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Research Paper

The influence of digital inclusion and exclusion on individual's perceptions of well-being and living their desired life in rural areas

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Abstract

The purpose of this research is to provide insight into the outcomes that digital inclusion facilitates on well-being and quality of life for individuals living in rural areas. This study moves beyond 'access' to Information Communication Technologies (ICTs) towards the meaningful use of ICTs that enables digital inclusion.

The objectives of this study are to identify the ways in which technology influences perceptions of well-being and if this contributes towards living of the desired lives for people in rural communities. This study followed an explanatory approach. This strategy was used as it seeks to gain insights into issues of technology in rural areas, digital and social inclusion which are not being researched widely especially in a rural context in order to understand them better and draw conclusions. This study used the Capability Approach as its theoretical lens to create a unique conceptual framework which explains the relationships between the concepts, the nature of the relationships and why these exist.

Key findings include the influence that age, income and education have on digital inclusion. Older participants did not necessarily use technology and the internet less nor did people with poor education as suggested by prior literature. Though some participants had poor education, they were not illiterate as they could read and write which makes them teachable and probably explains while they were engaging with technology quite remarkably. However, low-income earners used less technology and often has non-internet enabled phones which is consistent with most literature.

Three distinct type of users were identified based on ability and were categorised as poor, fair or good. However, regardless of ability, an interesting trend emerged regarding the type of usage. Two usage types were identified; desired and forced. *Desired usage* was where users engage on internet to perform tasks that they want to when they want to whereas *Forced usage* describes usage where a user had to engage on the internet due to there being no other alternative for the user. Examples identified include how certain transactions like banking could no longer be done in the traditional way because there are less branches.

A key trend identified in the study was that of engagement through others. Various reasons were identified why people engage through others namely capability, necessity and choice. Some people engage through others because they do not have the ability (capability) to engage directly themselves while others will engage through others due to circumstances beyond their control such as connectivity issues (necessity). Others choose to engage through others because there are other people who can perform required tasks for them (choice). It was also identified that the location of the users plays a big role in how they engage resulting in varying levels of usage depending on location. Users might have access to better connectivity such as Wi-Fi when in one location as opposed to 3G connection when in another place.

Digital desires of participants interviewed included better devices device with more functionality (internet-enabled devices for those who did not have them), additional devices such as tablets and laptops as well as better internet connectivity such as Wi-Fi for those actively using the internet.

In conclusion, it was found that most people viewed technology as having positive influence on well-being and used it for a range of needs such as business use, social use, communication, information seeking and job seeking, thus creating convenience even in rural communities.

Key contributions of the study include a conceptual framework which is derived from a combination of the synthesized models of Helsper's (2013) access, skills and attitudes together with the 5 C's as defined by Bradbook and Fisher (2004). New ideas are then added to the framework based on the findings creating new unique concepts such as type of digital inclusion (direct/self vs indirect/through others) and reason why people engage through others. These concepts can be ratified to see if they can be evidenced in future studies as well as used as inputs to other studies given limited literature available on these topics.

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Chapter 1: Introduction

Globalization and the rapid changes in technology have led to concerns about the widening of the digital divide, especially within vulnerable groups such as people in developing countries, people living in rural areas, low-income groups, girls and women, disadvantaged young people, older people and disabled people (Tinio, 2003; Zheng and Walsham, 2008; Goggin et al., 2018). Vulnerable groups mentioned are estimated to be 20% behind the average (Goggin et al., 2018). Technology and globalization result in a need for people to continuously learn and acquire new skills. This is essential to remain relevant and avoid missing opportunities to grow personally and professionally in a changing world. Information and communication technologies (ICTs) present the opportunity to access information anytime and anywhere (Livingstone, 2012). Thus, technology adoption becomes an important factor in improving access to information (Tamboto et al., 2015).

Emerging studies show that the world is moving beyond a focus on access to ICT/ the digital divide where the focus was on the gap between the technology 'haves and have-nots', towards digital inclusion (Parsons and Hick, 2008; Goggin et al., 2018; Ragnedda, 2017). Access to ICTs alone has become insufficient to determine digital inclusion but has become a first step in so doing (Ragnedda and Muschert, 2013; Goggin et al., 2018). It has become clear that the digital divide is not only concerned with availability of ICTs but rather the social issues which affect people's access to and use of ICTs (Warschauer 2003). This has led to second and third levels of the digital divide which need to be encompassed into studies with the first level of digital divide being that of access (Goggin et al., 2018). In addition, the relevant hardware and software must be available to literate users who will be able to use the technology effectively (Goggin et al., 2018). Some of the key reasons that have led to the recognition of the need to move from the digital divide to digital/social inclusion include the power of ICT to bridge the gap between marginalization vs digital inclusion and ICT becoming a key part of life in society (Warschauer, 2004; Ragnedda, 2017). According to Goggin et al., (2018), digital exclusion in any form has severe consequences for both individuals and society for all people regardless of their status.

The aim of this study is to understand how digital inclusion and exclusion influences people's perceptions of well-being, goal achievement and living the life they want to in rural areas through exploring concepts such as opportunity, ability, engagement and digital choice.

Significance/Research Gap

Even with the increased use of technology, information access and exposure to technology remains a challenge in many rural communities (Mtega, 2012). Where technology has been adopted, there are many debates regarding its benefits to society and to quality of life (Mo et al., 2015). It is generally accepted that people in marginalized communities have always struggled with issues of social inclusion within the realm of internet and connectivity. Goggin et al. (2018) state that any benefits that ICTs and the internet provide to people are not evenly distributed among all people depending on their circumstances. Wide use of the internet in rural and marginalized areas can contribute to poverty reduction and tangible benefits for people living in these communities (Beijing Review, 2018). There is a need to investigate the use of technology and the internet and the outcomes it may facilitate for its users such as well-being and agency freedom. There is also a need to explore the role that digital choice (explored later in this paper) plays on well-being and agency freedom.

Studies of digital inclusion such as those conducted by Helsper (2013) and Sen (1992) have mainly focused on non-African contexts, with few studies conducting research in the context of developing countries and

where little financial resources are available. Goggin et al., (2018) state that digital inclusion means different things to different people across the world, emphasizing the need to understand it in the context that it is being studied. This research fills a gap of studying digital inclusion within the African context and specifically a Zimbabwean perspective, as well as providing a perspective from developing countries. This research also adds to what Goggin et al. (2018) term as the second level of digital divide to understand inequalities in the access and use of ICTs which is likely to be evident in rural areas, as in the case in the community being studied. Goggin et al., (2018) state that the interaction that individuals have with ICTs shapes their quality of life given the increase in the reliance that day to day life has on ICTs. This study provides an investigation into understanding if this is the case in the community under study.

Literature suggests that regardless of levels of internet use among individuals, socioeconomic backgrounds play a role in determining if users can use ICTs to create value and meaning beyond access into tangible or social benefits (Ragnedda and Ruiu, 2017). Any inequalities or social privileges apparent between individuals are emphasized by the second level of digital divide. Individuals in a privileged position in society either socially, economically or better educated are likely exploit the benefits that ICTs have to offer more than people who may not be in such a privileged position, which is likely to exacerbate any existing privileges (Goggin et al., 2018). This study comprises of people of various socioeconomic statuses allowing the phenomenon of the second level of digital divide to be assessed to see if it holds true in this context.

Research Questions and Objectives

Problem Statement

Technology has become an integral part of life for many individuals around the world and its impact has been widely accepted as positive (Sutton, 2013). While technology and the internet has been adopted and used extensively in certain parts of the world, not everyone has been included in this wave of digital inclusion. Those left behind include a significant number of people living in rural areas due to issues such as poor education and low income (Helsper, 2013; Van Deursen and Van Dijk, 2015). People living in rural areas are identified as particularly not being able to harness the power and benefits of ICTs (Goggin et al., 2018). This has resulted in scenarios where some people in these areas have the means and opportunity to become included while others do not. This is a problem as technology continues to evolve, issues of inclusion can only get worse (Mtega, 2012). However, there is a need to explore why others have decided not to be included and not to use the internet (Eynon and Helsper, 2011). This research project explores the factors that influence inclusion in rural areas and if technology plays a positive role in their lives as suggested by literature. This will be done by outlining how technology can influence the perception of achievement of well-being and desired quality of life for people in rural areas. The concept of digital choice and its impact on inclusion also requires further exploration in order to understand if why those who have the means to use the internet choose not to. Furthermore, the impact that such choices have on well-being need to understood to see if people who fall within this category feel excluded.

Purpose

The purpose of this research is to provide insight into the outcomes that digital inclusion facilitates on well-being and quality of life for individuals living in rural areas.

This study moves beyond ‘access’ to Information Communication Technologies (ICTs) towards the meaningful use of ICTs that enables digital inclusion.

Research Questions and Objectives

This research will answer the following research question:

1. How does digital inclusion/exclusion influence individual's perceptions of well-being and living the life they want to in rural areas?
    a) Are there any factors that play a role in the varying depth of inclusion or exacerbating exclusion? This includes understanding the influence of the ability and engagement levels of individuals on the depth of inclusion. *Depth refers to how included a person is – fully or partially.* **[Digital Inclusion/Exclusion, Ability and Engagement]**
    b) In what ways does capability deprivation result in digital exclusion? **[Capability Deprivation]**
    c) What are the reasons that people who can be digitally included choose not be (voluntary non-inclusion)? **[Digital Choice]**
    d) What are the challenges that people face on the journey to digital inclusion (if desired)? **[No Opportunity | Continuity]**
    e) In what ways can people lacking access and connectivity be assisted to become included? **[Continuity]**

The objectives of this study are:

- To identify the ways in which technology influences perceptions of well-being and living the desired lives for people in rural communities
- To understand if people in rural areas view technology/digital inclusion as contributing to living their desired lives/achievement
- To identify factors that influence individuals' depth of inclusion
- To understand what influences digital choice for different people living in rural areas
- To explore options to promote the ICT use (continuity) in rural communities

Chapter 2: Literature Review

According to Van Dijk (2006), the digital divide can be defined as the gap between people who have access to technology and those who do not, with the most common forms of technology in question being computers and mobile phones. However, it has become evident that the digital divide is larger than physical access to ICT as previously emphasised, but encompasses the support structures and resources required to ensure that people are able to use technology in meaningful practices (Warschauer, 2004). This has brought about the rise of the concept of digital inclusion as access to technology alone is not enough. There is a need to explore broader issues that influence the access to and use of technology that contributes towards building a society where individuals can pursue and meet their goals in rural developing areas as opposed to urban developing areas.

The literature review will cover key definitions used for this study namely those of social inclusion/exclusion and digital inclusion/exclusion. It also covers typical challenges in achieving digital inclusion within the context of rural communities. The theoretical framework used (Capability Approach) is explained in conjunction with key literature that translates into the conceptual framework used in this study. The concepts within the conceptual framework such as digital choice and aspects of ability, engagement and digital choice are also explained.

Rural areas and ICTs in the context of this study

This section outlines what is considered a rural area in the context of this study. It also describes what is termed ICTs in this study.

Rural area – Rural areas are areas which are not considered as being within an urban area (towns or cities) – anything that is not considered as urban is thus rural. Rural areas are often farming or agricultural areas (U.S. Census Bureau, 2018). Rural areas in the African context are different to those in the West and other developed countries. Where you might find infrastructure and servicing in rural areas in the West, rural areas in Africa usually to have any services and have little to no infrastructure.

Technology/ICTs – For purposes of this study, technology comprises of the device/platform that is used for various functions including to access the internet. Technology also includes the type of internet connection that a user has for example broadband, wireless or 3G. For purposes of this study, the device that will be considered as part of this project are mobile phones, tablets and personal computers.

Community Context

The setting of this study is a rural/farming community of Somabhula, Zimbabwe, which was used to understand the phenomena under study.

Somabhula is a rural area in the Midlands province in Zimbabwe. It is about 40 kilometres away from the closest city of Gweru. The area comprises mainly of farmers and farm workers. It has a small number of civilians who mainly work in the public sector such as at the Railway Station, in schools, and at the post office. Regardless of the rural nature of the area, the area comprises of a few schools, a township with a few shops, a railway station and a community clinic. This community was selected because of the diversity it presents towards the study with a range of people living within the community with varying levels of education, occupations and income generating activities as well as various age groups. The diversity that this brings provides richness to the study and was used to put disadvantage into context for purposes of the study.

Bread and butter issues remain the core focus of people living in Somabhula. The few people with qualifications do not earn high salaries and none can be considered as wealthy. The majority of residents are farm workers with little education (most completed primary school with a few having gone through a few years of high school). On the other hand, the farm owners bring about a unique aspect of diversity of this community to contrast the majority of the residents in Somabhula and the average community member who is likely to have poor education and be working on one of the farms as a farm worker.

Some of the community members in Somabhula do not live here on a permanent basis. This is usually the case with farmers who often have other homes in the city where they live on an alternate basis to their farms. This applies to the family members as well whom they live with at intervals on the farm and in the city.

Some of the key challenges that Somabhula residents are faced with on a day to day basis are service delivery driven. There is load shedding for extended periods of time – in some cases days. Connectivity is a challenge and people need to know the areas with better connectivity in order to complete tasks that require connectivity. There are grave fuel shortages in Zimbabwe therefore travel to neighboring towns is restricted unless essential, therefore travel needs to be planned carefully. Regardless of these challenges, residents here have accepted these conditions as their 'normal' and try to live normal lives as much as possible.

Social Inclusion and Exclusion

Social exclusion is defined as 'the process through which individuals or groups are wholly or partially excluded from full participation in the society within which they live' which is important to a person's integration in society (Rawal, 2008; Byrne, 2005). Warschauer (2003) identifies that social exclusion may be a result of any of the broad issues in the following categories; digital, social and individual, geographic, community, cultural, economic and organisational. Levitas (2006) also provides categorisation of social exclusion into three main categories which are resources, participation and quality of life. Examples within these categories are material and economic resources, access to services, participation in economic, social and political activities as well as well-being and living conditions (Levitas, 2006). A person may be fully or partially excluded within the various categories of exclusion (Byrne, 2005). All the factors mentioned are important in the context of digital inclusion as they play a key role is determining how meaningful the access to ICT is; specifically the impact that ICT may have on helping people live the life they want to for example with regards to access to resources, participation, and quality of life (Warschauer, 2004). These factors are interrelated therefore there is a need to consider them holistically and their role in the achievement of social inclusion. The use of ICTs is a tool towards social inclusion (Goggin et al., 2018).

The provisioning and distribution of technological resources has resulted in the need for assessment of a wide range of societal issues such as social inclusion and exclusion as it has become accepted that information communication technologies (ICTs) have a role to play in addressing social deprivation issues and often have a positive impact on societies (Zheng and Walsham, 2008). This is part of the reason why individuals who suffer from a combination of social disadvantages including no meaningful engagement with Internet-based services may be said to suffer from 'deep' social exclusion (Bradbook and Fisher, 2004). Deep social exclusion is defined as a culmination of disadvantages that prevent users from access and use of ICTs and the internet (Bradbook and Fisher, 2004). This shows that IT plays a role in shaping social inclusion.

Access to information is one of the important factors in creating social equality as it empowers people through ICTs (Bradbook and Fisher, 2004). ICTs can either make a positive or negative contribution towards

social exclusion as they have the potential to either bridge gaps or exacerbate social exclusion. According to Bradbook and Fisher (2004), the role that ICT use plays has even been considered together with basic skills like literacy and numeracy, emphasizing its role in social inclusion. ICT unlocks opportunities and helps fulfil potential in individuals. Reasons such as these are some examples of why communities that face social exclusion are likely to also face digital exclusion (Bradbook and Fisher, 2004).

Social exclusion is not limited to deprivation that results from the traditional issues such poverty and lack of employment but a host of issues which may prevent people from accessing opportunities or means to achieve desired well-being "in the terms that are important to them" (Zheng and Walsham, 2008). A combination of different disadvantages such as gender, disability, poor education, occupation, low income, unemployment and perhaps age only worsen social exclusion and usually result in the variance of internet skill and usage (Helsper, 2013; Van Deursen and Van Dijk, 2015). Factors such as age, education and economic conditions play a role in determining usage of ICTs (Robinson et al., 2015). For example, people who have better education are expected to have better skills in using ICTs and the internet (Van Deursen and Van Dijk, 2015). In their research, Wagg et al. (2019) find that there is greater inequality of access among women compared to their male counterparts and this disparity was more apparent in rural areas. The above are examples of digital exclusion due to several factors. This shows that digital exclusion is involuntary, and not a result of an individual's choice (Eynon and Helsper, 2011).

Digital Inclusion

Digital inclusion relates to social inclusion within the realm of Information and Communication Technologies (ICTs) (Bradbook and Fisher, 2004). It consists of the activities that all individuals perform in order to access ICTs and use them in a meaningful and beneficial manner (Wagg et al., 2019). Digital inclusion must also ensure that individuals from disadvantaged groups have access to, and skills to use ICTs and are therefore able to participate in and benefit from today's growing knowledge and information society (Bradbook and Fisher, 2004; Ragnedda and Ruiu, 2017). Digital inclusion is not simply about access to ICTs but their proper use (Goggin et al., 2018). Digital inclusion presents unique advantages to users that result in improved quality of life through access to ICTs. Examples of such advantages include increased participation in social issues, access to information and preparing users for employment in the modern world (Goggin et al., 2018). Digital inclusion can thus be seen as a toolkit to improved quality of life. Martin et al. (2016) highlight that both access and skill to use ICTs are important as the lack of either of these could prevent a fuller digital experience. Digital inclusion needs to be studied in context and include other relevant factors that are specific to the area in which the research is being conducted such as the local language, appropriate content, literacy levels as well as other social structures existing in the community to be analysed (Bradbook and Fisher, 2004).

Frequency, skill and usage are metrics that are used to measure the level/extent to which IT is used and thus extent of inclusion (Bradbook and Fisher, 2004). The extent of inclusion can be measured through categorisation of several types of internet users as defined by Helsper (2008). These are listed below:

- **Basic users** – These are users that understand basic internet use and have access to the internet.
- **Intermediate users** – Intermediate users are users who may perform more complex tasks on the internet.
- **Mid-Age Low users** – Users who have reliable access and may have own computer and are willing to engage with ICT and internet.
- **Social users** – Users who use the internet mainly for entertainment or sociall purposes – likely to be young people.

- **Elderly Socially Isolated** – Elderly users who are not good with technology and do not use ICTs and internet. These people are likely to have very basic mobile phones likely not to have internet access.
- **Multiple/Deep Exclusion** – People in this category have little or no access to technology and do not possess any IT skills. These users are likely to be socially and digitally excluded and not interested in learning technology skills.
- **Economically Disadvantaged users** – These users are likely to be young with low incomes and limited technology.

The type of activities that people perform on the internet can also be categorised as follows (Helsper, 2008):

- **Basic or practical users** – These users use the internet mainly for information seeking and communication.
- **Participatory users** – These users may use the internet to perform various activities such as access to financial services.
- **Advanced users** – Advanced users will typically use the internet for a range of tasks, which may include connecting with people beyond their immediate network such as accessing social media. Advanced users will perform these tasks in addition to tasks that basic and participatory users may perform.

