home. The digital literacy training provided to the members of the participating households contributed to the objectification and incorporation of the internet access resource tools. Members of the households were now exploring and discovering new ways and aspects of using the internet at home. The mother from Household 3 was happy that she now had the skills that once had her miss a job opportunity. She was excited to have the basic computer literacy skills and said, “I was given a good job offer, only to lose it because I didn’t have computer skills.” She was now using online recruitment websites and also emailing her job applications to her prospective employers. Like the mother from Household 3, most of the study participants had confidence in using the digital skills they had acquired from the digital literacy training program.

In most households, families took turns using the ICT resources. In Household 18, family members were using the Internet for different online activities. The children aged 8 and 11 were enjoying playing online computer games and watching pre-downloaded videos. The two teenagers were checking out for interesting academic materials and random online chat with friends and relatives. The father would be watching the news, searching for information on what is happening in the slum, or updating his social network status. The mother would be using the internet to look for interesting designs for her road-side boutique and participation in the local women group discussions. The teenagers were now ICT specialists and would invite their friends for some computer literacy lessons. Vuojärvi, Isomäki, and Hynes (2010) suggest that “successful domestication comes about when the technology is successfully embedded within the daily routine and habits” (p. 261). The diversity in the number of activities that the members of Household 18 were involved in provides the evidence of successful domestication of the ICT resources.

### **Conversion**

Apart from sharing the ICT resources within the homes, the study participants shared the resources with their neighbors. Conversion deals with the neighbors’ understanding of the household’s relationship with the technology being domesticated. At this stage, the household members were using the internet for social communication, citizen participation, and seeking information. The households were also sharing the internet access resource tools with their neighbors by inviting them over to access the internet in their homes. The children would let their neighbors join them in enjoying the pre-downloaded videos or playing an online game.

After successfully finishing the digital literacy training, the father of Household 4 routinely invited his relatives residing in the neighborhood for basic computer literacy training and internet access in his house. He said, “I want all my family members to use the internet to communicate and share photos with my brother working in Uganda.” His desire and determination to be a digital citizen were impeccable. He had to attend the digital literacy training every morning (9:00-11:00 a.m.) on weekdays before heading to his makeshift roadside kiosk where he was working as a cobbler. He never missed a training session. The study team had a chance to have him explain to his spouse how he had man-

aged to store their family photos in the cloud so that they could access the photos at any time and from anywhere after this study project.

## DISCUSSION

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The internet and social media have significantly affected the way people spend their evenings at home. Many people are using the internet to interact and share information with friends and followers outside the confines of their sitting rooms (Wamuyu, 2017). The study collected data on internet usage, internet self-efficacy, and computer literacy. The study results show that most residents of Mathare Slum lack access to the ICTs. In the current networked and globalized world, this lack of access to ICTs indicates that the people living in Mathare Slum have been denied the opportunity to adequately participate in this information-based society. The study has demonstrated the utility of the domestication theory in introducing internet access in the households among the marginalized urban communities in a developing country. Successful domestication allowed ICT resources to become an integral part of the study households as seen in Household 18. The increase in digital skills and levels of digital optimism among the family members of the study participating households was also another way of expressing successful domestication. The study helped the members of the study participating households and their neighborhood to develop digital resilience, opening opportunities for their effective participation in the information society and narrowing the existing urban digital divide.

By providing the necessary internet access devices and digital literacy skills to the members of the participating households, the families were able to use the internet for their social communication, citizen participation, entertainment, seeking information, and acquiring knowledge, hence nurturing positive family development. The skills acquired could also help the families to have the ability to cope with any subsequent digital challenges while navigating the increasingly knowledge based Kenyan society and in participating in both local and global digital driven events. Members of the four participating households had used the internet to do online shopping, while a good number of the other study participants had used the internet for education purposes, civic engagement, and connecting with government agencies. Therefore, this a good indication of the potential uptake of e-commerce, e-participation, and e-government services among low-income households. The participants' internet usage contradicts most studies which indicate that when underprivileged communities are provided with free internet access, they primarily use it for entertainment activities such as watching movies, playing games, or consuming adult content (Kiri & Menon, 2006; Toyama, 2011).

