

Technology Access Centres and Community Development: The Case of the Eastern Cape Province in South Africa

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Abstract

The World Bank has in the past reported a 70 per cent failure rate of their information and communication (ICT) for Development (ICT4D) projects in many countries that they establish ICT projects at (Leung, 2013). South Africa as well has several examples of failed ICT4D projects of centres (Benjamin, 2003), especially during the first 10 years of the democratic dispensation (1994-2004). However, the second decade of democracy (2004 to 2014) has experienced better performance by ICT centres and better attempts at using ICT for community development. During this last decade, South Africans, stirred by the reality of the first failed telecentres, changed tactics and development strategies in processes of implementing ICT4D. These technology access centres, also known as e-centres, are now establishing for teaching citizens problem-focused ICT skills to address socio-economic challenges such as unemployment, illiteracy, and poverty. E-centres focus on education and health initiatives. This article describes two successful and one failed ICT4D projects that these two researchers conducted research on from 2012 to 2013, in a study that researched a few ICT centres in four South African Provinces (viz., the Eastern Cape, KwaZulu-Natal, Western Cape and Gauteng). This paper, however, provides details of ICT4D centres located in the Eastern Cape Province as data from all four provinces is vast and is best reported in a few publications, for recording and comparative reasons. Data were collected through personal interviews of persons using the ICT centres and also semiotic analysis of selected online videos on the ICT centres for elaborate information about the centre due to the fact that not many centre users were found at the centres by the researchers during site visits. Thematic analysis was implemented to analyze collected data.

Keywords: Technology access centres, digital inclusion, e-education, public-private partnerships, community development

1. Introduction

It is well recorded that ICTs have vast possibilities for educational and economic development. ICTs broadly include technologies that "capture, store, process, transmit and display information by electronic means" (Rao 2009:3). E-skills are taught by governments to citizens in many countries of the world and are internationally spread through forums such as the World Summit for the Information Society/WSIS (2005). In 2005, the WSIS, encouraging countries to empower their citizens with computer literacy and e-skills enabling people to function efficiently in information societies, defined e-skills as computer and Internet skills useful to 'empower individuals so that they can participate fully as citizens of the information society, and take advantage of all the opportunities before them; opportunities for employment and wealth creation, innovative education and learning strategies, and for using new life-enhancing services, such as interaction with public authorities'.

A wealth of research has been carried out since the 1960s into the role of computer technology in teaching and learning (Kuang-wu Lee & Chuang, [Sa]). In school systems as well as in community organizations in the Western world and in developing countries, the use of computers for different purposes in the classroom, multipurpose community centres (MPCCs) is widespread and this trend is on the rise in developing countries (Rahimpour, 2011). In South Africa, MPCCs have evolved since the mid-1990s, while e-community centres have evolved from around 2009. With the advent of an ever-increasing variety of educational multimedia software; with the various possibilities offered by telematics and above all, with the Internet, there is a growing interest in developing ways of incorporating these "new" technologies into the school curriculum so that teachers and their students may exploit their potential to the fullest. Additionally, there is an increasing preoccupation with the role that these technologies can play in education outside formal settings – e.g., in e-community forums and MPCCs - within the community at large, for open and lifelong learning (Lesame, 2009).

Technology is also used to establish links between formal and non-formal sectors can be developed and strengthened, breaking down traditional barriers to communication and the sharing of information resources. Government alone cannot perform the function of building e-centres and educating the nation (Hamid, 2010). Therefore, government started working with the private sector around 2009 in this quest to spread e-centres nationally for educational purposes. A prerequisite for success and sustainability of such centres is the use a *collaborative approach* in which the community participates fully in all stages and parts of an ICT project (Marshall & Taylor, 2005). This ICT *collaboration model* development model is also advanced in South Africa, for example, at Siyafunda Community Technology Centre (SCTC), (Ismael, 2013). The collaboration is between government, the private sector, municipalities, civil society organisations and other interested funders and parties collaborate to establish and operate ICT centres for the development of areas previously (i.e. before democratic rule) without ICT infrastructure and services.

Technology may be introduced into the education sector at any level of the system, from pre-primary to tertiary, in the non-formal as well as the formal sector. These technologies may be used as tools for aiding in the management and administration of the system or may be introduced into the e-skills curriculum, either specifically as subjects of study, for example where microcomputers are used to teach students basic computer awareness or programming, or as tools to improve the teaching-learning process in relation to other subjects in the curriculum. Where ICTs are fully integrated into the school or MPCC system, they may be used for all three purposes. Some experiences have shown the use of computers in teaching to motivate slow learners or "at risk" students as well teach e-skills to unemployed school leavers to enable them to find employment after completing an e-skills course at an e-community forum or a Thusong Service Centre (TSC) rather than at tertiary institutions that most economically deprived South Africans cannot afford to pay for.