Helsper's (2008) study is conducted from a developed country perspective but the concepts are not unique to that context and are relevant to this study which has the setting of a developing country. Key differences are likely to be skill and technology access of participants but the categorisation created in Helsper's (2008) study remains relevant as it caters for all user types from basic to advanced users. Helsper's (2008) study is applicable to this research as the concepts used can be applied in a different setting to provide a basis for comparison of findings.

Digital Exclusion

Poor access to ICTs (digital divide) in rural areas has worsened disadvantages that people face and reinforced digital exclusion. Issues of technology literacy and skills have also exacerbated the resulting situation of digital exclusion (Warschauer, 2003; Wilhelm, 2004). Digital exclusion results in unequal access to ICTs, which limits individuals' ability to participate in society (Martin et al, 2016). Digital exclusion maps well to social exclusion as promoting digital inclusion is often about solving social exclusion issues (Bradbook and Fisher, 2004; Martin et al., 2016).

Reasons for digital exclusion

Research conducted by Bradbook and Fisher (2004) shows that some of the reasons why people are not digitally included are; they may simply not be interested in using the internet and technology, limited/no access to the internet, inadequate skills to use the internet and with 39% expressing that they simply cannot afford it. Goggin et al. (2018) finds that the key reasons for digital exclusion are no access to ICTs, lack of ability to use ICTs as well as the lack of means to derive value from ICTs. There are people who may 'dip in and dip out' based on their circumstances resulting in instances where they are included and others when they are not (Helsper, 2013). There are also people who cannot be said to be excluded as they can access the internet via a 'proxy user' who is able to access the required information for them.

Helsper (2013) identifies a group of people categorised as "unexpectedly excluded". This is a group of people one would expect to be using the internet frequently due to factors such as education levels and general access to the internet but do not. This can be considered as "voluntary non-inclusion" as these

people have the means to be included but choose not to be. This is in line with the concept of a 'digital choice' that is introduced by Helsper (2013). 'Digital choice' can be defined as the considerations to engage or not in digital material. Factors influencing an individual's 'digital choice' may be cultural or societal. Reasons that may influence the 'digital choice' include preferences in communication, lack of skills, limited/no access and lack of trust in ICTs (Martin et al., 2016). For other people, technology does not add value to their daily lives which makes the use of the internet non-critical (Eynon and Helsper, 2011). The "unexpectedly excluded" show that non-engagement can be a result of digital choice (voluntary) or exclusion (involuntary) emphasizing the need for understanding the reasons for non-engagement.

Helsper (2008) also highlights that other people may not be included due to economic disadvantages they may face. Such disadvantages include low incomes and low levels of education especially among the unemployed. Other groups that are likely to be excluded are socially isolated people, disabled people and older people (Helsper, 2008).

Another study conducted by Helsper (2013), findings show that social disadvantage cannot always be equated to digital disadvantage. The study concluded that a young group of people who were socially disadvantaged was surprisingly highly engaged on the internet. Most of the people within this classification also had some form of education. This group has been referred to as 'the unexpectedly included' and has demonstrated that people from socially disadvantaged backgrounds may break inclusion barriers to become digitally included (Helsper, 2013). This group pf people contains people who would not be expected to be using the internet frequently and thus to be included. Given that the 'unexpectedly included' fall within the bracket of socially disadvantaged people, this shows that individuals can make a digital choice to engage or not to and social disadvantage may not always necessitate lack of engagement given that some who fall within this bracket are engaged (Helsper, 2013).

The journey towards digital inclusion

In light of the challenges that socially disadvantaged people face in becoming digitally included, Bradbook and Fisher (2004) identify three gaps which need to be addressed on the journey towards digital inclusion. These are supporting resources gaps, community-based gaps and leadership gaps. Supporting resources gaps arise when there is no support for individuals from bodies that can introduce ICT in communities for example initiatives that can introduce internet-enabled computers in public places such as libraries and schools. Community-based gaps are caused by initiatives that may exclude disadvantaged groups of people such as disabled people for example if computers are placed in public places for all community members to access, disabled people might not be able to go and access such resources in these places even if available. Leadership gaps are a result of misalignment among programmes that bring about more efficiencies if resources are used collaboratively. Leadership gaps may be prevented by ensuring that initiatives within communities are coordinated by a common leader such that efforts is not duplicated or resources wasted on similar or non useful initiatives. Bradbook and Fisher (2004) later provide the following recommendations to optimise the use of ICT in communities:

- Skills development for affected people
- Equipment to facilitate access to information
- Content and information creation
- Support for individuals interested in using IT for community projects

In addition to programmes that may improve inclusion in communities, rural communities need to make a conscious effort to learn about ICT and understand what this means for them (Jensen and Esterhuysen,

2001). The result that these communities can expect to get is potentially better standards of living and an improved economic status of the society (Bradbook and Fisher, 2004).

In addition, another lens that may be used to assist people on the journey towards inclusion are the characteristics of ICT access, skills, attitudes and engagement level with technologies identified by Helsper (2013) to determine inclusiveness. People are likely to have varying levels of mastery in these aspects and guidance must be provided as needed for example where the issue is access, facilitate programmes to enable improved access and where skills are a challenge, assistance must be provided to individuals to help them use the internet to improve their quality of life.

The above shows that the use of technology generally results in positive outcomes and better well-being for users in multiple aspects of life such as economic and social (Evans, 2019). This is evidenced by studies outside Africa (Bradbook and Fisher, 2004; Helsper, 2013) as well as several studies in the African context (Evans, 2019; Goggin et al., 2018; Ragnedda, 2017; Asongu and Le Roux, 2017). Evans (2019) finds that this is especially the case in the African context.

Challenges in using ICT in rural communities

Many studies have found that most rural communities have not been able to reap the benefits of using ICT due to underlying problems (Halili and Sulaiman, 2018). A key challenge is the cost of accessing technology where a large number of a people are living under the poverty line (Khan et al., 2012). Provision of services presents a big challenge as a good number of rural communities lack the communication and infrastructure needed to support ICT and internet use. Challenges such as these affect how communities will use ICTs (Goggin et al., 2018).

Khan et al. (2012) acknowledge that ICTs play an important part in society but that developing countries are still far from realizing their full benefits. Even with access to technology and the internet, developing countries face a range of issues such as not having the resources to support and maintain IT equipment. This means that people can be included on one day and not be included the next day. This is mainly linked to sustainability where projects that start with a big bang are quickly forgotten if they are not supported adequately (Khan et al., 2012). Attitudes and beliefs about technology also play a role in adoption and usage levels (Khan et al., 2012). The same research shows that those with better attitudes about computers tend to have better computer skills even if the limited resources in rural areas.

In the context of education, Helsper (2008) states that poor education creates a barrier in access to learning material using ICTs and the internet. This shows that before the issue of education and literacy is resolved, it may be difficult to move towards digital inclusion and ensuring that technology is used meaningfully.

Another danger of using ICTs to attempt to create digital inclusion is the potential to amplify underlying social issues and inequalities (Toyama, 2015). For example, if any form of technology such as computers are introduced in communities with poor literacy rates, computers might result in a shift of focus from improving literacy to improving computer literacy which is unlikely to be successful without basic literacy skills. Technology and the internet may not be the solution to social issues as these issues need to be dealt with first (Toyama, 2015). Given the goal to achieve digital inclusion regardless of the challenges explored above in rural areas, various frameworks in analysing digital inclusion are explored below. These frameworks are later used to put together a conceptual framework which can be used to analyse digital inclusion in rural areas.

Measuring levels of digital inclusion

Access, skills and attitude

Helsper (2013) categorises various factors that must be considered when analysing digital inclusion. These are ICT **access, skills** and **attitudes**. ICT **access** determines the location where people access the internet and the device such as mobile phone or PC, which all affect the quality of internet connection. Home access is generally considered as high quality access as it provides more freedom to its users to learn and develop their skills. The device/platform that is used to access the internet is also important as it differentiates the type of access that a user has for example broadband, wireless or 3G. **Skills** refer to the ability to use the internet to fulfil one's needs when using ICTs and the internet. Skill level can be measured by evaluating expertise in tasks that require ICT or internet use. **Attitudes** influence perceptions of the internet and thus its use, for example if a person is of the view that ICTs have a positive impact on quality of life, they are more likely to use ICTs. This means that an individual's attitudes about ICTs can "stimulate or hinder" how they engage with ICTs (Helsper, 2013).

The 5 C's of digital inclusion

Bradbook and Fisher (2004) define the 5 C's of digital inclusion that are used to assess how included an individual is. The 5 C's are outlined below:

1. **Connectivity** defines access methods to connect to the internet such as mobile devices or personal computers (PC). Connectivity also includes access method to the internet which may be wired or wireless (fixed or mobile). A fixed connection is usually faster than a mobile connection but has the disadvantage of not being usable when in a remote location.
2. **Capability** refers to technology/computer skills that can be used for meaningful purposes such as generating income for example through employment creation especially for those without formal education.
3. **Content** refers to the type of material accessed. Content delivered or shared online must be appropriate and relevant, especially in the case of disadvantaged groups given their education and background.
4. **Confidence** and motivation refers to the level of comfort that users have when using technology and motivation to continue doing so. Solutions are required to encourage non-users to start using the internet for their needs and to encourage users to continue doing so in rural communities.
5. **Continuity** ensures that individuals can use ICTs freely and there is ease of use in doing so. Initiatives that promote the use of ICTs and highlight its benefits should be promoted as well as removing barriers that may prevent people from using the internet.

The 5C's can be used to assess how included a person is and if this enables them to live they want to lead in the selected research community.

Figure 1 shows a synthesized model of Helsper's (2013) access, skills and attitudes together with the 5 C's as defined by Bradbook and Fisher (2004).

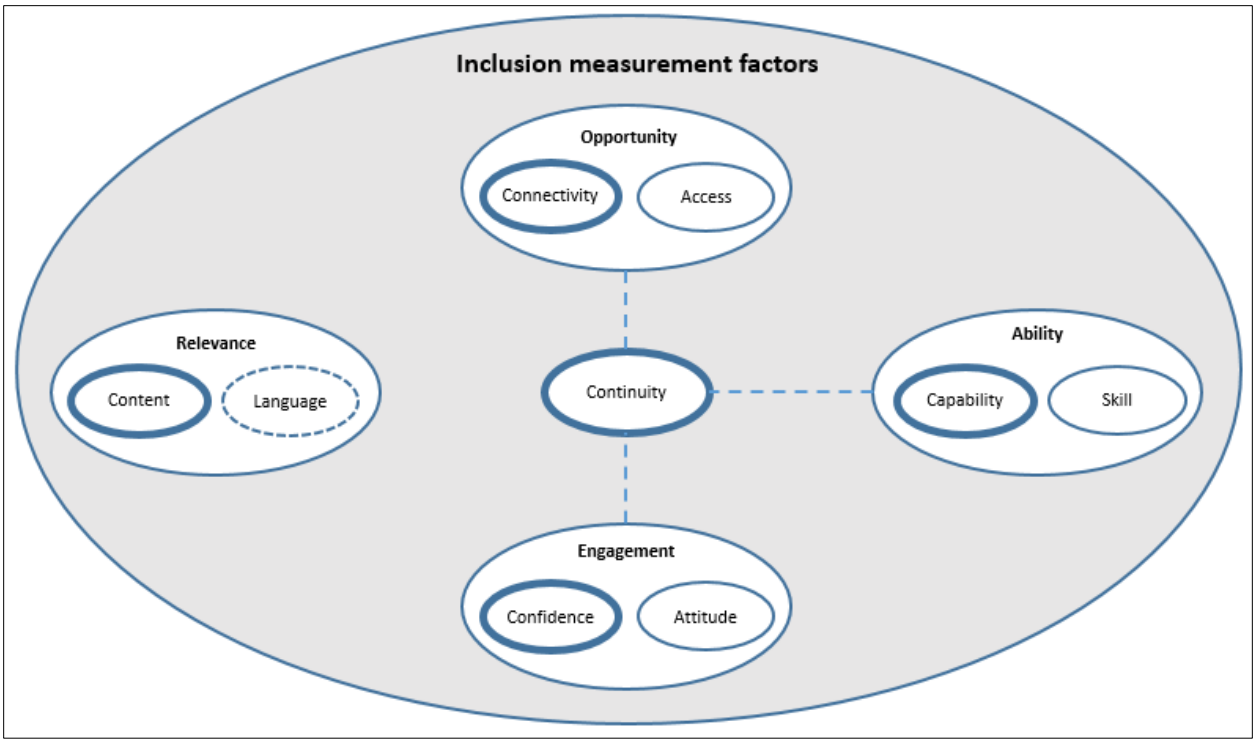

Figure 1: Inclusion measurement factors

Figure 1 shows the relationship between the two models which have been synthesized into four key concepts which are **opportunity, ability, engagement and relevance**. **Opportunity** determines what type of device an individual uses to access the ICTs and what kind of connection they have to the internet such as 3G or Wi-Fi. **Ability** refers to what an individual is able to do with ICTs and the internet i.e. their skill. Ability usually determines what an individual can use ICTs and the internet for such as social or professional use. The better one's ability to use ICTs, the more likely they are to use it for other income generating activities. **Engagement** comprises of a combination of factors that influence type of use, frequency of use and perception of ICT which culminate into how individuals interact with ICTs and the internet. As levels of engagement increase, ability is likely to increase as well as individuals learn new techniques. **Relevance** defines the extent to which the content accessible is applicable/relevant to the user and its contribution towards the achievement of the user's goals. Relevance is an important aspect in determining if individuals will use ICTs or not as well as the level of use (Goggin et al., 2018). The language that the content is offered in is of utmost importance as it is the difference between content that is understandable and contributes to goal achievement vs content which is not understandable and thus unusable. **Continuity** ensures that individuals can use ICTs freely and there is ease of use in doing so. There is a responsibility on policy makers and service providers to increase connectivity to make technology use seamless. Increased use of technology will improve access to a broader spectrum of people which may unlock new possibilities for people using the technology. Continuity has a dotted line relationship with all three of opportunity, ability and engagement as all three of these factors enable continuity which is key in digital inclusion. Research shows that rural areas face a particular challenge with continuity as training is not easily accessible and there may not be any public facilities available for internet use (Aires et.al. 2018). Without such training, digital inclusion cannot be achieved as digital literacy is required for users to be able to use ICTs effectively (Goggin et al., 2018).

Theoretical Lens

The viewpoint that is provided by Sen's Capability Approach (CA) is centered on what people are able to do/achieve i.e. their capabilities which translate into how people can create significance towards living their desired lives (Zheng and Walsham, 2008). A visual representation of the capability approach is shown in Figure 2 below.

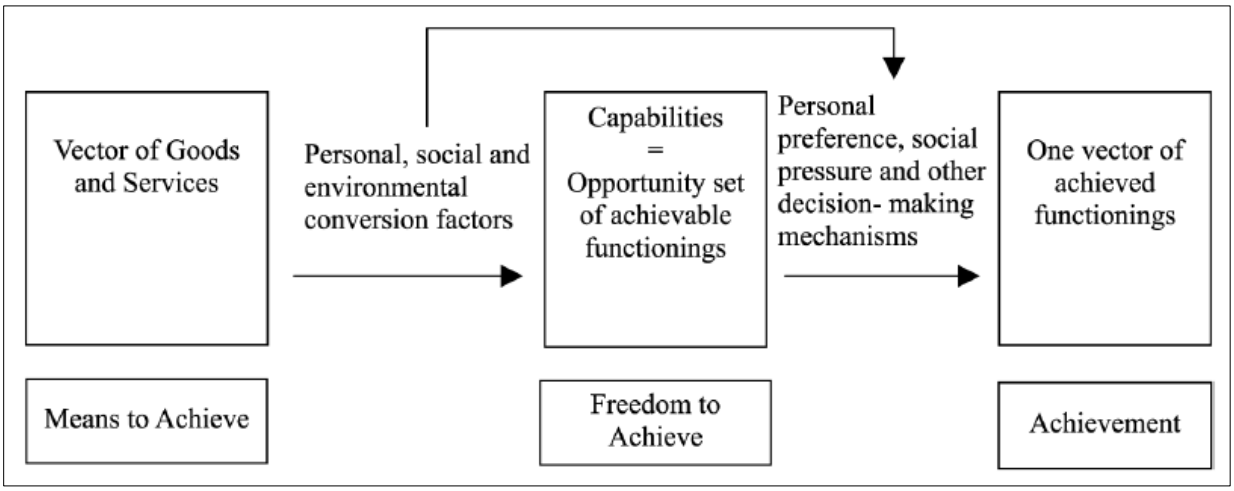

Figure 2: Capability Approach. Source: Zheng and Walsham, 2008

Sen (1992:40) defines a capability as a combination of functionings (realized achievements/expectations) of whether a person is able to live the kind of life they want. Goods and services enable people to generate capabilities using a combination of personal, social, and environmental factors (Sen, 1992). However, Sen (1999) further adds that what people are able to do and the kind of life they want to live is largely dependent on their freedom. This element of freedom dictates whether people have the means and opportunity to live the lives they want as well as create value in their lives. Sen (1999) thus views social issues such as poverty as the lack of freedom (unfreedoms) to perform activities which individuals would want to because of their situation, which affects their quality of life and what they can achieve. Sen (1999) also identifies that deprivation of any freedom adversely affects other freedoms.

In the Capability Approach, the 'means to achieve' can be seen as an input and first step to determine functionings available to a person. A combination of available functionings defines the person's capabilities. Capabilities can only be achieved if people have the freedom to enable the functionings required for them to live their desired lives. For example, a person may have a device such as a cellphone which is their '**means to achieve**'. With this device, their capability allows them to choose one of several methods (functionings) to communicate such as call, text message, chat platform such as WhatsApp or send message on social media if they have the '**freedom to achieve'**. The selected method of communication becomes an achieved functioning which enables 'achievement'. In this example, **achievement** may be a successful call to a friend to convey specific information. If the person did not have airtime to make the call, this may be seen as the lack of freedom to enable the desired goal/achievement. This shows that both capabilities and freedom to achieve are required for achievement.

According to Sen (1985), there are two perspectives from which capabilities can be viewed:

- Agency – Freedom and opportunities to pursue goals and interests.
- Wellbeing – One of the goals that a person may choose to pursue because of their agency. To achieve well-being, Sen (1992) provides that we need to consider what people are able to do. It is

important that this is viewed from the perspective of individuals as it is different for each person depending on their situation. Well-being means different things to different people. For example, books are a means for people to obtain information. However, it is important that the person who receives the book is able to read in order to obtain the information. A person who cannot read but who has book would still be without information therefore their well-being has not been enhanced in any way. Functionings can be used to evaluate the well-being of a person (Salais, 2003). In this example, a person who cannot read may obtain information by letting others tell them while a person who can read can read the book, possibly search the internet or even hear it from other people. This shows how the functionings available to a person can determine their well-being.

Sen (1992) views capability deprivation as aspects of life that could hinder people's capability to live their desired lives. Poverty is an example of a capability deprivation as it hinders a person's ability to live a good life. In the example above, the lack of ability to read can be seen as a capability deprivation.

Social exclusion and capability deprivation

Social exclusion results in the lack of **freedom**, which in itself is deprivation of other opportunities that a person could have had i.e. the deprivation of a **capability**. In this case, Sen (1992) argues that social exclusion results in '**capability deprivation**' i.e. where a person is deprived of **functionings**. Given the changing world in all aspects such as technology, economic, social and cultural perspectives, social and digital inclusion results in opportunities for people from diverse backgrounds to come together and share ideas, generate economic opportunities, and gain potential savings, better possibilities for educational progress and better potential for salary prospects, all from the use of technology. Any of these benefits of digital inclusion may result in many other additional opportunities being created on the back of this. As a result, exclusion may result in loss of opportunity as capabilities are never realized.