During the analysis of the data collected by the study team using semi-structured interviews, it was noted that all the eighteen study households had reached the conversion stage of the internet access resource tools domestication process, which is the final phase in the domestication theory. These households' family members were proud of themselves and happy to be enjoying the benefits of living in the Information Society. It was noted that the problem of limited digital infrastructure resources such as the constant supply of electricity affects the domestication of the internet access resource tools among the marginalized urban communities. The results also indicate a huge success in the study's digital literacy training program. This contradicts Chigona et al., (2010) where there was the challenge of successful progression of the study participants through the domestication process from commodification to appropriation and eventually to conversion stages. During the conversion stage of the domestication approach, sharing of ICT resources among the users is common. Similar to the studies by Hahn et al., (2008), Y. Chen (2013) and Letsie et al. (2015), the study found that the participating household members were sharing the ICT resources with their neighbors. The study also resonates with Kibere (2016) where mobile phone and mobile internet appropriation was achieved.

The study has provided empirical evidence for the successful use of the domestication approach in closing the urban digital divide in Nairobi County. In particular, it has managed to demonstrate that availing the internet access tools and computer literacy skills play a major role in influencing internet use, hence closing the urban digital divide. The study also reveals that use of the internet can con-



tribute positively to the quality of life for the residents of low-income households in urban areas. This supports earlier study where it was suggested that ICTs contribute to poverty reduction (Oxfam, 2009). Silverstone (2006) suggests that the process of conversion involves the development of skills, competencies, literacies, and the sharing of the pride of ownership. This is clearly demonstrated when one of the Household 4 family member can store the family photos in the cloud where he can still access them even when the project resources are no longer available for his household use. With the households using and also sharing the internet access resource tools with their neighbors, this is a positive way towards closing the urban digital divide.

### ***BARRIERS TO CONTINUED USE OF INTERNET AT HOME***

The participants were asked to specify any barriers to their intentions to continue using the internet. They indicated that use of the internet is expensive, while owning internet access devices is hampered by lack of electricity at home and fear of theft or losing the device. They indicated that internet safety was also a challenge as there are risks associated with how they can safely manage their online experiences and in dealing with uncomfortable and inappropriate online content.

From the study participants, the high cost of using the internet is also a major barrier to adoption of internet among the marginalized communities. This corresponds with other studies where the cost of using the internet was identified as a hindrance to its widespread usage (Wamuyu, 2017; Wyche, Forte, & Schoenebeck, 2013). Waema and Miroro (2014) also suggest that ICTs as a tool for poverty reduction is limited by the high cost of initial purchase and maintenance of ICT equipment. The study results shows that digital divide exists in Nairobi; left alone, the situation could get even worse, as Toyama (2011) indicates in his theory of technology as an amplifier that “technology helps the rich get proportionately richer, thus widening, and not narrowing, the gaps between rich and poor” (p.77).

### **TRUSTWORTHINESS OF THE STUDY**

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The credibility of a study is the degree to which the findings represent the true meanings of the descriptions of the primary participants (Lincoln & Guba, 1985). To establish the credibility of the study results triangulation and member checks were done. Creswell and Miller (2000) indicate that triangulation could be achieved by using different data collection strategies such as interviews, focus groups, or observations. The study achieved this by using different methods of data collection including surveys, record keeping, and semi-structured interviews. Member checking involves corroborating the research findings by seeking feedback from the study participants (Creswell & Miller, 2000). To complete member checking the study results were given to the study participants for a review of the accuracy of the content and to ensure that the study results and analysis reflects their views. Copies of Table 6, Table 7 and Table 8 were presented to eight different study participants, with each respondent examining whether the information they presented forms the basis of the study results. The eight participants agreed that the analysis was a true reflection of their views.

Confirmability refers to strategies used in limiting biases by ensuring that the data represents the information participants provided. Polit and Beck (2010) indicate that any study findings must represent the participants’ voice. The eight study participants were also given a summary of the study results, analysis, and discussions to confirm the researchers reporting of the study findings and to establish the trustworthiness of its conclusions. The participants agreed that there was no bias or subjectivity in the study results and their interpretation.