2. Literature Review

Any study requires a sound theoretical foundation which will assist in analyzing and interpreting the gathered data, among others reasons. Theories forming the basis of this study explain how ICTs are used by members of communities. The research is located within the field of community informatics (CI), a theoretical approach that explains how innovations are adopted and used by individuals, especially those unfamiliar with the technology (Gurnstein 2000a, 2000b; Harris, 2001). Other theories relevant for laying a sound foundation for this study are the technophilic and technophobic approaches to the study of the role of ICT in development (Lesame, 2009). The technophilic or utopian school of thought explains the positive ICT role in development and is pro-development, supports the deployment of ICT in communities and associates positive developments with this deployment. This perspective espouses the view that in the economy, ICT expands productivity and improve employment opportunities, and upgrade the quality of work in many occupations. Moreover, ICT offers many opportunities for small-scale, independent and decentralised forms of production. Regarding developing countries, technophiles envision that technology will aid countries to leapfrog stages of development (Matsepe-Casaburri, 2002).

As much as there are optimists about the role of ICT in development, there are also pessimists that view ICT as not contributing positively to development. Known as technophobes, these thinkers regard ICT as having a negative effect on development and contributing towards the expansion of the rich-poor information gap, the literate and the illiterate. Results of this study indicate more optimistic or technophilic results of how ICT has developed two rural Eastern Cape communities (Dwesa village and the town of Cofimvaba), while the results from another town (Cradock), indicate that ICT has not touched the lives of people which the ICT centre was established towards developing, which could be interpreted as a technophobic stance towards technology adoption and use.

There is much literature published in other countries on the role of ICTs in teaching and learning at community ICT training centres and schools (Marshall & Taylor, 2005; Musiyandaka, Ranga & Kiwa, 2013), but this kind of information and knowledge is not abundant in South Africa. This study contributes towards increasing existing knowledge in this area of study. Dwesa village has been researched by a few ICT enthusiasts before (some mentioned in this article), but the Cofimvaba and Cradock ICT centres have not been researched and written about, so this study fills that information void.

2.1 Role of technology in learning and e-skilling

Technology was originally intended to serve as a means of improving efficiency in the educational process (Jones & Knezek, 1993). "Nowadays the role of information and communication technology (ICT), especially the internet in the education sector plays an important role, especially in the process of empowering the technology into the educational activities" (Kaka, 2008:1). Technology such as the internet can be the most effective way to increase the student's knowledge, more especially if used productively. Literature in the United States, Australia and some Asian countries has

established that the teacher or ICT trainer should be the main motivator and initiator of ICT implementation at schools (and, by implication, at any other community centres where e-skills are taught) (Kaka, 2008). ICT trainers or those imparting e-skills to other persons should be aware that they are shapers of social change and future leaders, and should therefore be willing to introduce ICT in teaching and learning activities to impart more knowledge to those being taught e-skills. E-skill trainers should be agents of change from old teaching methods dominated by face-to-face, paper and pen, as well as blackboard communication to modern forms of teaching where technology such as the internet, mobile phones, social media, wikis and others is used to assist learners to gather, share, produce and transmit information.

The past decade has seen the rise of alternative methods of education and social support involving ICT interfaces, which include electronic mail (email), instant messaging (IM), text messaging or short message service (SMS), Web pages, social media and so on. Social support is an integral part of education and student life and ICTs have also been found to offer learners both education and social support necessary to live full fruitful lives. In the study of the role of ICTs in education and social support, Eden and Heiman (2011) found that ICT offers students support, encourage more interaction between students which might evoke more proactive coping strategies, that instant messaging is more useful for receiving social support and email is more useful for practical social and education advice.

2.2 Community Informatics

Community Informatics (CI) is employed in this paper to identify technology available at the centres as well as ICT service providers supporting the e-centres in one way or another. The CI theory is also executed to assist in identifying ICT users and e-skills taught at the selected e-information centres for different educational and economic purposes and contexts. In principle, CI theory explains how ICT is adopted and employed by technology users, especially those users unfamiliar with the technology (Gurnstein, 2000a; Harris, 2001). "The study of community informatics (CI) is emerging in part in response to the challenge of achieving economic and social development for communities through the use of ICT, and pays attention to physical communities and implementation of technologies and applications, which enhance and promote their objectives" (Harris, 1999:74). Furthermore, Gurnstein (2000b) states that CI begins with ICT, as providing resources and tools that communities and their members can use for local economic, cultural and civic development, and community health and environmental initiatives. As a theoretical framework, CI also includes the ICT and the "user" (in this case teachers, school children and other users at the selected schools and TSCs) (and the "uses" to which they put ICT).