Model Selection Justification

Various models from various studies were reviewed to understand the best fit for this research project. The two models that were selected for purposes of the conceptual framework for this study are namely Helsper's (2013) access, skills and attitudes together with the 5 C's as defined by Bradbook and Fisher (2004).

Other models that were taken into consideration before deciding on the framework to be used as a basis for the study are the 'Digital Effectiveness' framework by Bellini (2018). Bellini (2018) introduces the concept of digital effectiveness which consists of three factors namely access, cognition and behaviour. Effectiveness is centered on how the use of ICT can result in desirable outcomes for individuals in human-technology interaction even where mastery of the technology is not high. Access refers to the conditions under which individuals access ICTs, cognition refers to potential to use ICTs fully and behaviour refers to practical use of ICTs to meet specific needs, which may include a decision not to use ICTs. Bellini (2018) starts with the digital inclusion of people within the digital society through access to technology as the first step in ICT use whereas this study is more focused on digital inclusion as an outcome/the end goal. However, there are some similarities in some of the terms used in the study by Bellini (2018) and the framework selected in this study such as access, opportunity and engagement which Bellini (2018) defines as effectiveness of use.

Another study that was reviewed is the 2014 study by Van Deursen and Van Dijk which identified various measures to identify digital inclusion. These factors are namely 'amount of internet use', 'motivations', 'age' and 'employment status' which are aligned to some of the factors that this study aims to investigate when measuring depth of inclusion. Van Deursen and Van Dijk (2014) propose a means to measure inclusion but

not a framework that shows all aspects that may affect inclusion. However, the factors to measure inclusion that they propose are used within the analysis of findings for this study. Another study which does not contain a framework but with concepts that have been adopted in this study is that by Robinson et al., (2015) who identified gender, age and different social groups as aspects that need to be studied in order to understand ICT usage. These concepts were included in the data collection and analysis of findings in this study in combination with other literature reviewed.

Conceptual Framework

The Capability Approach will be used in this study to understand the role of digital inclusion in aiding individuals to live the life they want to and whether they have the freedom to do so. Concepts from of the Capability Approach will be used to answer important questions in the community where the research will be conducted.

The conceptual framework in Figure 3 below is constructed from the basis of the Capability Approach while incorporating the aspects from the 'Inclusion Measurement Factors' model presented in this Figure 1.

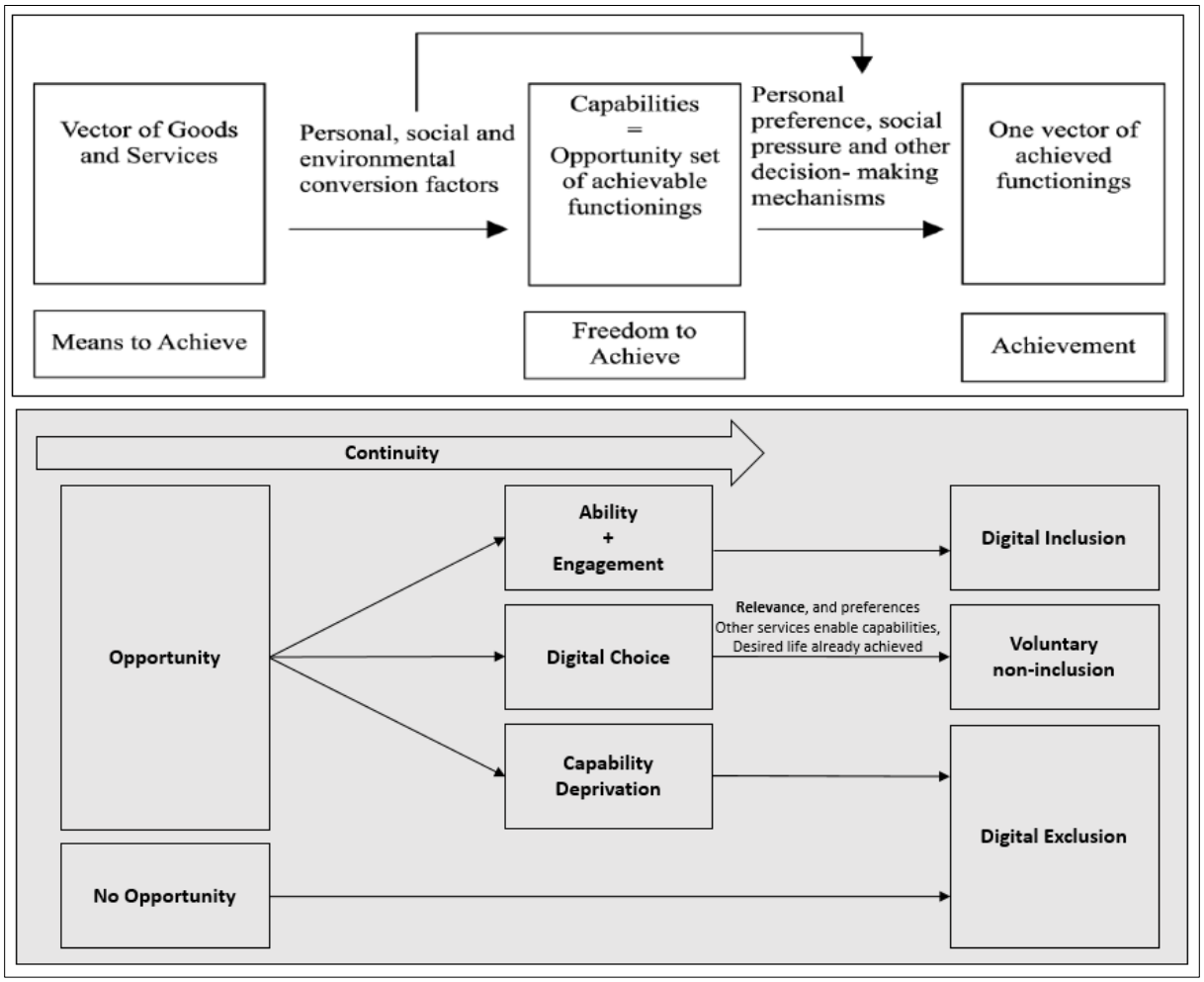

Figure 3: The Capability Approach in digital inclusion

The Capability Approach is built on the basis that the 'means to achieve' in the form of goods and services can be used to enable capabilities (given that the individual has the 'freedom to achieve') and ultimately achievement of goals. The 'means to achieve' can be interpreted as '**opportunity'** while capabilities can

be interpreted as a combination of 'ability' and 'engagement' in the 'Inclusion Measurement Factors' model as shown above. The goal in the 'Inclusion Measurement Factors' model is Digital Inclusion ('achievement' in the 'Capability Approach') which is the intersection/presence of all of the measurement factors namely **opportunity, ability, engagement, continuity** and **relevance**.

Figure 3 above starts with **opportunity** as it shapes what a person can or cannot do as well as the kind of interaction an individual has with technology. This can be equated to a concept that Bellini (2018) describes as a result of the "real possibilities" that the user may have as this determines what the user can do. Possibilities encompasses two aspects where a person has a device to access ICTs and the internet and another aspect where the relevant infrastructure is available to support such use. Park et al., (2015) defines infrastructure as one of the preconditions for digital inclusion as there cannot be inclusion without the possibility to access the internet. Once a person has the opportunity to use ICTs, **ability** determines the extent to which technology can be used/engaged with (**engagement**) depending on their agency freedom. Freedom is important because opportunity without freedom cannot lead to achievement. In fact, opportunity without freedom leads to capability deprivation which is explored later. The continuous use (**continuity**) of ICTs and ease of use in doing so can enable well-being by promoting better connectivity and community with a broader spectrum of people which unlocks new possibilities and information sources for those with the **opportunity** to do so. In rural areas, these opportunities may be something as simple as an online university or job application which may enable them to achieve goals, live a better life and ultimately the life they want to lead which may not be available or easily accessible without ICTs. The internet provides an interconnection of ideas and information which are necessary to promote inclusion (Beijing Review, 2018).

Individuals make their own **digital choices** which are likely to be related their goals and expectations. Where there is agency, there is choice to use or not use ICTs and the internet. The fact that people can choose not to be included brings about a key issue in the relationship between digital and social exclusion as the means to be included does not always result in inclusion (Helsper, 2013). There are many reasons why people choose to use ICTs while others choose not to. Common reasons for choosing to use ICTs and the internet are to enable capabilities which people perceive will allow them to achieve their goals and expectations in order to improve their well-being and ultimately enable them to live the lives they desire. The use of technology (digital inclusion) is only one of the ways in which these goals can be reached. People who have the ability to use ICTs and the internet but choose not to may do so because they already have access to other services that enable their capabilities which allow them to live their desired lives – this is the power of digital choice. In some cases, there is no capability deprivation and individuals may already be living their desired lives and thus there is no benefit perceived from using technology. On the other hand, others may not perceive technology as the way to help them achieve their goals and therefore choose not to actively engage in any form of technology.

Relevance also plays a crucial role in digital choice as people need to make a decision on whether technology is relevant within their contexts. Two sub-categories within the relevance category in the 'Inclusion Measurement Factors' model are 'content' and 'language'. The content must be suitable for the audience and presented in a language that is understandable for users. Relevance thus plays a role in influencing digital choice and the final decision of whether to use ICTs and the internet or not. Perception of whether technology can help achievement of goals would depend on 'relevance' concepts, amongst other things – this translates to 'personal preference, social pressure and other decision-making mechanisms in the Capability Approach in Figure 2. For example, everyday life in rural areas may consist of small scale farming which is likely to be for subsistence purposes as opposed to income generating. This means that technology and internet may not add much value to everyday life and becomes a low relevance aspect. Where people living in these areas may have the **opportunity** and **digital choice** to use technology, they are likely to choose not to or to use it minimally.

The situation where individuals choose not to use ICTs and the internet but have the means and resources to do so is not digital exclusion, as exclusion cannot be by choice. Relevance is critical to this digital choice as people who have the opportunity to use technology are likely not to use it if they perceive it does not add much value to everyday life and is not relevant. For purposes of this study, this phenomenon has been termed '**voluntary non-inclusion**' in Figure 3 above.

The alternative path where people have **no opportunity** (i.e. no means to achieve) results in an inability to make choices and usually restricts what people hope to achieve (functionings). This deprivation of functionings is capability deprivation, as people cannot enable their capabilities. Capability deprivation ultimately results in social exclusion. This is a hard cycle to break and socially excluded people are likely to continue to lack important opportunities and freedoms that allow them fully unlock their capabilities. This exclusion can be in any of the social exclusion categories of resources, participation and quality of life (Rawal, 2008). In the context of developing countries, some people are too poor to afford the tools (resources) required to be included such as mobile phones and may have poor access to networks for communication as some areas still do not have mobile coverage or have weak coverage (participation). Basic living conditions (quality of life) may be poor which itself makes other things like ICTs and mobile internet access a luxury.

While people may achieve **digital inclusion** should they have all of opportunity, ability, engagement and relevance; it is important to assess how included people are as they may be somewhat included but not fully able to harness the power of technology and the internet to improve their well-being or live their desired life. This is because they may lack some of the freedoms that people who are socially excluded also lack. This is why it is important to measure the *depth* of inclusion to understand to what extent an individual included – fully or partially. There is no dichotomous division between digital inclusion and exclusion as there are varying levels of inclusion and reasons why this is the case need to be understood (Goggin et al., 2018). These reasons are complex further emphasizing why it is important to understand the depth of inclusion (Wagg et al., 2019). Ragnedda and Muschert (2013: 2) terms this as "nuances to the digital divide". Studies show that there are various forms of digital inclusion and while individual may be included, disadvantaged groups are likely to use ICTs and the internet less than advantaged groups (Robinson et al., 2015). For example, a common challenge in rural areas is that people may have access to technology and internet via mobile phones but are often unable to afford Wi-Fi or mobile data resulting in them being offline most of the time and unable to achieve well-being through technology. Also, while some people in rural areas have the right devices to engage and be included the digital wave, they might not be able to use the device optimally or might not have internet access due to poor infrastructure to fully harness the functionality on such devices (Park et al., 2015). Home internet access remains a distant fantasy for most people in rural areas across the world (Park et al., 2015). This can be seen as a lack of freedom to use technology to the extent that the user would like, showing that inclusion can be limited due to issues like cost and infrastructure availability. While technology use may be limited, this does not always equate to complete inclusion.

Chapter 3: Research Methods

Research Philosophy

Information systems research is driven by two key schools of thought namely interpretivism and positivism. Both research methods are used widely in IS research. The interpretivist approach was used for the purposes of this research. Interpretive research methods involve the use of the preconceptions of the researcher to define the research process while the researcher is also influenced by human subjects in the research thus both parties influence each other's perceptions. Interpretive approaches thus focus on the examination of a given phenomenon from the perspective of the subjects of the research and is often viewed as subjective (Walsham, 1995). This is a study of perception hence an interpretive approach is recommended to cater for the subjective nature of the research as opposed to an objective study which would be more suited to the positivist approach where outcomes are measurable. The research uncovered how people perceive digital inclusion and exclusion through their own subjective interpretations. The subjective nature of interpretive research must be dealt with accordingly through an understanding of the subjective interpretations of the participants.

Interpretivist research has a theoretical grounding to explain why things behave in the way they do (Gregory, 1993). This is one of the reasons why this approach is relevant for this study as the research questions aim to understand the influence of digital inclusion on capabilities which in itself is an explanation of why things work in a certain way. This approach is also relevant to this study there may be more than one interpretation of a social system as identified by Gregory (1993). On the contrary, positivist methods were not suitable for this research as they imply that there is only one correct and valid interpretation of a social situation whereas this study provided results that can be interpreted in many ways.

Qualitative research was used in this study. Qualitative research falls under the interpretivist paradigm. Qualitative research is the process of creating order and significance to a set of collected data (Marshall, 1996). Seidel (1998) defines qualitative research as a way to "think about things" to gain a full picture or understanding of data gathered as well as any relationships that may exist. This type of research thus does not focus on individual components but rather, the full picture in its entirety as a way to identify common aspects and themes. This study puts together many components and explains these in a form of social enquiry to understand social reality and qualitative research provides a good basis in which to do so.

Research Evaluation Methods

The subjective nature of interpretivism requires that research within this paradigm display characteristics of trustworthiness such that the results of the study are credible skewed (Walsham, 1995). According to Shenton (2004), trustworthiness consists of four factors namely credibility, transferability, confirmability and dependability as explained below:

- **Credibility**: The researcher needs to be able to answer how they justify that their research holds true and findings are accurate. *The literature review provided a sound basis on research that has been conducted within the field of study that guided how the research was carried out based on best practice. This basis provided a solid foundation for data collection and analysis. In order to ensure riguor in the research, a write-up of the data analysis method has been provided and supported by verbatim feedback received from participants during interviews. This ensures that the true meaning of data gathered is not lost and has been interpreted appropriately. The thematic approach has also been used to identify themes emerging from the data collection and literature*

review (Boyatzis, 1998). Data re-examining and recoding were also conducted which further adds rigour to the data analysis process (Auerbach and Silverstein, 2003).

- **Transferability**: The research conducted must be able to be recreated in a similar context for example a similar population and other scenarios. *The research used a similar research approach as conducted by Helsper (2008) who conducted the research within a developed country with this study focusing on a developing country which shows its potential for transferability within a different setting. This approach was refined and details of how this was done have been provided in the data collection and analysis sections which also promoted reuse by future studies. Many of the concepts used in this study were synthesised from studies done in the developed context, the framework created and used in this study is transferrable.*
- **Confirmability**: The researcher must prove that the research is not based on any preconceived ideas but on findings from data collected and that findings have not been altered to suit a particular outcome. *Multiple concepts (inclusion, exclusion and the aspect of digital choice) have been analysed with the aim to give a holistic view in answering the research question and research focus as opposed to being biased to one view point. In addition, no outcomes were predetermined but rather provided from the findings once data was collected and analysed.*

- **Dependability**: The dependability of the study is in relation to the extent to which the research can be recreated by other researchers and similar outcomes produced. *The data collection process followed has been detailed at a granular level explaining all steps and rationale for so doing to aid readers to an understanding of how findings have been reached. A comparison of the findings between this study and prior studies has been provided in the findings section to discuss if findings are similar to literature or contradicts it. Where findings differ from literature, new literature has been sourced to understand if the findings are supported in other studies.*

Research Design and Strategy

This study was of explanatory nature. Explanatory research is research conducted to identify links between concepts related to the research problem, leading researchers to explain phenomena, not merely describe it. It is used to obtain more information, gain insights and ideas to define the nature of a problem or increase knowledge on the problem. This type of research is often used where concepts in question often have not been well researched and may not be well understood and additional research is required to provide conclusions. Explanatory research can also be used to discover alternatives or explore a situation further (Stebbins, 2001). This strategy is appropriate in this study as it was used to gain insights into issues of technology in rural areas, digital and social inclusion which are not being researched widely in order to understand them better and draw conclusions. As such, the problem has to described first and issues arising explored before they can be explained. This is consistent with explanatory research, which is said to evolve from exploratory to descriptive and finally explanatory research.

This study uses the Capability Approach as its theoretical lens and concepts from this form the basis for this study to create a conceptual framework which explains the relationships between the concepts, the nature of the relationships and why these exist. This further emphasises the explanatory nature of the study.

Data Collection

Data Collection is the first step of any data related project and involves collecting data in the method prescribed in the research (Polkinghorne, 2005). The data required determines the data collection instrument to be used. In this case, the data required would describe the kind of technology a participant uses and the impact that this has on their day to day lives and ultimately well-being. As a result, the research instrument selected was interviews.

Interviews were used in this study as the research instrument as the intent was to find out detailed insights on technology and internet usage from people within a selected community. Interviews worked well in this study because each session was used to get an in-depth understanding from participants given the explanatory nature of the research. This provided a good platform to probe further in line with the concepts that need further investigation to obtain additional information. This probing was a combination of concepts from literature as well as emergent themes from the interviews. This also provided additional advantages such as social cues (Opdenakker, 2006)

Interviews were preferred over focus groups for this study as the opinions of each participant can be understood in detail without the disadvantage of potentially being overshadowed by others (Acocella, 2012). Interviews were also better in this case as the background of each individual needed to be well understood in order to understand the community context from a personal perspective which cannot be achieved via focus groups (Acocella, 2012). It is particularly important to consider each participant's background in this study in order to understand each participant's goals and what well-being means to him or her. Moreover, their background shapes their goals and helped in asking appropriate follow on questions to understand the relationships between the concepts.

Nine interviews were conducted ranging from 30 minutes to one hour each. A diverse group of people with varying backgrounds and incomes were interviewed in order to obtain an accurate view of the members that comprise of the community. A mix of adults (over the age of 18) were requested to participate. The diversity of participants selected was ideal as it provided a range of people to be interviewed in order to get a broader overview of the population under study. A brief background about the project was provided and participants invited to participate in the study and interviews scheduled. A total of 28 questions was included in the instrument (Appendix B) but not all questions were asked due to responses from previous questions being sufficient to answer subsequent questions. The first few questions were used to obtain context about the community, the role of the participant within the community and the how the participant fits into the community. The next set of questions aimed to explore factors that influence exclusion/inclusion as a common theme that has been identified in the literature. The remaining questions aimed to obtain detailed information on concepts from the conceptual framework to understand where participants fit into the model and if responses support any of the themes from the literature or suggest new emergent themes.