### **CONCLUSIONS**

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Despite the proliferation of mobile internet access in Kenya, the digital divide still exists between those living in low-income neighborhoods and those living in more affluent parts of Nairobi. This digital divide could continue to increase as the government is spending millions of shillings in the

provision of Digital Learning Program in government primary schools only. Most of the children from the low-income neighborhoods are missing out on this program as they usually attend the Alternative Provision of Basic Education and Training (APBET) schools and church sponsored schools, which are the main academic institutions in the Mathare slum. These institutions lack basic facilities and cannot afford internet access or digital literacy skills training for their pupils or the neighboring communities.

Fong (2009) indicates that “bridging the digital divide has implications regarding fostering economic equality, educational potential, and earning potential” (p. 472). The study has shown that it is possible to narrow the urban digital divide among the low-income communities in a developing country where there are many social and economic inequalities using the domestication approach. The selected households were provided with internet connectivity and digital literacy training and successfully went through the internet domestication process. This is an indication that urban digital divide is a social, economic problem which requires policy interventions aimed at poverty reduction and sustainable development.

This paper makes a practical contribution in that, while there have been many studies on digital divide between Africa and the rest of the world (Olatokun, 2008), within the African continent (Fuchs & Horak, 2008; Oyelaran-Oyeyinka, & Adeya, 2004; Unwin, 2005), among genders (Kvasny, Payton, Mbarika, Amadi, & Meso, 2008), and between rural and urban areas at national levels (W. Chen & Wellman, 2004; Donnermeyer, & Hollifield, 2003; Furuholt, & Kristiansen, 2007; Rao, 2005), there are few studies exploring urban digital divide and especially among the marginalized communities in the low-income urban areas such as Nairobi.

## RECOMMENDATIONS

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Best (2004) suggests that the “internet should be a human right in and of itself” (p. 23) and this study recommends that the government of Kenya should fill the digital divide gap that exists in its cities by providing the low-income urban communities with access to the internet. Wolcott, Press, McHenry, Goodman, and Foster (2001) indicate that the internet is not a single innovation but a cluster of related technologies that must be present together, making it not easy for households in low-income communities to get. People who do not have access to the internet should be motivated through user training, provision of the right infrastructure, and offering them affordable ICTs access packages. The government should also look for mechanisms by which low-income communities can have access to the internet and related technologies.

The Kenyan Government, non-governmental organizations, and private organizations are all investing in ICTs as they seek to provide their services online. However, these services access and usage among the low-income urban communities depends on the availability of the requisite resources including internet access hardware and digital literacy skills. The UN Sustainable Development Goals (SDGs) indicate that the global leadership is committed to endeavor for universal and affordable access to the internet in the least developed countries by 2020. Therefore, the Kenya government should seek to provide internet access services for the marginalized Kenyans by availing resources for the last mile connectivity and internet access. This could be done by introduction of affordable requisite ICT and related infrastructures among the marginalized communities with the objective of providing digital literacy and internet access for all.

Kenya is regarded as a mobile nation due to its success story in mobile money adoption (Wamuyu, 2014). The absence of an ICT inclusion policy is, therefore, a huge setback to the achievement of the Kenya vision 2030 (Government of Kenya, 2007). A digital inclusion policy should be developed to prioritize digital literacy training, to promote universal internet access for all Kenyans, and to elucidate the social-economic benefits of internet access. The policy interventions should also include the means to measure and prove the value of any initiatives aimed at closing the digital divide. Policy

makers should also explore ways of introducing digital literacy and media literacy skills training so that the Kenyan people have the requisite skills to use online services.

Through differentiated Internet services (DIS), one ISP has continued to provide internet access options that meet the small budget and personal internet access needs for individuals living among the marginalized communities while making marginal profits, a win-win approach. This is what other ICTs' infrastructure and service providers should seek to achieve by providing affordable internet services to the urban low-income and other marginalized communities.

## LIMITATIONS

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This study has two limitations. First, the study did not take into consideration the education levels of the participants. Oxfam (2009) suggests that the degree of education of household members positively influence ICT access and use. Lee (2001) also indicates that making internet access available, even if it is free, to people who are not literate is useless. However, the study worked with the presumption that only basic literacy was essential in being part of the project as computer self-efficacy and internet self-efficacy were to be developed in the course of the digital literacy training program.