In this study, CI was applied in the research methodology part through questions asked in personal interviews, asking those teachers, TSC managers and ICT trainers teaching e-skills and those receiving e-skilling about technologies they use for what educational activities, including hardware and software. Questions about the role impact of the ICT on the learner's education, which fall within the CI realm, were also asked. All these questions therefore, locate this study within the CI field. Fundamental to the advancement of personal education or social and economic development through ICT usage, is access to ICT. Gurnstein (2000b, 3), identifies an "ICT Access Rainbow" with discrete levels, which creates the required environment in which access to ICT can be provided or even achieved. These levels are:

- a) *governance and policy* – which identifies who manages the centres, and promotes cooperation between different stakeholders to establish and operate a community ICT centre. In this regard, Marshall and Taylor (2005) state that the social inclusion approach that is fundamental to a community informatics system (CIS) approach is based on principles of *participation*, *self-actualisation* and *individual responsibilities* to the rest of the community. In South African communities these principles, and also *the social inclusion approach* to community development is practiced through local meetings called *iimbizo*, where all community members are invited to voice out their views about the processes and centres envisaged;
- b) *literacy and social facilitation* – this happens in schools and other educational institutions and TSCs;
- c) *service providers* – are critical in ICT service provision to ensure that community members have access to ICT and information;
- d) *content and services* – this factor is critical in aspects of community development as it aims to promote the relevance of ICT centres to local problems and also the creation of local content in local languages that local people speak, understand and write. In a study on challenges facing women using ICT in the Eastern Cape, Chisango (2013) states that local languages should be used to develop new TSC content as most local women in that province do not speak or understand English and prefer ICT content that is written in their own language, *Xhosa*;
- e) *software tools* – become necessary especially where new local content has to be developed for use local TSC users; and

- f) *devices and carriage facilities*, which include “technical” aspects at a technology offering centre, for example: connections to networks such as the Internet and computers, “economic” aspects such as the costs of using ICT at the e-community forums or TSCs, and “social” aspects such as cultural, educational or literacy, and social barriers limiting the use of ICT.

In this study some elements of the “ICT Access Rainbow” are evident in data gathered and presented in Section 6 of this article.

The next section briefly describes some aspects of ICT centre development and operation which have, in the past few years, contributed to success and failure of ICT4D projects. This description could shed some light later on in the article as to factors which have contributed to the success of the Dwesa Siyakhula Living Lab (SLL) and Cofimvaba Thusong Service Centre (TSC) and the failure of the Cradock Chris Hani District Digital Hub.

3. Factors that Have Contributed to the Failure of ICT4D Projects

The telecommunications infrastructure of sub-Saharan Africa is very underdeveloped, despite the fact that the South African telecommunications infrastructure was (in the early 2000s) more advanced than that of the other neighbouring countries in the region (Goldstuck, 2013). The World Economic Forum Global Information and Communication Report (2012) stated that the sub-Saharan African region still has the least developed ICT infrastructure in the world, and also has a severe lack of ICT skills. South Africa is located within the sub-Saharan region. Furthermore, international and national data made available during the past few years indicate that access to and use of ICT infrastructure and services is not universal in South Africa (Lesame, 2009; Chisango, 2013). It is imperative therefore that this situation of declining ICT service deployment be reversed by establishing more ICT centres moving into the future.

3.1 Poor or absence of a telecommunications infrastructure

African countries have a less developed ICT infrastructure when compared to countries in other regions (Pitt & Levine, 2003). Recent African ICT statistics (2012-2013) indicate that African countries, such as Nigeria, Mauritius, and Tunisia are advancing faster than South Africa (Goldstuck, 2012; Lesame, 2013a). Some structural challenges which have contributed to slow or in some countries retarded ICT facilities growth in some African countries, include the following, according to Mbatha and Lesame (in Lesame, Mbatha & Sindane, 2012):

- Historical structural imbalances and inequalities caused by colonialism, capitalism and related economic conditions that impoverished Africa and its people;
- Low ICT penetration in Africa, which include the following:
- Lack of investment in the ICT infrastructure;
- Investment inefficiencies in the sector;
- Inadequate private sector involvement in advancing ICT deployment initiatives;
- Foreign exchange scarcity;
- Poor management incentives in the ICT market; and
- Insufficient ICT regional development.