Data Analysis

Data analysis provides the basis for breaking down (data reduction) of data into components to reveal its characteristics. This process also creates structure for the data collected to start to make sense of it and allows the researcher to create a picture of what the findings are incrementally (Seidel, 1998). Seidel (1998) provides an iterative model which shows the data analysis process as looping between collecting things, noticing things and thinking about things. Dey (2003) considers this as a way to break down data in order to truly identify its component parts.

The method used to guide analysis for this study is thematic analysis for qualitative research. Thematic analysis as defined by Braun and Clarke (2006) has 6 main steps as shown below:

1. Familiarisation with data
2. Assigning of codes to your data
3. Identification of patterns or themes in codes
4. Reviewing of themes
5. Defining and naming of themes
6. Summarization in report

For each of these steps, a summary of how each step was used for analysis within this study is explored within this Data Analysis section. All of the steps as defined by Braun and Clarke (2006) were incorporated into the analysis of data for interview data obtained which demonstrates rigour in the approach followed.

Once interviews were completed, all data collected during interviews was transcribed into written form for analysis. The transcription process provided a valuable way to listen to the interviews again for the researcher to familiarize with the data as well as start identifying trends and common themes and start understanding the possible relationships that may exist. Where apparent, key themes were recorded by noting them down for reference at a later stage in addition to the a priori themes already identified.

The coding process to identify similar ideas and themes then commenced where interview feedback was categorised into codes previously defined for exploration in the findings. New codes were also identified during this process. Coding can be defined as a method of classifying and categorizing similar concepts. The outcome of coding is similar concepts organized by similar themes (Auerbach and Silverstein, 2003). This process started with some initial identification of codes to be used for the fundamental aspects of the conceptual framework on print-outs of each interview the transcripts. The key aspects included in this coding were opportunity/no opportunity, ability, engagement, digital choice, capability deprivation, relevance and digital inclusion/exclusion. All definitions of the key aspects were consolidated on an Excel sheet in the manner shown in Figure 1 below and used as initial broad codes. Note that this is not the full list below but an example of a priori themes.

A priori theme	Code	Definition
Capability	Cp	A combination of functionings (realized achievements/expectations) of whether a person is able to live the kind of life they want.
Ability	Cp-A	Ability refers to what an individual is able to do with ICTs and the internet i.e. their skill. Ability usually determines what an individual can use ICTs and the internet for such as social or professional use. The better one's ability to use ICTs, the more likely they are to use it for other income generating activities.
Engagement	Cp-E	Engagement comprises of a combination of factors that influence type of use, frequency of use and perception of ICT which culminate into how individuals interact with ICTs and the internet. As levels of engagement increase, ability is likely to increase as well as individuals learn new techniques.
Opportunity	O	Opportunity determines what type of device an individual uses to access the ICTs and what kind of connection they have to the internet such as 3G or Wi-Fi.
Relevance	R	Relevance defines the extent to which the content accessible is applicable/relevant to the user and its contribution towards the achievement of the user's goals. The language that the content is offered in is of utmost importance as it is the difference between content that is understandable and contributes to goal achievement vs content which is not understandable and thus unusable.
Continuity	C	Continuity ensures that individuals can use ICTs freely and there is ease of use in doing so. There is a responsibility on policy makers and service providers to increase connectivity to make technology use seamless. Increased use of technology will improve community with a broader spectrum of people which may unlock new possibilities for people using the technology. Continuity has a dotted line relationship with all three of opportunity, ability and engagement as all three of these factors enable continuity which is key in digital inclusion. Research shows that rural areas face a particularly challenge with continuity as training is not easily accessible they may not be any public facilities available for internet use (Aires et.al. 2018).

Data Analysis Figure 1: A priori themes sample

Furthermore, additional coding was then addeddirectly on the transcripts if it did not fit into any of the a priori themes identified or provided more granularity on a priori themes previously defined. Figure 2 below shows how the existing a priori theme of engagement (Cp-E) was made more granular based on transcripts into 'Cp-E-through others' to code instances where for engagement through others was identified in the interviews. This was further expanded into 'Cp-E-through others-capability' and 'Cp-E-through others-necessity' to define two categories of why people engaged through others that emerged from the transcripts.

Transcript	Code
I generally struggle with technology, it's just one of those things. I have tried with very little luck and unfortunately I do rely on my family for help with many tasks.	Cp-E-through others-capability
Poor connectivity means that the signal can just disappear so I have to ask my daughter to help me with transactions.	Cp-E-through others-necessity

Data Analysis Figure 2: Coding sample

Once coding was completed on the transcripts, it was then transferred onto a Microsoft Excel document that provided descriptions of explanations on what each code meant. Figure 3 below provides an example of the updated code descriptions once transferred from the transcripts.

Code	Description
Cp	Capability
E	Engagement
Cp-E-through others-capability	Engagement through others due to lack of ability/capability.
Cp-E-through others-necessity	Engagement through others due to circumstances beyond their control e.g. poor connectivity.

Data Analysis Figure 3: Code Descriptions

This also served as a second run through of content in each transcript and in some cases resulted in new codes being created or elaboration on existing codes which resulted in identification of new themes as well. For example, the code of 'Cp-E-through others-choice' shown in Figure 4 below was identified during the process of reading through each transcript again and transferring codes to the dictionary of code descriptions.

Code	Description
Cp	Capability
E	Engagement
Cp-E-through others-capability	Engagement through others due to lack of ability/capability.
Cp-E-through others-necessity	Engagement through others due to circumstances beyond their control e.g. poor connectivity.
Cp-E-through others-choice	Engagement through others due to availability of others who can perform tasks for them.

Data Analysis Figure 4: Additional Code Added to Code Descriptions

Content from all themes was revisited and the process to start summarizing findings into the various codes commenced. Key themes and findings were documented and relationships identified in the process. This process required certain parts of the transcript to be re-read to ensure original context was not lost in the coding process as well as for the inclusion for necessary and relevant quotes to support findings. This process is called data re-examining and recoding. Re-examining data presents an aspect of rigour into the data analysis as this process can be refined and results in more targeted analysis (Auerbach and Silverstein, 2003).

The final stage of the analysis was to document all findings. Once documented, findings were revisited to allow for structuring that provided a logical and clear picture of the study in relation to the aims of the research.

Ethics

Ethics is an important aspect of any research study and careful considerations need to be made to ensure that research is conducted in an ethical manner. As part of this study, the following ethical principles have been applied:

1. **Respect for persons**
    a. **People should be treated as autonomous** – people must be allowed to make their own decisions without researchers influencing decisions whether or not to participate in research. All pertinent information must be disclosed in order to allow the individual to make an informed decision. This is important because the respondent must not be forced to participate for example if they are uncomfortable with providing some of the information.
    b. **People with diminished autonomy should be protected** – there are people in society who may not be able be able to make decisions fully such as young children and people who are mentally disabled. Such people must not be taken advantage of and only included in research in very specific scenarios as making a decision independently may be a challenge for them. This is important so that the research is not found to have abused any individuals who are unable to make decisions independently (Dittrich, 2012). No interviews were conducted with participants under the age of 18 or with the mentally disabled as part of this study.
2. **Beneficence** – The essence of beneficence is such that research must not do any harm to any person and must maximize benefits for participants while minimising risk. This means that research must not be conducted at the expense of another party and researchers have a duty to minimize risk to participants for example where a drug is being tested on humans. This is important because respondents may agree to participating in the research without being fully aware of potential risks (Dittrich, 2012). Participants in this study were not exposed to any risks in their participation in the study.
3. **Justice** – This principle highlights that research must be fair and equitable. This principle presents a framework in which to consider when thinking about the beneficiaries of the research as well as the risks. For example, if research is intended for the general population, there must be appropriate representation of gender, location, age to name a few. This is important to ensure that the findings of the research are relevant and true (Dittrich, 2012). This study ensured that participants represented the diversity of the community under study to ensure that the data collected was a true reflection of the community being studied.
4. **Privacy and data protection** – Protection of privacy is a key principle in research ethics. This principle is important in protecting the privacy of respondents in data collected and data processing. This also involves the protection of data collected (storage) and its disposal. This is important because respondents may not want their responses to be made public for personal reasons (Dittrich, 2012). Data collected in this study was stored on transcripts with pseudonyms and not participant names to guarantee anonymity. Consent forms have been stored separately and not linked to the transcripts. Data collected is stored on a password protected device which only the researcher has access to and backed up on the cloud (One Drive).
5. **Analysis and reporting** – Researchers must disclose how data has been analysed and disclose all findings even if unexpected. This is important to ensure that the research findings present an accurate representation of the data collected and not altered to create a different impression (Bhattacherjee, 2012). Data collected for this study has not been altered in any way and all findings have been presented.

Overall, this study used the Deontological or Duty-based Theory as a guideline for ethical conduct. This theory states that there are a set of duties and responsibilities that we ought to follow as they are moral imperatives (Alexander and Moore, 2007).

See Ethics Certificate attached in Appendix C.

Participant Summary

A total of nine interviews were conducted and a summary and brief description of the participants interviewed is provided below.

Participant	Description	Participant Identifier
Farmer – over 70	- Farmer aged above 70 who has been farming in the Somabhula area for over 20 years. - Has a tertiary qualification therefore well educated. - Earns a reasonable income enough to sustain him and his family. - Does not stay in Somabhula permanently, has a second home in the capital, Harare. - Does not use much technology, only use is a basic phone for calling and sending SMS's – digital choice due to limited ability. - Does not use the internet. - Relies on family and friends for transactions that require internet or any advanced skills on his phone.	Farmer 1
Farmer's wife – over 65	- Wife of farmer in above description and has been staying in Somabhula on an ad hoc basis with her farmer husband. - Has a tertiary qualification therefore well educated. - Fairly proficient in technology use, has a smartphone, tablet and laptop which she uses as needed. - Uses the internet for various tasks such as communication via WhatsApp, internet banking and research on topics of interest, both business and social. - Only has access to a 3G connection as there are no Wi-Fi service providers in Somabhula. - Is often tasked to complete tasks for her farmer husband. - Struggles with network connectivity in Somabhula – identifies this as a hindrance to progress and increases reliance on others to perform tasks for her.	Farmer's Wife
Farmer's daughter – 19 years old	- 19-year-old daughter of farmers described above. - Has completed A levels and currently in second year at the University of Cape Town (UCT) in South Africa. - Very proficient in technology use – can perform all advanced tasks required without assistance. - Has a smartphone, tablet and laptop which are all used for focused needs. - Uses the internet extensively for study, research and social purposes. Has Wi-Fi connection at UCT but not when visiting Somabhula – only access to 3G.	Farmer's Daughter
Farmer – under 35	- Young farmer – 34 years of age farming in Somabhula. - Has a Master's degree qualification.	Farmer 2

	- Very proficient in technology use – can perform all advanced tasks required without assistance. - Has a smartphone, tablet and laptop which are all used for focused needs. - Uses the internet extensively for research and social purposes. - Only has access to a 3G connection as there are no Wi-Fi service providers in Somabhula.	
Farm manager – 44 years old	- 44-year-old farm manager working on one of the farms in Somabhula. - Completed O'levels but no further qualification thereafter. - Makes just enough to sustain his family with very little to spare. Attributes this to tough economic environment as money is worthless. - Has a smartphone which he mainly uses for communication via WhatsApp and to receive and make payments via mobile money. - Does not own any other device. - Only has access to a 3G connection and has to buy data on an on-going basis. - Uses the internet mainly to access social media sites.	Farm Manager
Farm worker – 32 years old	- 32-year-old farm worker working on one of the farms in Somabhula. - Did not complete high school therefore does not have any recognized qualification. - Fairly happy with income as he does not have a family and uses his income mainly on himself. - Has a smartphone and uses a 3G connection to access WhatsApp. - Uses phone for mobile money transactions via USSD. - Does not have a bank account hence no need for functionality such as internet banking. - Does not known any other device.	Farm Worker 1
Farm worker – 39 years old	- 39-year-old farm worker working on one of the farms in Somabhula. - Did not complete high school therefore does not have any recognized qualification. - Reliant on support he gets from farm owner to pay school fees and food supplies for a large family. - Has a basic cellphone with no internet connection capabilities. Phone used mainly for calls to farm owner, and occasionally family and friends. - Uses phone for mobile money transactions via USSD. - Does not own any other device. - Does not have any form of internet connection.	Farm Worker 2
Community member (teacher)	- Teacher at local primary school and is aged over 50. - Has lived in Somabhula since early adulthood.	Teacher

	- Has a teaching diploma in secondary education. - Has a smartphone which she uses for various tasks mainly communication via WhatsApp and internet banking. - Does not use social media or other functionality on her smartphone. - Has access to a 3G connection and has to buy data.	
Community member – retired government worker	- Retiree from local government water department aged over 65. - Has lived in Somabhula for over 30 years. - Has a tertiary qualification in public administration. - Has a smartphone and a tablet. Uses most functionality on smartphone including internet capability. - Accesses various social media platforms on both smartphone and tablet. - Has access to a 3G connection and has to buy data.	Retiree

Chapter 4: Findings

Factors affecting Digital Inclusion

Literature seems to suggest that age, level of education and income affect digital inclusion. Low-income groups, people with poor education, disadvantaged young people, and older people are recognized as being vulnerable groups in issues of digital inclusion (Tinio, 2003; Zheng and Walsham, 2008). Age, income and education are also identified as potentially worsening social exclusion (Helsper, 2013; Van Deursen and Van Dijk, 2015). In this study, the three factors of age, income and education were analysed in relation to the various participants interviewed.

Age

Of participants under 30 interviewed, all were highly engaged and had a good grasp of technology and used the internet. Differences were identified where it came to the type of device held and the type of use of the internet. These differences were mainly attributed to what the participants could afford. Participants under 30 who had the devices they wanted and needed were either farmers, or children or relatives of the farmers. However, the others were farm workers who did not have much disposable income to spend on nice devices. Younger participants who came from advantaged backgrounds had multiple devices; in most cases, a smartphone, tablet and laptop. They had access to the internet on all their devices. Though access was via 3G, these participants could afford to buy more data than others. The other participants who did not have the luxury to have any devices they wanted only had a smartphone with the only access to the internet being WhatsApp via 3G which they mainly used for communication and entertainment i.e. sharing of jokes and other entertainment through various groups.

Although two older participants stated that they used technology and the internet quite extensively, younger users were more comfortable with their technology use and had a wider range of tasks that they performed on the internet. Below are two extracts of how younger participants stated that they were interacting with technology:

> *"My cellphone is used mainly for communicating and exploring social media whilst my tablet has more constructive apps like fitness apps and an app to learn languages. I also use my tablet to read books … I read emails on my laptop, do research, do schoolwork like assignments and watch Netflix."* – Farmer's Daughter

> *"I use my cell phone to research topics I want to know more about, and also sometimes for social media like Pinterest. I also use it to catch up on movies, series and latest music. I also do my banking online on the app so use the internet for that too. I also have various apps on my phone which I use for different purposes."* – Farmer 2

Below are two extracts of how older participants stated that they were interacting with technology:

> *"Yes I do use the internet but I would like to learn some applications on my phone that I am not familiar with that I would like to use. My daughter tells me about some fascinating things that she does on her phone which would be great for me to learn. Things like apps to listen to podcasts sound really interesting."* – Farmer's Wife

> *"I think there are many more advanced tasks on the internet that I could do apart from my usual browsing and occasional mobile banking. The internet has so much more to offer."* – Retiree

The above shows that there were some differences in usage as a result of the participant's age. Findings were consistent with literature where age is identified as a disadvantage in digital inclusion. In this case, the older participants excluded because of skills despite access and do less in comparison to the younger users. However, literature suggests that for a study conducted in Australia, digital uptake for older users was initially slow and steadily increased (Goggin et al., 2018). This phenomenon cannot be confirmed from this study.

Income

In this study, the higher income earners or the people who were satisfied with their income used more technology and often had multiple devices which they used for different purposes. Lower income earners usually had a non-internet enabled phone or a basic smartphone as their only device with limited internet use as they could afford less data especially in the tough economic environment in Zimbabwe. Lower income earners had limited access to internet as data for general internet connection was expensive. Those who used the internet used basic functions and applications like WhatsApp where internet connection was obtained mainly by purchasing of a data bundle which works out to be slightly cheaper than buying data which enables users to access anything on the internet and not be restricted to an application like WhatsApp - purchase of the WhatsApp specific bundle means that connection is automatically restricted to that application only. One participant stated that:

> *"My only option is the WhatsApp bundle, the other options are too expensive and I do not need them."* – Farm Worker 1.

The disparities in income identified in this study are consistent with literature which suggests that people with a higher income use more technology and internet and are likely to be more included. Literature provides that individuals in a privileged position in society either socially, economically or better educated are likely to exploit the benefits that ICTs have to offer more than people who may not be in such a privileged position (Ragnedda and Ruiu, 2017; Goggin et al., 2018).

Education

Of the nine participants interviewed, all except three had some form of qualification from certificate/diploma to Masters degrees. This represents the generally high education and literacy rate of people living in Somabhula and Zimbabwe in general (national average of 92% which is the highest in Africa) (Chisita, 2011).

Previous studies suggest that the more educated an individual is, the higher the probably is that they use technology more actively. Of participants interviewed, three did not use technology at all or had minimal interaction with technology. Reasons for this varied but the correlation to education was not demonstrated. Interestingly enough, one of the most learned participants, a farmer with a Master's degree aged over 70 used very little technology. He attributed this to how he started using technology much later in his life and struggled to attain the necessary skills to perform tasks independently. This shows that in this context education is not a measure of technological aptitude or a pre-requisite for ability, but age could definitely play a role. Other interviews reveal that younger people with very little education used their smartphones extensively, especially for WhatsApp. These people rarely used other internet capabilities such as Google for research purposes, internet banking and other forms of social media partly as they did not have specific needs that required these capabilities in order to be fulfilled but also because of the restrictive cost of data

– it was established that data purchased was often through a data bundle which restricted access to WhatsApp only.

There are several reasons why the findings above are not aligned to literature. Firstly, participants with poor education in this study were identified to be using their smartphones fairly extensively. It should be noted that these participants were using cheap smartphones and none of their phones was from any of the familiar brands like Samsung, Apple etc. These were brands that the researcher has not heard of before and phones used were cheap smartphones sold at a fairly low prices. The affordability of these phones meant that people with poor education and likely to be in low income jobs could afford to own a smartphone with internet capabilities just like any other smartphone. Another reason is that data bundles for specific applications that were considerably cheaper than general internet access data led which led to people buying data only for the functions and applications that they were interested in on their smartphones. WhatsApp and Facebook were common popular choices.

While literature suggests that poor education creates a barrier in access to learning material using ICTs and the internet, communities have evolved and where people with poor education interact with educated people as in this case – there will be some form of knowledge transfer, even though it is as the most basic level. The other consideration is literacy levels. Though some participants had poor education, they were not illiterate as they could read and write which could explain while they were engaging with technology quite remarkably.