Second, the study did not take into consideration the age differences among the participants. Age has been found to be a significant factor in influencing the use of information systems. Similar to this study, different age groups were considered to use ICTs in various ways by Y. Chen (2013). Household 18 members adopted the ICT resources to fit their individual lives and used the resources for different purposes based on their age groups. However, the study sought to examine the domestication process at the household level which meant that the ICT resources would be shared across different ages within the family.

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## APPENDICES

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### APPENDIX A

#### Basic Computer Skills Assessment Questionnaire for Potential Learner

Please answer the questions honestly and to the best of your ability. Your teacher will use your answers to plan what you will learn in computer class. There are no right or wrong answers.

#### Demographic information

1. **Indicate your gender**                      Male                          Female   
 2. **Age**    15-19        20-24        25 -30        More than 30   
 3. **Education**

- I have finished Primary School?                      Yes                       No   
 I have finished High School?                      Yes                       No   
 I have finished College?                      Yes                       No

#### Access to ICTs

#### 4. Access to Mobile Devices

- I have a mobile phone?                      Yes                       No   
 My phone can access the Internet                      Yes                       No   
 My phone Number or my contact phone Number is (*Optional*): \_\_\_\_\_

#### 5. Access to Computers

- Do you have a computer at home or have access to a computer?                      Yes                       No   
 Can you use a word processing program to write a letter or paper?                      Yes                       No   
 Are you interested in learning how to use computers?                      Yes                       No

#### I want to take a computer class because:

- I've always wanted to know about computers and now I have the chance.                      Yes                       No   
 I need to use a computer to look for a job or for a future job.                      Yes                       No   
 I would like use computers to highlight issues in my community.                      Yes                       No   
 I need to use a computer to manage my responsibilities.                      Yes                       No

#### 6. Access Internet

- Do you have the Internet access at home?                      Yes                       No   
 Who is your Internet Service Provider? \_\_\_\_\_  
 Do you have any access to the Internet?                      Yes                       No   
 From where do you access the Internet? \_\_\_\_\_  
 If you are given a web address, can you go to a specific website to find information?                      Yes                       No   
 Do you have an email account?                      Yes                       No                       **email address (*Optional*):** \_\_\_\_\_  
 Can you send, reply to, forward, and print an email?                      Yes                       No

#### 7. Use of Social Media

- I use Facebook    Yes     No                       I use Twitter                      Yes                       No   
 I use LinkedIn    Yes     No                       I use Instagram                      Yes                       No   
 I use WhatsApp    Yes     No                       I use Google+                      Yes                       No   
 I use Snapchat    Yes     No                       I use YouTube                      Yes                       No

#### 8. Chama membership

- I am a member of a Chama    Yes                       No                       Chama name: \_\_\_\_\_



**APPENDIX B****Case Studies Interview Guide**

1. On average, how many hours per day do you spend on the Internet?
2. What do you use internet for?
3. On average, how many webpages do you visit per day?
4. What do you like doing online?
5. How often do you use internet for the following activities?

<b>Online Activity</b>	<b>Everyday</b>	<b>More than once a day</b>	<b>Once a week</b>	<b>Once a month</b>
Watching news				
Chatting and Social Communication				
Citizen participation (Commenting on newspaper websites, political forums, open debates)				
Contacting government agencies (e-government)				
Online Shopping				
Information Search				
Games and Entertainment				
E-mails				
Academic and Educational activities				

6. Do you believe that internet access can help improve your entire family life?
7. How would you describe your proficiency in the following activities based on your digital literacy training classes?

<b>Digital Literacy skills</b>	<b>I cannot do this</b>	<b>I can do this with some assistance</b>	<b>I can do this independently</b>	<b>I can teach others how to do this</b>
Using a search engines such as Google, Bing, to search for information on the web				
Creating a blog				
Video streaming				
Using a Word-processor				
Using Spreadsheets				
Using Presentations				
Using Calendar				
Describe components of a computer				
Use of social media such as Twitter, Facebook, or Instagram				

8. Where will you access the internet after the project?
9. Please state 3 challenges that could impede your intentions to continue using the internet after the project?

## BIOGRAPHY

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