Capabilities towards Digital Inclusion

Two key capabilities namely engagement and ability play a key role in the journey to inclusion. Both need to be present to be able to enable inclusion. Findings on ability and engagement from this study are explored below.

Ability

The conceptual framework used as the basis for this paper defines ability as what an individual is able to do with ICTs and the internet i.e. their skill. Ability usually determines what an individual can use ICTs and the internet for such as social or professional use. The better one's ability to use ICTs, the more likely they are to use the internet more extensively to perform advanced tasks and possibly for income generating activities.

In this study, varying levels of ability were identified. These can be split into three categories namely poor, fair and good and compared to other factors for participants interviewed. Of the participants interviewed, 3 could be rated as having good grasp of how to use their devices, 4 can be said to be fair while the remaining 2 had a poor grasp of how to use the technology available to them.

Ability rated as good was where users were able to perform tasks on their devices independently with no help from others. It was also noted that people who were very proficient in using their devices and navigating their way on the internet were likely to have more devices than those who were not. Participants who were comfortable with their use provided comments such as:

> *"I am very proficient in using the various devices I own and the internet. I can confidently complete all the tasks I need to with little to no help at all."* – Farmer 2

> *"I am quite competent on the internet. I have learnt not just to use it to access social media, but also for a lot of practical purposes such as booking tickets, making payments and submitting*

assignments. I think I could do any task really now given you can Google ways to complete whatever task you want to." – Farmer's Daughter

The types of tasks performed by people who were proficient in their use of technology are consistent with literature which identified these people as advanced users who use their devices to connect to other people on the internet as well as perform tasks such as banking online (Helsper, 2008).

Ability rated as fair means users were able to perform some tasks independently but needed some help for others. Responses received by such users include:

> *"I can say I am fairly confident with my ability to use technology and internet but there are some other things that I think with regards to internet I could do with some help."* – Teacher

> *"I can do some things on my own but ask for help on a good number of other things."* – Retiree

In the context of this community, users whose ability was considered fair included users who used the internet for very little. None of these users used their devices to access tasks such as various forms of social media or information seeking on the internet. Previous sections have explored how some users only bought a WhatsApp specific bundle to give them access to the internet for WhatsApp only. For some of these participants, WhatsApp was all they knew. This means that while they were using their devices to access the internet, there was a lot still to be explored and learnt but no opportunity to do so. These kinds of users were also identified in the literature as 'participatory users' who used the internet to perform basic tasks such as access to financial services (Helsper, 2008).

Ability rated as poor was identified where users could barely use their devices or needed a lot of help to do so. Of the two users whose ability was identified as having poor ability, neither of them had multiple devices but had a basic non-internet enabled device. It was evident that these individuals did not use whatever devices they had fully, mostly performing basic functions like making calls. Poor ability can be rated by statements such as this:

> *"I have always had a phone from the time that they were introduced in the early 90's. However, it's always been the most basic one with limited features. As long as I can call and send messages."* – Farmer 1

Users with poor ability can be equated to 'basic/practical users' as defined by Helsper (2008), where users tend to use technology for practical day to day activities such as communicating with others.

It was identified that ability does not always limit the type of tasks that people perform as evidenced by the emerging theme of engagement through others. For example, while the participant with the quote above had poor ability, he had a significant number of tasks performed for him by others. This topic is discussed in more detail in the next section.

Engagement

Engagement comprises of a combination of factors that influence type of use, frequency of use and perception of ICT which culminate into how individuals interact with ICTs and the internet. As levels of engagement increase, ability is likely to increase as well, as individuals learn new techniques.

Direct Engagement

Most participants interviewed used their devices independently to access to the internet. Though they were able to do so independently, two categories of use were emerged:

- **Desired usage** – users engage on internet to perform tasks that they want to when they want to.
- **Forced usage** – the digital world has forced people to engage on the internet even in cases where they would not have ordinarily done so. For example, there are certain transactions that can no longer be done in the traditional way that they have always been done. One participant noted that:

> *"Of late, the banks are really encouraging us to use internet banking, online banking such that if we go to the bank, they tell us to do those things online so I am really forced to use the internet for my day to day. Several bank branches have also closed down in our area so it is becoming more and more inconvenient to find a branch."* – Farmer's Wife

In this case, engagement is a result of necessity rather than voluntary use where there is no alternative for the user.

Literature explored does not identify a split in the type of usage hence this finding provides a new dimension that can be explored by future studies.

Engagement through others

An emerging theme from the study shows that it is common for people living in the areas under study to engage with technology through others. For purposes of this study, this type of engagement has been termed 'indirect engagement'. Indirect engagement provides the means for people to achieve what they would should they have interacted directly with technology themselves. There are varying reasons for indirect engagement for people who had the means to engage directly. These have been split into three categories:

- **Capability** – Users will often engage through others were they do not have the ability to engage directly themselves. One participant interviewed stated that:

> *"If I really need to do something on the internet on or online, then I ask my wife or my daughter to do it for me. They have created an online banking profile for me and often make transactions on my behalf when I instruct them to do so."* – Farmer 1

> *"I generally struggle with technology, it's just one of those things. I have tried with very little luck and unfortunately I do rely on my family for help with many tasks."* – Farmer 1

his shows that the participant can get the same benefit from asking a family member to complete a transaction for him vs completing the task himself. This type of engagement warrants that there are always multiple people involved in the completion of a task, where one instructs and the other actions the task.

Literature identified ability as being a reason why people engage through others. Martin et al. (2016) states that a lack of skill is a reason why people choose not to engage with technology. This same reason contributes to how people who cannot engage themselves may decide to do so through others.

- **Necessity** – There are instances where individuals have indicated that they had to engage with technology through others in order to complete tasks due to circumstances beyond their control.

Some of the examples given include connectivity issues where users are unable to complete transactions on their own when needed as the internet connection is poor. Examples include:

> *"Poor connectivity means that the signal can just disappear so I have to ask my daughter to help me with transactions."* – Farmer's Wife

> *"Sometimes when the connectivity is poor I ask colleagues to perform certain tasks for me, for example making internet payments."* – Farmer 2

Both participants above are totally capable of completing tasks on their own but there are instances when they rely on others to assist them.

- **Choice** – There are users who have become accustomed to the idea of asking others to perform tasks for them. In some cases, this has been brought about where they have no other choice such as connectivity issues as explored above but this tends to develop into habit where users continue to do so even when they have connectivity and there is no need to do so. However, it is clear from the findings that where some participants could get the same outcome through others and had the choice of people who can assist them – they will consider using this method. This was common only in older participants who were 65 and older.

> *"If I really need to do something on the internet on or online, then I ask my wife or my daughter to do it for me."* – Farmer 1

> *"If my family can help me with the things that I need to do online then I let them help me."* – Farmer's Wife

Literature explored does not identify necessity and choice as reasons to engage through others therefore the findings around this provide a good platform for exploration in future studies.

Engagement location

Of the participants interviewed in this study, four of the nine noted that they did not live in Somabhula on a permanent basis. Given the nature of the Somabhula town being mainly a farming community, two of the participants who were farmers had other homes in the city where they would occasionally live on an alternate basis with their farms in Somabhula. One participant was a university student who would only live in Somabhula during the holidays therefore spent most of the year at university. The other participant was also farming in another town hence had two bases. In all of these cases, responses around engagement of these participants was different depending on their location at a given point in time.

The participant living in Somabhula only on school holidays had a Wi-Fi connection at most times when at university which meant that there were no restrictions to internet use when at the university. Other participants living in other locations with better infrastructure at intervals also shared that they had Wi-Fi and better connectivity in the other locations where they were based. Even if they did not have Wi-Fi, they had better 3G connectivity in comparison to the connection they had in Somabhula.

> *"I don't have Wi-Fi when I am here at the farm which really sets me back as it is more convenient for me to use Wi-Fi and not have to worry about buying data."* – Farmer 2

> *"I have access to Wi-Fi when I am at school, but not at home so I end up doing so much more when I am at school. At home in Somabhula I'd buy data mainly for WhatsApp because I'd need a lot of data to sustain my needs on YouTube and Netflix…when I am at UCT, I buy a little bit of data for the periods that I am not in a Wi-Fi zone but this does not happen often."* – Farmer's Daughter

The above quotes show that the location played a role in how included people were at a particular point in time. These participants used the internet more when the connectivity was better as opposed to Somabhula where the signal was poor and where they had to rely on 3G data. Depth of inclusion for these people was thus also reliant on location – most were happy with their engagement when outside Somabhula while they wished they could do more when in Somabhula which results in varying depths of inclusion depending on one's location.

Literature suggests that there are people who may 'dip in and dip out' based on their circumstances resulting in instances where they are included and others when they are not (Helsper, 2013). The phenomenon identified in this study where usage differs based on location is similar to that identified in literature.

Considerations when assessing Digital Inclusion

The conceptual framework developed in this study shows digital inclusion as the desired end goal with the exception of voluntary non-inclusion where users choose not to engage with technology. However, it recognizes that there are varying levels of inclusion therefore it is important to assess the depth of inclusion.

Depth of inclusion

Based on the definition of digital inclusion, participants who used some form of device can be considered to be included but this study argues that the depth of inclusion (meaning the extent to which they are included) needs to be assessed. For example, one participant had a smartphone which he used to make calls and send SMSs but nothing else. He did not use his smartphone to access the internet nor use any of the advanced features.

> *"I have a very basic smartphone which I use to make calls, receive calls and to send SMSs."* – Farmer 1

This type of use is the most basic use and the lowest level of inclusion. On the other hand, another participant who had a smartphone used it to access the internet and perform a wider range of advanced tasks.

> *"I also use the internet to get information, to read and to know what is going on in the world. I also do my banking online now. So I use the internet a lot."* – Farmer's Wife

There is a great difference between these two participants and it is clear that the second participant's depth of inclusion is much more elaborate than the first.

The group studied also showed that income played a role in determining depth of inclusion. It was identified that most low income earners who have access to the internet do so via a WhatsApp bundle as the general access bundle costs more. As a result, such people are restricted to a WhatsApp connection which affects the depth of inclusion. People who could afford more data on the other hand could buy a general internet access bundle and had the freedom to use the internet for information seeking and other needs. This reason meant such users are more included than the lower income earners. The quotes below show the differences in how financial reasons can restrict internet use.

"Sometimes I want to watch videos of how some things are done online but I can't, it's just not possible. I don't buy enough data to allow that." – Farm Manager

"If I need to do something that is heavy on data I buy data with that in mind as this means I would have to buy more than my usual consumption." – Farmer's Wife

While literature suggests that digital inclusion can be measured by 'amount of internet use', 'motivations', 'age' and employment status' (Van Deursen and Van Dijk, 2004), not all of these measures fit in well into this study. 'Amount of internet use' is a good and practical measure as all participants could be measured of this aspect from non-use to frequent use. Motivation for participants selected within this community varied extensively due to the differences in the livelihoods of the participants which results in a scenario where this cannot be measured accurately. Age is not a reliable factor as it has already been identified in this paper that higher levels of engagement cannot be attributed to younger or older participants. 'Employment status', like motivation is hard to quantify due to differences between participants, mainly the type of employment.

The findings above show there are varying depths of inclusion but current methods to measure this cannot be used for reasons explained above. As a result, a suggested framework to measure depth of inclusion is explored in the Discussion section.

Digital Desires

Participants interviewed were asked if they wished they could do more on their devices and the internet. This was used to gauge the level of inclusion and to identify what aspirations people had when it came to their technology use. This is important to identify if this relates to well-being and contributes towards the achievement of goals in any way. People who were happy with their technology and internet use generally had less digital desires showing a correlation between depth of inclusion and digital desires. Findings suggest that that the higher the number of digital desires that one has, the lower their perceived depth of inclusion as they require more desires to be met before they can feel included. Various categories of digital desires identified are explored below.

Device

The conceptual framework in this study identifies two types of people; those with the means to achieve/opportunity and those without. Means to achieve determines factors like affordability and type of interaction with technology. As explored in the 'Income' section above, people with the means to achieve had less digital desires vs people with less opportunity. While people with opportunity stated that they did not have any additional aspirations or had less aspirations regarding the devices they own and internet access, people with less opportunity had more aspirations that they needed to be fulfilled so they could feel included. One participant mentioned that:

"I wish I could afford a better phone with more functions, I would love that." – Farm Worker 1

On the other hand, participants in the higher income groups had multiple devices and did not complain about their devices.

"I own an iPhone SE, a Samsung Galaxy Tab and a Lenovo ThinkPad." – Farmer 2

"I own a smartphone, tablet and a laptop. I have a Samsung Galaxy A6+, a Samsung Galaxy Tab S and Acer laptop." – Farmer's Daughter

Literature shows that people in low-income groups are conscious of cost and are price sensitive which means they are likely to own something easy to use or affordable (Kuriyan, Nafus and Mainwaring, 2012). In this case the farm worker confirms this by aspiring for a better device with more functionality to the basic one being used at present.

Type of connection

While people with less opportunity aspired for a better and more reliable devices and more affordable data, participants with more opportunity were usually satisfied with the device/s they owned but aspired for better connectivity to the internet such as Wi-Fi access which was not possible in Somabhula due to unavailability of infrastructure.

> *"Unfortunately I don't have Wi-Fi connected, there is no service provider for Wi-Fi. Once I tried from the local telecommunications company but it doesn't have the necessary infrastructure for Wi-Fi connection in our area."* – Farmer's Wife

> *"I don't have Wi-Fi when I am here at the farm which really sets me back as it is more convenient for me to use Wi-Fi and not have to worry about buying data."* – Farmer 2

The people who did not have digital desires related to better connectivity was due to the fact that they actually did not know that other types of connectivity existed.

> *"I don't know of any other way of accessing the internet than buying data like I do now."* – Farmer Worker

Bradbook and Fisher (2004) identifies limited/no access to the internet as one of the reasons why people may not be digitally included or as a factor affecting their level of inclusion.

Type of use

Other participants had aspirations to use the internet to do more and do things independently without needing help from others, learning to use certain applications on their devices and the possibility of accessing content in other languages, as most content was in English. The digital desire where users want to do more on the internet can be related to ability – the poorer a user's ability is, the more likely they are to want to learn new functions depending on what is important to them. Others are also restricted from doing more due to type of connection they have. In this study, the older participants wished they could do more from an ability point of view while the younger participants wished they could do more from an affordability point of view i.e. afford a better phone and more data. Literature suggests that age, occupation and income play a role in the variance of skill and usage (Helsper, 2013). These factors can be supported by the findings above.

Age of engagement

A few observations were identified between ability and age. As much as younger participants tended to use technology and the internet more, an interesting relationship was identified between age and age of engagement. Age of engagement can be defined as the age when people are exposed to any form of technology as well as the internet. It was identified that people who had been exposed to technology from an early age (in this case in primary school) were likely to use technology to do more. Though two older participants who used technology and the internet quite extensively only started engaging with technology later in life, there was a trend that younger users who had access to technology from an earlier age were

more comfortable with their technology use and had a wider range of tasks that they performed on the internet. A relationship between the age at which participants started using technology and the kind of tasks they performed on their devices and ultimately their digital desires was identified. Where users started using technology from an early age, they used technology and the internet to do more and had less digital desires (aspirations) as they felt that they had the ability to engage with technology at the level they desired.

Example of participant who started using technology at a young age (Farmer's Daughter):

Age of engagement: Primary school, aged 6 or 7 ("I started using technology in primary school when we had dedicated computer classes and soon afterwards my father installed a desktop computer at home, where I would play games. My parents also had smartphones which I would use here and there")
Tasks performed on internet: Range of basic and advanced tasks ("…communicating and exploring social media…read books…watch Netflix")
Digital Desires: None ("I already feel as though I am utilising the internet for all it has to offer in relation to my needs")

Example of participant who started using technology at a young age (Farmer 2):

Age of engagement: Primary school, aged 11 ("I started using technology in primary school during computer classes")
Tasks performed on internet: Range of basic and advanced tasks ("My cellphone is mainly to communicate with customers, friends and family. My tablet is mainly for reading and my laptop is for research")
Digital Desires: None ("I think I use the internet for all the functions I would like to and should I need to do more then it will be easy for me to do so")

Example of participant who started using technology later in life (Farmer's Wife):

Age of engagement: After age 40 ("I started using technology when I bought a mobile phone in the late 90s - that's when I bought my first phone on credit")
Tasks performed on internet: Various basic tasks but not many advanced tasks ("I use the internet to get information, to read and to communicate especially via WhatsApp…to do my banking online")
Digital Desires: Learn new applications and functions ("I would like to learn some applications on my phone that I am not familiar with that I would like to use…there are other things that I struggle with and require help with")

Comparing the older and younger participants, it seems ability to use technology more proficiently is better learnt at a younger age as it tends to result in users being more comfortable and confident in their use of technology. While younger participants stated that they did not have any digital desires as they did not feel that anything was lacking, older participants who started using technology in adult life had more to learn and thus had more digital desires.

Olson, O'Brien, Rogers and Charness (2011) state that older people use similar technologies to those used by younger users but also find that there is a noticeable difference in their usage rates with the younger users engaging more. While no literature relates usage rates to the age at which users started using technology, this study definitely shows a trend in age of engagement and level of future use.

Factors leading to a negative user experience in digital inclusion

Of the participants actively using the internet in day to day life, a variety of factors outside the user's control were identified to be negatively affecting the user experience.

Connectivity Issues

A key theme that emerged was that of connectivity. All participants who use the internet in this community stated that they have struggled with connectivity on multiple occasions. Many find that the connectivity is not guaranteed and is better in different places and on different days. Some of the comments given during interviews are as follows:

> *"I have to go to different physical places to try and find where the signal is."* – Farmer's Wife

> *"If the service provider would have more infrastructure maybe also that would improve connectivity. because this has made me disadvantaged especially as and when I am here at the farm [I] would have preferred to have Wi-Fi available."* – Farmer 2

> *"It can be really frustrating at times especially when there is no power and there is no signal for extended periods of time."* – Farmer's Daughter

It was also established that there are other issues that are specific to this community that affect connectivity such as the availability of electricity. When there is no electricity, the connectivity seems to go with the electricity. In some cases, there is no connectivity even when there is electricity creating a difficult environment especially when users want to perform transactions (particularly business transactions) that require an internet connection and network signal. This is an environment specific factor that may not be applicable in other communities. However, Khan et al. (2012) states poor connectivity and poor power infrastructure as one of the challenges in achieving digital inclusion in rural communities, as is the case in this study.

Cost of device

Participants in the lower income groups had aspirations of owning better devices which would enable them to do more with technology and possibly have greater interaction on the internet. In some cases, they simply aspired to have better devices for reliability purposes and to fit in with others.

> *"I see that financial resources are something that I would need to help me feel more involved regarding technology and my internet use. For example, if I had the appropriate financial resources, I could have a laptop of my own and get rid of the current phone I have and buy a decent phone."* – Teacher

> *"I have a second hand phone which I bought in town but it works sometimes and sometimes it does not switch on. I wish had money to buy a brand new reliable phone."* – Farm Worker 2

Both of these participants can be categorised as low income earners in Zimbabwe. Of course farm workers would earn even less than a teacher working within the public sector but a similarity here is that both wish they could afford better devices because they do not think that they currently have the means to do so.

According to Kuriyan, Nafus and Mainwaring (2012), low-income groups are highly price sensitive and are looking for something easy to use or affordable. In this case, they have affordable devices as is found to be the norm in literature but have desires of owning better devices.

Cost of data

The cost of data is a big challenge for many of the participants who took part in the interviews. While a few participants with higher incomes (mainly farmers) aspired to have a more superior internet connection such as Wi-Fi, other participants either did not know what Wi-Fi was or any internet connection other than their current connection via 3G. There was a common theme that the cost of data restricted use. Though those with higher income could afford to buy more data, they were conscious of how much they were spending on data.

The result is that data tailored to required need was purchased as opposed to data that could be used for general access to the internet. Many were reliant on WhatsApp bundles as this was most important to them in order to keep communication lines open. Other platforms like YouTube and Instagram, though desirable to some participants were not an option as the cost was much higher for much less data in comparison to WhatsApp. As a result, participants were willing to forgo access to such sites with the exception of instances where they were in Wi-Fi zones.

> *"It would be nice if I could use YouTube more often when I'm at home but it simply uses too much data."* – Farmer's Daughter

The challenge of the cost of data is exacerbated by poor connectivity issues as even the high income earners in this community are restricted to use less data as opposed to if there was Wi-Fi available. As mentioned above, poor connectivity and infrastructure therefore affect usage of the internet in rural areas in a negative manner (Khan et al., 2012).

Continuity to achieve Digital Inclusion

Continuity ensures that individuals can use ICTs freely and there is ease of use in doing so. This includes enabling other people within their families and communities to do the same. A recurring theme that came out of this study is that of training, both the giving and receiving of training. These concepts are explained below.

Giving Training towards Digital Inclusion

All participants who are proficient with their use of technology and the internet were comfortable to teach others and to help them do the same. Some of the participants' responses included:

> *"Yes I help others who do not know how to use the internet and those who do not know how to use their phones."* – Farmer's Wife

> *"I would teach others to do the same because in the world we live in skills such as the ability to send and receive mails are necessary in day-to-day life."* – (Farmer's Daughter).

One participant who used very little technology and relied on outdated methods of doing things such as going to a branch as opposed to banking online wanted a class where he could be taught how to use his smartphone for advanced tasks. This was the case even after many years of having his smartphone but using it only for the most basic functions. This particular user was not confident to learn how to use technology himself and would be more comfortable in a classroom setting.

> *"Maybe if someone could teach me that would be great, like a class of how to use your smartphone or something like that - that could be useful."* – Farmer 1

In this case, some form of training would be applicable but it is probably difficult to find anyone or institution that offers such training. The participant stated that he had also not heard of such training but would be very keen to attend if he could find it. Training for those who struggle being included is a way of encouraging technology use as it removes barriers that prevent people from using the internet, thus promoting continuity (Bradbook and Fisher, 2004).

Receiving Training towards Digital Inclusion

The section above on giving training explores training that participants interviewed would like to receive. Some of the feedback received from participants showed that older participants who had started using technology in their professions had gone through some form of training when they had to use certain devices for the first time, computers in this case.

> *"I had a computer at work, I started using the internet but only for my work. Then we were on the internet. There was a lot of training on how to use technology and the internet. They would train us."* – Farmer's Wife

This is what one participant had to say about the training that they received when they started using some form of technology in the early 90s. The only other participants who wanted training to use their devices were older people who wanted to be taught to fully utilize the functionality that their phones had to offer. These findings show that most participants did not have a real training need on how to use their devices and how to navigate the internet for their needs. This was more evident in the younger participants who are younger than 30 who have been actively using technology since they were much younger. They explore new features on their devices and taught themselves most of the functions they use now. As a result, ability to use technology comes more naturally to them. Training people in the use of technology and the internet also aids continuity and is a positive aspect of helping users who are not proficient in their use towards increased use (Bradbook and Fisher, 2004).

Opportunity and Digital Inclusion

This study uncovered showed a new relationship between opportunity and digital exclusion. It was identified that where people did not have the means to be included such as a device, this did not always lead to digital exclusion. It was noted that there were other means where this lack of opportunity could amount to some form of digital inclusion.

For example, a participant stated that they often interacted with high school learners from poor backgrounds who did not have devices nor internet access. The participant who is a teacher at the local school identified this as a setback for these students especially concerning further studies and tertiary education as most applications for university and higher learning were now online. This was a dead end for most students as most of them did not continue studying after they completed high school.

However, some students managed to get help from people other than their parents or guardians who assisted them further their education. This was done in one of two ways; students were helped to complete an application for further studies online or students were assisted with resources (financial or other) to travel to universities they wanted to study at/any university selected by person assisting them. People who assisted these students were often the student's parent's employer or a teacher at the school who took interest in the student. The above scenarios show that the lack of opportunity can lead to digital inclusion in one of two ways namely:

- Engagement through others (when a person completes a task on an internet-enabled device on behalf of another person e.g. completing an online university application form for someone with no device).
- Support and guidance (Assistance with other resources (e.g. financial) to improve the life of a digitally excluded person to enable them to be included in future e.g. sponsoring travel to universities for admission purposes).

The categories above are explored further in the Discussion section.

Influence of Digital Inclusion on well-being and achievement of goals

One of the key questions of this study is to identify if technology and internet use help people in developing areas improve their well-being and contribute to the achievement of their goals. The study also aims to understand if the influence on the lives of people in rural areas is positive or negative. Findings on the type of influence that the different participants perceive are explained below.

Positive influence

All participants identified their use of technology for communication as necessary and contributing towards their well-being in one way or the other. This was the case more so for people who were reliant on the use of technology for their livelihood.

Type of internet use

The following categories of internet use were identified; business, family, social, international access, information seeking and job seeking. In all these categories, the internet facilitated positive outcomes for users.

Business Use

Somabhula being farming community, is on the outskirts of the city and Gweru, the closest town is approximately 40km away. Most supplies used on farms are sourced from Gweru, therefore technology has become key in aiding the sourcing of required items – ideally, travel is only organised once suppliers for required items are identified and prices compared. This has become pertinent to travel plans as Zimbabwe is facing fuel challenges so communication and obtaining information on the internet about required products and prices helps create efficiencies and savings before any travel is arranged. Communication via phone calls is another common method of obtaining required information. A participant highlights the importance of this communication in this quotation;

> *"Procurement of items required in the farm is not always easy given some of the challenges that we face. We also get most of our supplies such as cattle dip and food supplies from the city so trips to and from Gweru need to be factored into our operations. Fuel shortages and high cost of tolls to and from the city are important considerations before travel to Gweru is organised. We travel only when really necessary."* – Farm Manager

Apart from use of technology to guide and inform purchasing decisions, the internet is becoming used more and more for information seeking for business-related needs and to inform business decisions.

> *"I use the internet for getting information for our business, for our ranching business. I use the internet to find information about modern methods. How other people are doing the same business*

elsewhere. What has changed about the way we do business since way back and what is different now." – Farmer 2

Family Interaction

This was one of the most common categories for technology use for both users who had access to the internet and those who did not. Those who did not have access to the internet used standard calling and SMS functionality to communicate with family members while most of those with an internet connection had shifted to the use of WhatsApp for communication.

> *"It's convenient. I keep in touch with my family."* – Farm Manager

> *"I use my phone a lot to communicate with my family as they do not live here with me. I often phone them or talk to my brothers and sisters on WhatsApp and in some cases I communicate with family on chat platforms on social media sites."* – Farm Worker 1

A study conducted in Australia by Goggin et al. (2018) found that the internet was also widely used to connect with family and friends across the world, therefore, the findings of this study show similarities in this regard.

Social Use

Many participants used their devices to communicate with friends socially including access to social media, which was both a form of entertainment and communication used as and when desired.

> *"The influence that I think technology has on my life is that I keep in touch with my family, with my friends wherever they are. I really keep in touch with my friends all over the world. We keep in touch and we talk about … what we want to talk about anytime."* – Farmer's Wife

Use of technology for social use is explored in the Age and Ability sections in more detail where the findings are explored in relation to those aspects.

International Access

Participants identified that access to the internet really helped them be in touch with people internationally, both friends and family. WhatsApp and various forms of social media such as Facebook and Instagram were identified as key platforms being used for so doing and allowing for communication with people internationally. This kind of interaction for social reasons is explored in previous sections. One participant pinpointed how they were using the internet for international access to people beyond use for communication purposes only. This participant was actively participating in an international bible study group with people from all over the world. This meant she had access to people to pursue her interests – in this case she did not necessary know them personally like friends and family.

> *"I told you earlier about my bible study which I now do online and we carry on with our discussions and reading the bible and pray together even if they are all in different places and in other countries. My well-being is certainly being enhanced continuously by technology. I can say that technology plus the internet play a very big role in my life and in my career."* – Farmer's Wife

Information seeking

Several participants who actively used the internet were using it for general information seeking purposes. This included finding information on things of interest, hobbies and general information about the world around them.

> *"I get information about things that I want to know about. I read some other things that are of interest to me and I learn a lot of things."* – Teacher

> *"I do research on things that I like, my hobbies and to learn how to do certain things accurately."* – Farmer's Wife

> *"I also use the internet to get information, to read, to read the newspaper, to read. what is going on in the world, what is going on in my district. So I use the internet a lot."* – Farmer 2

Of the people who use the internet for information seeking, a trend in usage was identified. Participants who were working as farm workers and had little education did not use the internet for information seeking as they had no need for this. Only people with some form of education were using technology for information seeking activities for both business and social needs.

> *"I use the internet to access content about a particular disease in the cattle for example, and all the relevant information available comes up such as the symptoms and how can I know which symptoms have affected my cattle and what drugs can I use to give the cattle relief and also what can I do wrong. So like that the content is very helpful to me."* – Farmer 2

More examples of participants using the internet to obtain information for Business needs are explored in the 'Business Use' section above.

Job seeking

Job seeking online has opened doors for many and has created new opportunities for people living in rural areas like Somabhula. It was identified that people seeking employment could now take advantage of this new reality and find jobs in the city on online platforms. Many believe that this will open doors especially for the younger generation trying to make their way into the job market.

> *"The internet presents opportunities for all those looking for jobs especially now that we live outside the city. It is very beneficial especially for the young people in our community. I think there are many goals that we have realised."* – Teacher

Goggin et al. (2018) suggests that the internet presents a platform for citizens to improve their quality of life through digital inclusion for example through access to better jobs. The various types of technology and internet use explored in this section are in line with what the literature suggests. These types of internet use facilitate different forms of well-being for the participants involved. The theoretical framework defines this as achievement with well-being being an example of achievement. The different types of internet use explored here can be seen as functionings where functionings can be used to evaluate the well-being of a person (Salais, 2003). The different types of use can thus be seen as enabling the well-being and achievement of users.

Convenience

Apart from the categories listed above of internet use, it was evident that technology use in general enabled various other benefits for users in the Somabhula community. Many examples came through where

participants identified the internet as enhancing their lives by creating convenience in their lives. Some of the items identified as bringing convenience to the people of Somabhula were community specific given the special needs of the people living there and the challenges that they face. For example, technology enabled Somabhula residents to obtain information about supplies required from Gweru, the closest city before travelling there. This factor is particularly critical within this context as supplies were not readily available in Gweru and other difficulties such as the availability of fuel. Where fuel had been sourced, it became critical that the trip would result in sourcing of all the required supplies.

> *"My well-being is enhanced. No time wasting. I have eradicated unnecessary journeys. I only go to some places when I really need to, when I must. Otherwise most of my tasks I do online."* – Farmer 2

> *"Yes I have realised some goals with the internet. For example, the banking was now getting to be time wasting with all those queues in the bank, you have to wait for hours to be served. But now due to internet, I can now do my banking online at any time in the comfort of my own home. I don't have to wait in those queues … this is a good goal we have realised through internet."* – Farmer's Wife

The quotations above show that convenience was both from time saving, cost saving and only travelling when necessary and for essential travel only. The advantage that convenience brings to day-to-day life for people in Somabhula demonstrates the tangible benefits that technology can introduce in communities. According to Beijing Review (2018), wide use of the internet in rural and marginalized areas can contribute towards significant wins and tangible benefits for people living in these communities.

Community Context

A theme that emerged from multiple participants was the struggles that people in this community face and how technology has made a difference is some of these daily struggles. Typical challenges include fuel shortages, load shedding that can go on for days and unavailability of day to day materials required on farms from stores.

Some participants stated that they felt that their active use of the internet resulted in less worries and peace of mind regarding tasks they are required to perform. This is because some of the required tasks can now be resolved simply by engagement with technology. This was particularly a recurring theme among Somabhula residents given the location of this farming community where travel to the city forms a critical part of day to day life. Technology has resulted in peace of mind where information is more readily available and people are less worried about things that can be resolved by a single basic technology interaction. Examples where this has been the case are the use of WhatsApp groups to understand when electricity will be restored, if supplies required are available from stores in the city and general information seeking on any items which could have caused stress should there have been no technology solution.

> *"The power supply here is unpredictable. There is no clear load shedding schedule but a few years ago we created a WhatsApp group with ZESA, the power supplier where we can get some answers regarding how long load shedding will last and enquiring if there is an electrical fault and so on."* – Farm Manager

> *"So, this influence I think is positive, I know is positive because it is an improvement on my life, less worries, less stress so that I can always find out things that I need to."* – Teacher

The benefit that technology brings in this community given their unique challenges can also be seen as an example of how digital inclusion contributes towards the benefits for people living in rural communities and some of the outcomes that technology can help them achieve (Beijing Review, 2018).

Negative influence

While most participants generally felt that technology impacted their lives positively, a few negative impacts of technology were identified. For example, one participant was worried that they did not know what their children and other younger users were accessing on the internet which could lead to the access of inappropriate content. Another participant felt that it was harder to get equal opportunity for those in rural areas vs those in urban areas who had more access to technology. This meant that those living in urban areas automatically had an advantage and access to opportunity in comparison to their rural counterparts. This also resulted in automatic exclusion of people who do not have the access to the internet and may not even have a device that they can use in some cases.

> *"Everything is online now and people who do not have access to the internet might now be at a disadvantage. Like in our schools, students now need to apply online for university and they often don't have that access given most of their backgrounds here and the incomes of their parents."* – Teacher

> *"Although, most of the influence is positive, I also think that there is a bit of negative influence especially when younger children use technology for example I can't always lock that I don't want my children to see. There is an age where I can't take away phones from them."* – Farmer's Wife

The findings about adults worrying about content accessed especially by younger users has been identified in literature as a risk. Mustafaoğlu, Zirek, Yasacı, and Özdinçler (2018:14) describe the internet as providing "intentional and unintentional" results. Access to "illegal, violent, and sexual content, communication with dangerous people" are some of the risks identified showing the relationship with the concerns expressed by participants in this study.

No change (indifferent)

While other participants felt that technology was a good tool for communication, some still felt that it did not change anything in their day to day lives and that they could possibly live without it save of the few instances they had to make a call or communicate with other people. This goes for both devices and access to the internet. Some felt that they could live with a basic non-internet enabled device and make do without internet access while others felt that they would be able to carry on with life as normal without both a device and internet access. One of the reasons provided for life without any form of technology was due to the nature of the area they live and the type of lifestyle people there live. Most farm workers grew up in Somabhula and live with their families on the farms where they work meaning they have access to them at all times, reducing the need for any technological intervention or non face-to-face communication.

> *"Yes there are a few ways in which I can go about my business without using technology. For example, instead of doing a transaction on my phone, I will walk into a branch and complete the transaction there with the help of a bank teller. Also If I need to communicate I just call as opposed to using something like WhatsApp."* – Farmer 1

> *"I've lived here at the farm with my wife and children for over 16 years. I hardly need to call anyone and I ask for a phone here and there when I need it. My parents live at the plots close to where I*

work so I can always walk there if I need anything from them. A phone is not essential to me." – Farm Worker 2

There is little literature that suggests that there are people who do not see the value or benefit of technology. Most literature points to either the positive or negative impact of technology on people's lives, and findings in relation to each of those sections are provided above.

Potential positive influence if used

This section focuses on the participants who did not use internet-enabled devices on their devices or did not have internet-enabled devices. It is quite remarkable that participants falling into the categories mentioned above acknowledged that there is a lot of benefit to be derived from technology and internet use even though they were not active users themselves. Reasons for their non-use included no means to own smartphones that are internet enabled while others did not use the internet because they did not have the ability (skill) to do so and had the option to use others to perform their required tasks on their behalf.

Most of the perceived benefit of using technology that people who did not use the internet identified was a result of what they heard from other people and how they saw other people use technology in day to day life.

"One of the other guys we work with here tells me that he calls even when he has no airtime. He said it is called WhatsApp." – Farm Worker 2

"My daughter always tells me that my life will change once I master this technology thing." – Farmer

Other benefits identified by people not using technology could be attributed to a form of peer pressure and not what the participants themselves identified to be a benefit. This caused people to feel like they were socially excluded.

"Sometimes I do feel a bit left out and as if I am missing something. For example, friends and family will often talk about things that they are sharing on WhatsApp and other platforms on their smartphones and tablets and all of that." – Farmer 1

The benefits identified by non-users are consistent with the benefits suggested in the literature such as cost savings, easier communication and easy access to information and more so, digital inclusion where belong can feel that they belong (Beijing Review, 2018; Van Deursen, and Helsper, 2018).

The significance of the findings provided in this section and their meaning is explored in the Discussion section below. This includes highlighting of new or unexpected findings and explanations of why this may be the case. Recommendations for future studies based these findings are also provided.

Summary of Findings

A summary of the findings of the study is presented in Table 1:

Item	Findings
Factors affecting Digital Inclusion	**Age** - Of participants under 30 interviewed, all were highly engaged and had a good grasp of technology and used the internet. Differences were identified where it came to the type of device held and the type of use of the internet. These differences were mainly attributed to what the participants could afford. Although two older participants stated that they used technology and the internet quite extensively, younger users were more comfortable with their technology use and had a wider range of tasks that they performed on the internet. **Income** - In this study, the higher income earners or the people who were satisfied with their income used more technology and often had multiple devices which they used for different purposes. Lower income earners usually had a non-internet enabled phone or a basic smartphone as their only device with limited internet use as they could afford less data, especially in the tough economic environment in Zimbabwe. Lower income earners had limited access to the internet as data for general internet connection was expensive. **Education** - Previous studies suggest that the more educated an individual is, the higher the probably is that they use technology more actively. Of participants interviewed, three did not use technology at all or had minimal interaction with technology. Reasons for this varied but the correlation to education was not demonstrated.
Types of engagement emerging:	**Engagement through others** • Capability – Users will often engage through others when they do not have the ability to engage directly themselves. • Necessity – There are instances where individuals have indicated that they had to engage with technology through others in order to complete tasks due to circumstances beyond their control. • Choice – There are users who have become accustomed to the idea of asking others to perform tasks for them. **Direct Engagement** This can either be: • Desired usage – users engage on the internet to perform tasks that they want to when they want to. • Forced usage – the digital world has forced people to engage on the internet even in cases where they would not have ordinarily done so. For example, there are certain transactions that can no longer be done in the traditional way that they have previously always been done.
Digital Desires	The following digital desires were identified:

	• Device - People with less opportunity had aspirations for better devices so that they could feel included. • Type of connection – People with less opportunity aspired for a better and more reliable devices and more affordable data, participants with more opportunity were usually satisfied with the device/s they owned but aspired for better connectivity to the internet such as Wi-Fi access which was not possible in Somabhula due to unavailability of infrastructure. • Type of use – Other participants had aspirations to use the internet to do more and do things independently without needing help from others, learning to use certain applications on their devices and the possibility of accessing content in other languages, as most content was in English.
Factors leading to a negative user experience in digital inclusion	• Connectivity Issues - All participants who use the internet in this community stated that they have struggled with connectivity on multiple occasions. Many find that the connectivity is not guaranteed and is better in different places and on different days. • Cost of device - Participants in the lower income groups had aspirations of owning better devices which would enable them to do more with technology and possibly have greater interaction on the internet. In some cases, they simply aspired to have better devices for reliability purposes and to fit in with others. • Cost of data - The cost of data is a big challenge for many of the participants who took part in the interviews. While a few participants with higher incomes (mainly farmers) aspired to have a more superior internet connection such as Wi-Fi, other participants either did not know what Wi-Fi was or any internet connection other than their current connection via 3G. There was a common theme that the cost of data restricted use.
Positive Influence of Digital Inclusion on well-being and achievement of goals	The following categories of internet use that had a positive influence on well-being and achievement of goals were identified: • Business use • Family • Social • International access • Information seeking • Job seeking
Negative Influence of Digital Inclusion on well-being and achievement of goals	One participant was worried that they did not know what their children and other younger users were accessing on the internet, which could lead to the access of inappropriate content. Another participant felt that it was harder to get equal opportunity for those in rural areas as compared to those in urban areas who had more access to technology. This meant that those living in urban areas automatically had an advantage and access to opportunity in comparison to their rural counterparts. This also resulted in automatic exclusion of people who do not have the access to the internet and may not even have a device that they can use in some cases.

Table 1: Summary of Findings

Chapter 5: Discussion

The aim of the study is to understand if technology and internet use play a role in the well-being of people living in rural areas. The findings above help to aid the understanding of the subject and help to fill gaps on what this means and how this should be interpreted and its relationship to literature.

Interpretation

The findings of this study reveal a range of new concepts that present considerations to be taken into account regarding research on digital inclusion.

Factors affecting Depth of Inclusion

The findings show that there are several factors that play a key role in ultimately defining what a person can or cannot do online. Examples of these factors include ability and connectivity which affect levels of engagement. These factors are identified as some of the requirements for a full digital experience (Martin et al., 2016).

This study identifies that as much as depth of inclusion is affected by various underlying factors such as ability and access, choice and income plays a significant role in shaping this. Choice and income determine whether people use the internet or not and to what extent. Choice and income thus play a role in determining how included a person is or how included a person can afford to be. People who choose to engage through others may not be as engaged as those who engage directly as their engagement is dependent on liaising with others first. Type of connectivity was also identified as a factor that affects depth of inclusion. Given that the majority of the participants could be considered as low-income earners, their most common way of accessing the internet was through the use of WhatsApp bundles for connectivity that was restricted to WhatsApp only and not all-access internet. This type of connectivity was restricted by what people could afford and cannot be equated to the access that people who can access anything desired on the internet especially through better connection such as Wi-Fi with no restrictions to what can be accessed.

Based on the findings in this study that affect how people engage on their devices and their levels of internet use, a proposed approach to measure/assess the depth of inclusion is by using the questions below:

- **Device** – Does user have an internet-enabled device?
- **Internet use** – Does user use the internet at all?
- **Type of engagement** – Does user engage on internet directly i.e. independently?
- **Level of assistance required** – Can user complete most tasks without requiring/seeking help from others?

If the answers to all of the above questions are *Yes*, this can be considered to be a high depth of inclusion while a combination of *Yes* and *No* responses would represent lower levels of inclusion.

Age of engagement

Comparing the older and younger participants, it seems ability to use technology more proficiently is better learnt at a younger age as it tends to result in users being more comfortable and confident in their use of technology. While most younger participants stated that they did not have any digital desires as they did

not feel that anything was lacking, older participants who started using technology in adult life had more to learn and thus had more digital desires.

Olson, O'Brien, Rogers and Charness (2011) state that older people use similar technologies to those used by younger users but also find that there is a noticeable difference in their usage rates with the younger users engaging more. While no literature relates usage rates to the age at which users started using technology, this study definitely shows a trend in age of engagement and level of future use which translates into how comfortable people are with technology in later life.

While literature confirms that age is a disadvantage in digital inclusion, it also suggests that for a study conducted in Australia, digital uptake for older users was initially slow and steadily increased (Goggin et al., 2018). This phenomenon cannot be confirmed from this study and this is something that could be explored by future studies to understand if the engagement of the older participants interviewed evolves over time.

Influence of technology on well-being

The items below were identified as some of the benefits of the use of technology and the internet which influenced the well-being of participants interviewed.

Context-derived convenience

A theme that emerged from the study is the convenience that is facilitated by the use of technology. However, it is important to understand that the type of convenience identified here is mainly as a result of the context in which this study is completed. This shows that the type of convenience is a direct result of the needs of the people who are using the technology. This gives rise to the notion that digital inclusion is only inclusion if it meets the needs of the people using the technology at a given time. For example, in another community without the specific challenges faced in Zimbabwe like fuel shortages and availability of supplies, it is not critical to be able to access the internet to find out information as one can easily source required supplies in the city without necessarily having to perform other research tasks to find out if supplies are available. In another context where fuel and supplies are easily available in cities, this might not be a convenience factor.

The definition of digital inclusion used in the study by Martin et al., (2016) highlights that "access and skill to use ICTs are important as the lack of either of these could prevent a fuller digital experience". The findings of this study show that access and skill are not the only critical factors of inclusion but necessity plays a role as it determines the actual need that needs to be met for the end user.

Opportunity and Digital Inclusion

The findings of this study identified that there was a range of people of all ages who did not have opportunity i.e. the means to own a device let alone have access to an internet connection. The conceptual framework used in this study identifies a relationship between opportunity and digital inclusion/exclusion. The nature of the relationship between these two concepts is such that opportunity (coupled with a variety of other factors such as ability and engagement) is a prerequisite for any form of digital inclusion. Where there is opportunity, there are various paths to inclusion if desired whereas where there is no opportunity, the conceptual framework sees this as ultimately leading to digital exclusion.

This study uncovered noteworthy findings about the relationships between opportunity and digital exclusion. An alternative path was identified where the lack of opportunity can also lead to digital inclusion. It was

noted that there were other means where this lack of opportunity could amount to some form of digital inclusion. The lack of opportunity can lead to digital inclusion in one of two ways namely:

- Engagement through others
- Support and guidance

Engagement through others

It was identified that there were instances where people without the means to be included could engage through others. Individuals with no opportunity can be assisted with a device that they can use for their needs at a point in time or be guided to do so on another person's device which may be internet enabled. For example, in the scenario mentioned above where people with the means assisted students by completing application forms for the student online. While the students were not engaged at that point, potential for further their studies could in future enable them to start using various devices such as computers at university and start accessing the internet. This can be seen as an extension of the conceptual framework where no opportunity can still lead digital inclusion by way of engagement through others.

This study identified three broad categories of why people may engage through others. These were capability, necessity and choice. Literature explored does not provide much steer in terms of the reasons why people engage through others, therefore the findings around this provide a good platform for exploration in future studies.

Support and guidance

People with no means to be included such as no devices or internet connectivity can be assisted by others towards inclusion. This is the case as in the example above where students without devices can be assisted by those with resources for example with money to go to a university to apply in person. This form of support enables the student to be included in future leading to another possible extension of the conceptual framework where the lack of opportunity but a certain level of guidance could lead to inclusion in future. This further shows that no opportunity does not always equal exclusion.

Capability deprivation

Capability deprivation is the deprivation of functionings (Sen, 1992). Functionings are realized achievements/expectations of whether a person is able to live the kind of life they want (Sen, 1992:40). Participants were asked if technology had a positive influence on their lives. While all participants identified the influence to be somewhat positive, it was noted that most of the residents in Somabhula who worked on the farms as either farm workers or managers/foremen of some sort were content with the kind of life they lived on the farms. For most of them, this has been their way of life for most of their lives and given their limited education, they do not have firm goals that drive them. There was some indication that perhaps the impact of technology on well-being could be felt in future generations who would be likely to use technology more actively in daily life.

This shows that the aspirations and goals of each individual determine if there is a capability deprivation or not and in most of these cases, the low income earners do not have a basis for comparison to what a better life can look like and in their opinions, there isn't any capability deprivation in their lives.

Relevance

The idea of relevance did not come across strongly in the interviews conducted. Given the generally high literacy rate of the participants, those who used the internet for information seeking were generally comfortable with English as the medium of communication. While some identified that it would be a plus if

content could be more readily accessible in vernacular, it did not detract from the current relevance of the various categories of information accessed on the internet. Future studies can explore this aspect further to identify the importance of relevance in digital inclusion.

Ability and Engagement

The conceptual framework shows the two ideas of ability of engagement as related. The findings indeed show the relationships between these two ideas. However, a new dimension emerged to the relationships between these two concepts was identified where it was determined that while ability guides how engaged a person can be, it does not always limit the type of tasks that people perform as evidenced by the emerging theme of engagement through others. People with less ability can have others perform tasks for them which can still result in high engagement but indirectly.

The conceptual framework in Figure 4 below has been updated to show that ability is only required where there is direct engagement (engagement through self) with a new dimension where 'engagement through others' can occur without the presence of ability.

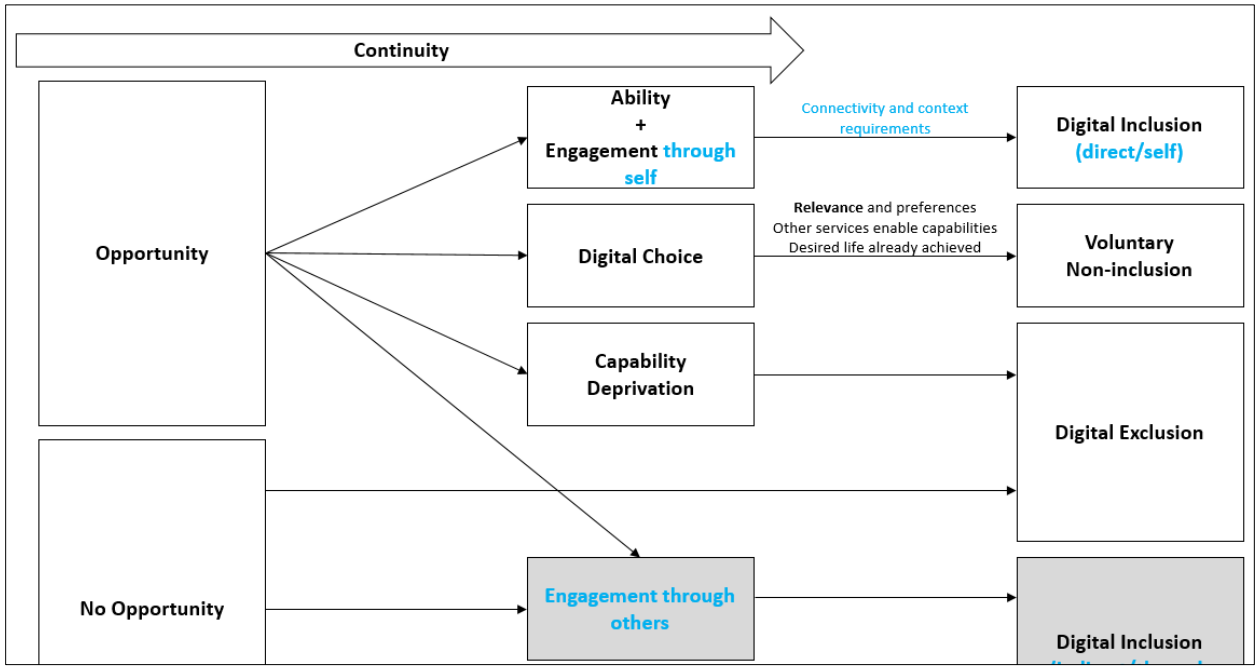

Figure 4: Update of 'engagement' to 'engagement through self' and addition of 'engagement through others' dimension

Connectivity and contextual requirements

Common themes that were identified in the findings were challenges with connectivity as well as other unique challenges that people in the Somabhula community face such as fuel shortages and frequent power outages. These factors are beyond the control of the people living within the community but ultimately play a role in how connected and included they are. These factors therefore need to be considered as they impact the depth of inclusion even though users may have high ability and high engagement. For example, users may have high ability and engagement but experience connectivity issues which means they are included only when they have connectivity. Their inclusion thus depends on these external factors.

The conceptual framework in Figure 5 below has been updated to show that where ability and engagement are present, connectivity or any specific contextual requirements need to be considered before digital inclusion can be achieved.

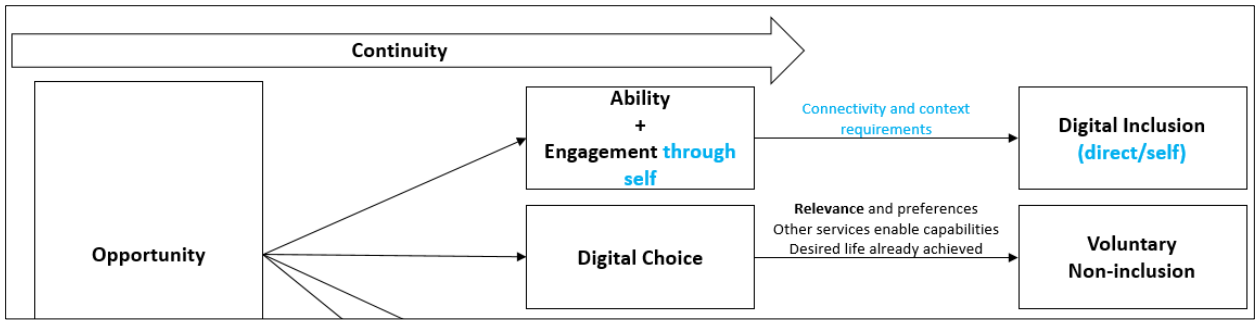

Figure 5: Inclusion of 'connectivity and context requirements' in conceptual framework

Digital Inclusion (Self vs Through Others)

The findings of the study expose an interesting aspect that needs to be considered in the conceptual framework. The conceptual framework shows that digital inclusion requires opportunity (the means to have access to technology), ability and engagement. However, data analysis shows that it is possible to be included without ability. This was identified where participants asked others to perform tasks for them. This demonstrates that some depth of digital inclusion can still be achieved in the presence of engagement but without opportunity and ability as shown by the differences in the initial conceptual framework vs the new framework shown in Figure 6 and Figure 7 below.

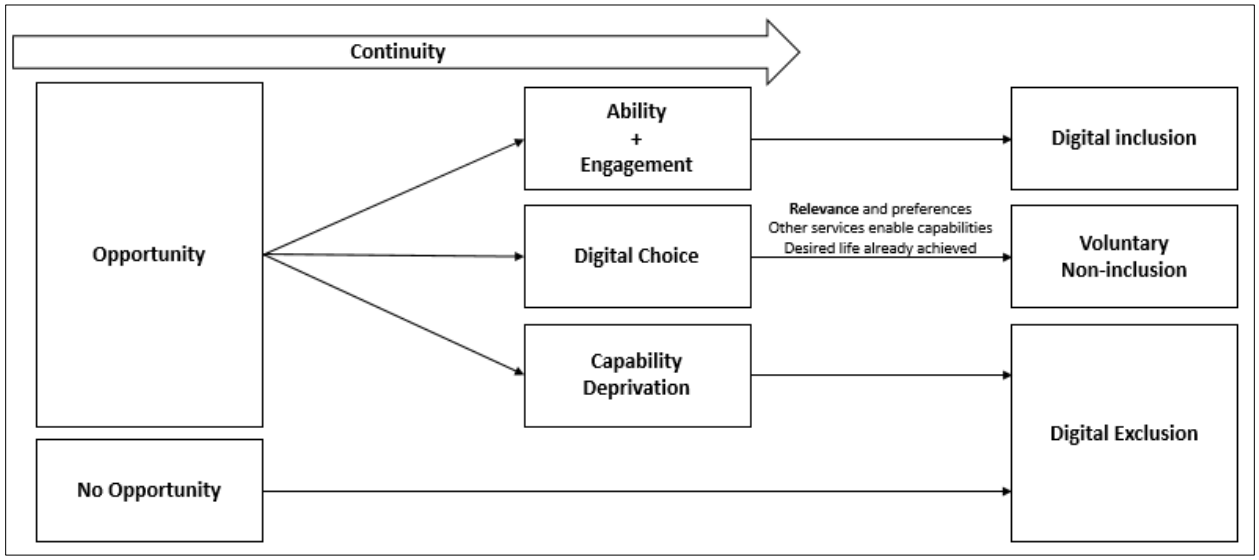

Figure 6: Original Conceptual Framework

The grey blocks and blue text in Figure 7 represent the additions made to the conceptual framework. The updated conceptual framework presents the idea of two types of digital inclusion namely:

- **Digital inclusion (Direct/Self)** – this is digital inclusion where the user is included directly through their own abilities and engagement with devices on the internet. This is aligned to the definition of digital inclusion used in this study.

- **Digital inclusion (Indirect/through others)** – this is digital inclusion where the user is included through engagement that is done through others. This means that the user may not may be particularly good skills to engage directly and relies on others to do so. As a result, such users are engaged and have the tasks that they need done by other people on their behalf.

Digital Choice

Digital choice is defined as the considerations to engage or not in digital material. Factors influencing an individual's 'digital choice' may be cultural or societal. Reasons that may influence the 'digital choice' include preferences in communication, limited/no access and lack of trust in ICTs (Martin et al., 2016). The findings of this study show that digital choice was mainly the result of a lack of skills of the participants interviewed. Given that the setting of the study is in a rural area, this is consistent with the level of skill that literature suggests that people living in rural areas would typically have.

However, a new aspect to the digital choice was identified where people engaged on the internet through others as a result of their own choice i.e. they chose not to engage directly in scenarios where they could because they had other people at their disposal who could perform the tasks for them. This is represented by the new grey block of 'engagement through others' added to the conceptual framework. Where participants could get the same outcome through others and had the choice of people who can assist them – they will consider using this method. This also then presents a different outcome where digital choice not to use technology does not always lead to voluntary non-inclusion but can lead to indirect digital inclusion which is inclusion through others (see Figure 8 below for representation on conceptual framework).

Updated Conceptual Framework

The implications of this the findings of this study result in the need to craft a developed conceptual framework. The blocks highlighted in grey and text highlighted in blue in Figure 7 show additions/changes to the conceptual framework.

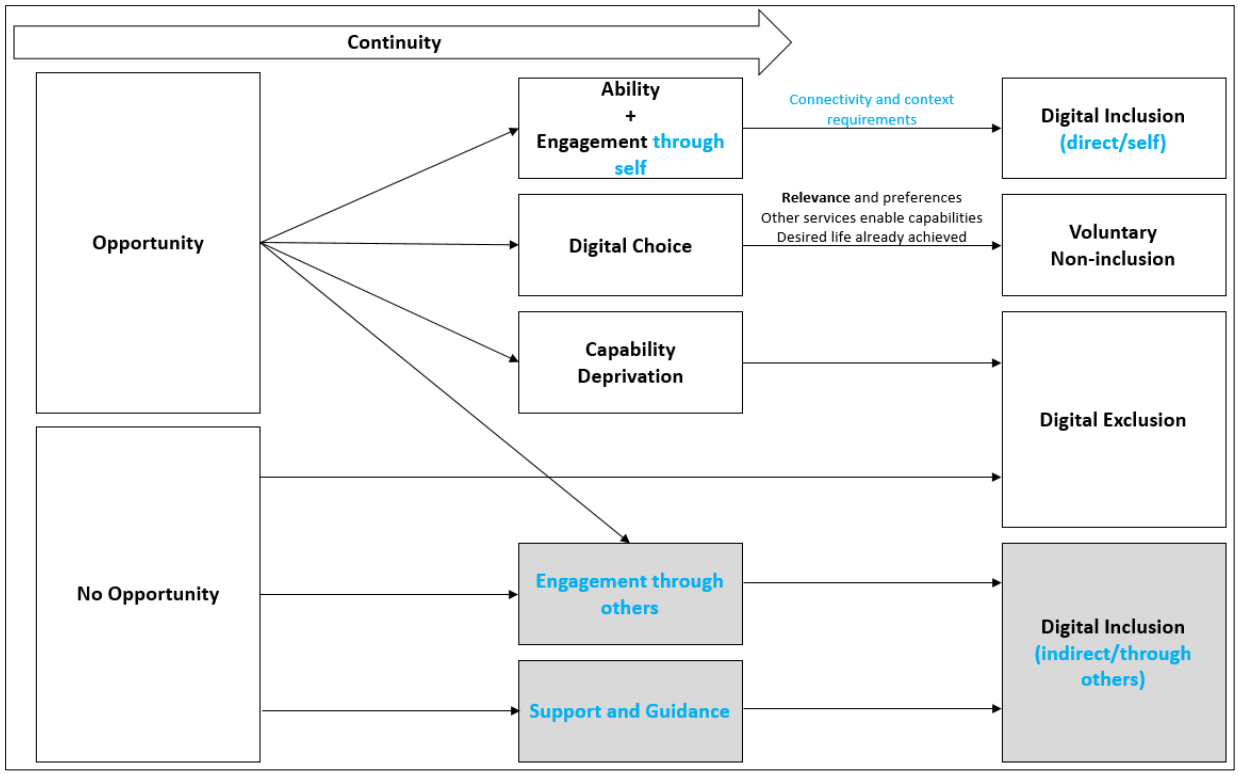

Figure 7: Updated Conceptual Framework

The updated conceptual framework still shows alignment to the Capability Approach used as the theoretical lens for this study. Opportunity/no opportunity shows whether there is a 'means to achieve' and depending on this, people engage differently (self/through others) or do not engage at all. The different choices of how people engage have a relationship with the capabilities and ultimately 'freedom to achieve' present to them. For example, people who engage independently may do so because they have the ability (capability) and freedom (e.g. connectivity) to do so. On the other hand, sometimes people do not engage because they do not have the ability (capability deprivation) or if they do have the ability, they may not have the means to purchase data to complete desired tasks (lack of freedom). The different methods of engagement such as call, text message, chat platform such as WhatsApp or communication via social media are functionings that can enable capabilities but different people will have different combinations of these functionings.

The updated conceptual framework provides scenarios where capabilities and freedom to achieve are used together to achieve the end goal which is digital inclusion. Some scenarios do result in the lack of achievement in the case where there is no opportunity and no other ways to engage resulting in digital exclusion.

The updated conceptual framework shows that there may be external factors (not just individual issues) that result in situations where the means to achieve is present but without freedom to achieve e.g. people have devices but cannot use them to access the internet where there are power outages due to no connectivity. The conceptual framework also highlights scenarios where the means to achieve is not present but freedom to achieve is present e.g. engagement through others.

Notably, it can also be said that means to achieve is therefore not only access to technology but also access to other people with the means to achieve who can aid people who do not have the means themselves to

achieve digital inclusion i.e. some freedom to achieve can occur even without the capability approach's definition of 'means to achieve'.

Chapter 6: Conclusion

This study aimed to understand if technology and internet use play a role in the well-being of people living in rural areas. The findings provide key guidelines on how this should be interpreted and its relationship to literature. Based on the analysis conducted, it can be concluded that technology has an important role to play in shaping well-being in the lives of people living in rural areas. The results show that all people who used technology (including those who did not use it actively or as much as they would like to) acknowledged that the influence that technology and the internet had on their lives was positive. While some people did not use the internet, their use of non-internet enabled devices was recognised as positive and contributing to their well-being. The findings also highlight the differences between what different people see as well-being and what may be considered capability deprivation by different people. These differences show that while some people may have limited depths of inclusion, they do not view this as a capability deprivation or as affecting their well-being as they are content with their current way of life.

Other key concepts explored in the study include how varying levels of ability and engagement affect digital inclusion, the role that opportunity plays in digital inclusion/exclusion as well as factors that may affect the depth of inclusion of individuals. While it was clear that opportunity played a role in the depth of inclusion, four key factors were identified as shaping inclusion. These are; device, internet use, type of engagement and level of assistance required. High inclusion levels could be identified where a user had a device and was actively using the internet independently with no need for assistance for most tasks.

Concepts that came across strongly include opportunity, ability and engagement which led to the revelation of emerging concepts such as engagement through others and type of digital inclusion (direct/self vs indirect/through others). Analysis of these concepts provided guidance on how the group under study compares to the conceptual framework created before data was collected.

In order to ensure continued use of technology in rural areas, some of the themes identified were around training. People who were not very proficient in their use of technology felt training would help them use more technology. Training was seen as a way of encouraging technology use for people with low depths of inclusion as it removes barriers that prevent people from using the internet. The more proficient users within the community were willing and able to teach others use various devices and the internet which is a positive step in fostering the use of technology and aiding continuity in digital exclusion.

Limitations

Prior research on the topic was conducted in developed countries therefore there is likely to be a large gap between what is considered rural in that context vs what is considered rural in the context of this study which is in a developing country. This also meant that the conceptual framework used might not be a great fit for the study as it is not built from literature from a developing country context.

Participants were selected conveniently and due to this selection, none of the participants fit the profile to explore one of the ideas of voluntary non-inclusion presented in the conceptual framework. Future studies can therefore explore this subject to justify if it happens as presented in the conceptual framework.

The setting of this study is in a farming community, out of the city. This gives the study a very unique and specific context that might not be the case in similar studies. Studies done in other rural communities can provide diversity and means for comparison with this study and other future studies. Future studies that

may follow should then consider the context of such studies in comparison to this one to identify if this study provides enough background for what the future study intends to accomplish.

The small sample size of the people interviewed in this study may not be able to provide a representation of rural areas hence the need for future studies to corroborate and compare findings to this study.

Recommendations for Future Studies

The findings and analysis that followed in this study presented the need for recommendations of factors to be considered in similar studies in future. These are described below.

Given that none of the participants fit the profile to examine and understand the concept for voluntary non-inclusion presented in the conceptual framework, future studies could explore this further to understand the considerations that need to be made in order to understand this better. In order to do so, participants who have the means to engage with technology and the internet but choose not to (digital choice) because of various reasons should be studied as well as their reasons for so doing. This will then establish if the relationship denoted in the conceptual framework based on literature can be justified.

Future studies should also consider studying the extensions to the conceptual framework provided in the Discussion section of this paper to identify if this holds true within their studies which may be in a different setting. Concepts like type of digital inclusion (direct/self vs indirect/through others) and reason why people engage through others require ratification to see if they can be evidenced in other studies and used as inputs in future studies given limited literature to be used as an input on this topic. This study also uncovered noteworthy findings about the relationships between opportunity and digital exclusion. An extension to the conceptual framework has been made where the lack of opportunity can also lead to digital inclusion through 'engagement through others' and support and guidance'. These concepts could be ratified in future studies.

The idea of relevance did not come across strongly in the interviews conducted. Given the generally high literacy rate of the participants, those who used the internet for information seeking were generally comfortable with English as the medium of communication. While some identified that it would be an advantage if content could be more readily accessible in vernacular, it did not detract from the current relevance of the various categories of information accessed on the internet. Future studies can explore this aspect further to identify the importance of relevance in digital inclusion.

This study identified a distinction between usage types namely desired vs forced. Literature explored does not identify a split in the type of usage hence this finding provides a new dimension that can be explored by future studies to see if there are people who use technology because they want to vs others who use it because there is no other way to complete their tasks.

This study identified three broad categories of why people may engage through others. These were capability, necessity and choice. Literature explored does not provide much steer in terms of the reasons why people engage through others, therefore the findings around this provide a good platform for exploration in future studies.

The definition of digital inclusion used in the study by Martin et al., (2016) highlights that "access and skill to use ICTs are important as the lack of either of these could prevent a fuller digital experience". The findings of this study show that access and skill are not the only critical factors of inclusion but necessity plays a role as it determines the actual need that needs to be met for the end user as a user may have access and

skill but it is not necessary for them to engage. This definition can therefore be adapted to include user needs i.e. *access and skill to use ICTs are important as the lack of either of these could prevent a fuller digital experience given the user has a need that can be fulfilled by access to ICTs.*

The conceptual framework provides a cross-section at a point in time but some of the extensions to the framework such as 'engagement though others' and 'support and guidance' present an opportunity for future studies to explore them from a longitudinal perspective to see if these result in different outcomes over a period of time.

Research Contribution

Previous studies have focused on the digital divide where the main aim of technology has been to provide access to users who might not have had it. However, with the world moving towards social inclusion, the focus has moved towards the role and impact of technology on social inclusion. This study will contribute towards the body of knowledge by providing pointers to a complex topic and seeking to understand if access to technology and digital inclusion impacts the well-being of people in rural areas. The study used the Capability Approach to assess the issues of digital inclusion, which created a means of comparison with other studies using a similar approach to analyse the underlying issues existing in this field of study.

Also, the Capability Approach identifies the means to achieve from an individual perspective but thus study considers how people can obtain means through other people. This dimension provides a new perspective that is used together with the original literature on inclusion/digital divide to bring about the social/community element that tends to lack in existing literature.

The conceptual framework presented in this study also provides a framework which can be used by researchers in future when performing similar studies from a combination of the synthesized models of Helsper's (2013) access, skills and attitudes together with the 5 C's as defined by Bradbook and Fisher (2004). New ideas are then added to the framework based on the findings creating new unique concepts. The synthesis of these concepts is a contribution to the body of knowledge which can be reused in other studies and thus contributing to the growth of the field of study.

Apart from this theoretical contribution, this study also provides a practical view on the reality of digital inclusion and exclusion from a developing country perspective in a field of study that is still growing. Literature used as the basis for the study was mainly from a developed country perspective therefore this study provided much needed context for future studies to build on in the context of developing nations emphasizing the transferability of the study.

With the rapid changes in technology and the need for people to continuously learn and acquire new ICT related skills, this study answers important questions about social and digital issues which affect people's access to and use of ICTs in rural areas. It also provides important guidelines on how ICTs can start to make greater impact to well-being and goal achievement for people living in rural areas.

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Appendices

Appendix A: Glossary of Terms

Rural area – Rural areas are areas which are not considered as being within an urban area (towns or cities) – anything that is not considered as urban is thus rural. Rural areas are often farming or agricultural areas (U.S. Census Bureau, 2018).

Technology/ICTs – For purposes of this study, technology comprises of the device/platform that is used for various functions including to access the internet. Technology also includes the type of internet connection that a user has for example broadband, wireless or 3G. For purposes of this study, the device that will be considered as part of this project are mobile phones, tablets and personal computers.

Appendix B: Interview Protocol

The interview protocol used for this study is outlined below.

#	Question	Conceptual Framework	Research Question	Theme
1	Tell me a bit about yourself and what you do? Probing: 1. Are you employed? 2. If yes, what is your occupation?	N/A	a	Community context
2	What is your experience of living here? Probing: - What is important to you and as a member of this community?	N/A	a	Community context
3	How old are you? - Younger than 20 - 20 to 30 - 30 to 40 - 40 to 50 - 50+	N/A	a	Factors that aid inclusion/exclusion
4	Do you have a disability?	N/A	a	Factors that aid inclusion/exclusion
5	Do you hold any qualification?	N/A	a	Factors that aid inclusion/exclusion
6	How satisfied are you with your income?	N/A	a	Factors that aid inclusion/exclusion
7	Do you use any form of technology?	Engagement	b	Technology use
If response to Q7 is "no" i.e. participant does not use technology – answer questions 8 to 13.				
8	What are the reasons that you do not use any form of technology?	Engagement	d	Digital Choice

#	Question	Conceptual Framework	Research Question	Theme
	Note: Establish if non-use is by choice			
9	Are there any factors outside your control that hinder your use of technology? Probing: - Any other examples of such factors e.g. cost of device?	Engagement	d	Digital Choice
10	Is there anything that would make you use/want to use technology?	Engagement	d	Digital Choice
11	Are there other ways/methods that enable you to achieve the things you want to achieve without the use of technology?	Engagement	d	Digital Choice
12	Do you think that your non-use of technology affects your quality of life in any way or hinder you from achieving a sense of well-being in any way?	Engagement	d	Digital Choice
13	Do you feel that not using technology or the internet disadvantages you in any way in comparison to others who actively use technology?	Engagement	d	Digital Choice
If response to Q7 is "yes" i.e. participant uses one or more forms of technology/internet – answer questions 14 to 30.				
14	What device/s do you own and do you have access to the internet and in what way e.g. 3G/Wi-Fi? Probing: - If user has multiple devices: o Do you use different devices for different purposes?	Engagement	b	Engagement measurement
15	If user uses internet: - What kind of tasks do you use the internet for? Probing: - Do you perhaps use the internet to access social media or for information seeking purposes? Note: Understand which category participant falls in *a) Basic or practical – information seeking, communication*	Ability	b	Engagement measurement

#	Question	Conceptual Framework	Research Question	Theme
	b) Participatory activities e.g. financial services *Advanced – social media i.e. connect with people beyond immediate network*			
16	How did you start using technology and the internet and would you teach others to do the same?	Engagement	b	Engagement measurement
17	How long have you been actively using technology in everyday life?	Engagement	b	Technology use
18	How often do you use technology? Probing: Understand which category participant falls in *a) Everyday* *b) At least once a week (but not everyday)* *c) Less than once a week* *d) Monthly* e) *Don't know*	Engagement	b	Engagement measurement
19	How do you rate your ability with technology and internet use?	Ability	b	Engagement measurement
20	In what ways do you feel that content you access on the internet is relevant to you? Probing: - In what ways do you think internet content could be more suited to you? - Is the language that the content you access suitable for your needs?	Relevance	a	Factors that aid inclusion/exclusion
21	Have you ever used a friend, relative or another person to obtain information for you on the internet or to do a task like placing an order or making a payment? Probing: - Why is that so? *Is It because you could not do the task yourself or other reasons?*	Ability	b	Engagement measurement
22	Do you wish you could use the internet to do more? Probing: - Why is that so?	Ability	b	Engagement measurement

#	Question	Conceptual Framework	Research Question	Theme
23	What new functions would you be interested in learning to perform on the internet if any?	Continuity	e	Continuity
24	What devices and kind of internet connection do you aspire to have to enable you to live the life you want to?	Continuity	e	Continuity
25	Are there any factors outside your control that hinder or restrict your use of technology and the internet? Probing: - Examples may include cost of device, cost of data or relevance of information.	Opportunity/ Capability Deprivation	c/e	Challenges towards inclusion
26	What other challenges do you face in using technology or internet access?	Opportunity	e	Challenges towards inclusion
27	What resources and support do you need to help you feel more included regarding technology and technology use if any?	Opportunity	f	Challenges towards inclusion
28	What role does technology play in your life? Probing: - How important is it that your technology and internet access are readily available to you? - How has ICT and the internet enhanced your well-being? - Has technology contributed towards the realisation of your goals or quality of life? Note: Establish if role/influence of technology is positive or negative?	Engagement/ Relevance	b	Engagement measurement

Appendix C: Ethics Clearance Certificate

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Research Office

HUMAN RESEARCH ETHICS COMMITTEE (NON-MEDICAL)
R14/49 Makoni

CLEARANCE CERTIFICATE	**PROTOCOL NUMBER: H19/10/16**
PROJECT TITLE	The influence of digital inclusion and exclusion on individual's perceptions of well-being and living the desired life in rural areas
INVESTIGATOR(S)	Ms T Makoni
SCHOOL/DEPARTMENT	Information Systems/
DATE CONSIDERED	18 October 2019
DECISION OF THE COMMITTEE	Approved
EXPIRY DATE	19 November 2022

DATE 20 November 2019

CHAIRPERSON (Professor J Knight)

cc: Supervisor : Dr E Coleman

Appendix D: Consent Form

Title of project: The influence of digital inclusion and exclusion on individual's perceptions of well-being and living the desired life in rural areas.

Name of researcher: Tsungai Makoni

I …….. agree to participate in this research project. The research has been explained to me and I understand what my participation will involve.

I agree that my participation will remain anonymous	YES NO (please circle)
I agree that the researcher may use anonymous quotes in the research report	YES NO
I agree that the interview may be audio recorded	YES NO
I agree that the information I provide may be used anonymously anonymously by other researchers following this study	YES NO
I understand that my participation in this study is voluntary	YES NO
I understand that I am not under any obligation to perform in this this study and may withdraw my consent for any reason at any time with immediate effect. No reason need be provided.	YES NO

……

(Signature)

……

(Name of Participant)

……

(Date)

Appendix E: Participation Information Sheet

Participant Information Sheet

Dear Sir / Madam,

My name is Tsungai Makoni and I am a Masters student in Information Systems at the University of the Witwatersrand in Johannesburg. As part of my studies, I have to undertake a research project, and I am investigating the influence of digital inclusion/exclusion in rural communities. The study is titled "The influence of digital inclusion and exclusion on individual's perceptions of well-being and living the desired life in rural areas". The aim of this research project is to find out to how digital inclusion and exclusion influences people's perceptions of well-being and goal achievement.

As a member of the Somabhula community, you are invited to take part in an interview which is entirely voluntary. This is a once off activity that will involve answering a few questions and will take around 45 minutes. You are invited to participate to provide your view to a range of opinions from a diverse group of community members for input into the research study. With your permission, I would also like to record the interview using a mobile phone.

You will not receive any direct benefits from participating in this research, and there are no disadvantages or penalties for not participating. You may withdraw at any time or not answer any question if you do not want to. The interview will be completely confidential and anonymous as I will not be asking for your name or any identifying information, and the information you give to me will be held securely and not disclosed to anyone else. I will be using a pseudonym (false name) to represent your participation in my final research report. If you experience any distress or discomfort at any point in this process, we will stop the interview or resume another time.

If you have any questions at any time during or afterwards about the research process, feel free to contact me or my supervisor on the details listed below. If you wish to receive a summary of this report, I will be happy to send it to you. If you have any concerns or complaints regarding the ethical procedures of this study, you are welcome to contact the University Human Research Ethics Committee (Non-Medical), telephone +27(0) 11 717 1408, email Shaun.Schoeman@wits.ac.za

Yours sincerely,

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Dr Emma Coleman | Emma.Coleman@wits.ac.za | 011 717 8152