The limited telecommunications network infrastructure and level of Internet literacy and accessibility affect the use of such technology and leads to inadequate information sources (Musiyandaka, Ranga & Kiwa, 2013). Community service centres are widely regarded as a key measure of offering a wide range of services needed by the communities to the communities, and empowering to bring about their own development (Conradie, Morris & Jacobs, 2003). The national recognition that ICT centres contribute towards community development has pushed African countries like South Africa to accelerate the development of such centres with the hope that social ills such as high illiteracy levels and lack of access to developmental information will be reduced. The three ICT centres researched in this study were developed towards contributing in one or another to community development.

3.2 Absence of a well-integrated or unclear government ICT policy

In the last decade South Africa has failed to develop a well-integrated ICT policy which promotes the development and use of advanced technology such as broadband. Former Communications Minister, Dina Pule (2012a; 2012b), stated that the government remains committed to delivering “100 per cent broadband penetration by 2020 and delivering a million jobs by 2020”. Similar promises of ICT infrastructure delivery by government have been made in the past by other

ministers, but most of these promises have not been fulfilled and the country's ICT services remain underdeveloped and consequently Minister Pule was fired in 2013 by President Jacob Zuma for, among other reasons, poor delivery of ICT services, nepotism and corruption (*City Press*, 2013; *HumanIPO*, 2013). Critical ICT industry analysts, such as Muller (2012), believe that what is needed to deliver ICT infrastructure and services in South Africa is "less talk and trips by government officials and more action". Current Communications Minister Yunus Carrim published a new Broadband Policy in November 2013, which is aimed at providing wider access to ICT services and broadband Internet (Mungadze, 2013). The sooner the stipulations of the Broadband Policy are implemented in reality will access to and use of ICT services improve in South Africa. This ICT infrastructure improvement could contribute towards different levels of community development. Additionally, the International Telecommunication Union (ITU, 2011) regards the mobile revolution – including the emerging mobile-broadband Internet – as a key enabler to achieve internationally agreed development. In 2013, more than 94 per cent of South African households have access to mobile phones (*e-Skills Institute Newsletter* 2013, Edition 21). The challenge is to apply and use these mobile phones to advance educational initiatives and create jobs.

3.3 Lack of social capital to use ICT or lack of interest in using ICT

In order for individuals to use technology, they should be positively inclined to using technology. Individuals who do not like technology because of various personal and cultural preferences often do not use technology and are also technophobic towards technological use. This technophobia is also referred to as "retrogressive behaviour" in technological language (Howard, 2008 in Musiyandaka et al., 2013), which means behaviour that displays ignorance towards ICT and lack of interest in learning about ICT. Van Dijk (2008) refers to this kind of barrier to ICT use as lack of motivational access, which could be a result of variables such as people having no time for or liking of computers, lack of ICT skills, rejection of the medium (Internet and computer games), lack of money and no need or significant usage opportunities. Additionally, Ngcobo and Herselman (2006) mention illiteracy and cultural beliefs (for example, fear of computers) as some aspects of "retrogressive behaviour" which inhibit some persons from using computers. Chisango (2013) alludes to lack of ICT knowledge and knowledge of one language (Xhosa, in the case of Chris Hani municipality in the Eastern Cape Province, where Chisango conducted research) is also a barrier to Internet use as users prefer to use their own language, Xhosa, instead of English which most people in that rural area cannot speak or write.

It is crucial therefore, that local people should be educated towards a positive inclination about computers and this is an area where we as researchers should play a significant role, by teaching those who are fearful of computers about how the computers can help to improve their education and consequently their lives. Local ICT users should also be encouraged to learn the English language which is dominant on the Internet while they can also promote the use of their own languages online.

3.4 Irrelevance of technology to local problems

Technology can fail to develop some communities because the introduced technology was not aimed at assisting local people towards solving their specific socio-economic challenges. This lack of relevance of technology to solving local problems has resulted in some community members not using ICT as they did not see its relevance to improving their lives. Musiyandaka, Ranga and Kiwa (2013) term this barrier to ICT use "design-reality gaps", which indicates a situation in which ICT4D projects were developed in community without the necessary awareness of the socio-cultural context of local people, lack of motivation and lack of understanding of the role of ICT in solving urgent local community challenges, a shortcoming which often results in the failure of an ICT project in its initial or pilot stages or could lead to a project to be unsustainable in the long run especially if community members fail to adopt the project and use it as their own. It is therefore critical for ICT developers to communicate better with members of each community to assess what the community development needs are, so that each ICT projects is developed towards trying to assist a community towards addressing the identified social challenges. This also improves the chances of community members using the ICT centre, marketing it to more community members and consequently owning it.

3.5 Lack of dedication by ICT centre operators to the ICT project and community development

Communication to members of a community about how an ICT centre should be operated is one of the important factors which determine the success of these centres, as already stated earlier on in this article, as per collaborative model to ICT project development (Ishmael, 2013). It is critical, therefore, that individuals who are able to include other community

members in the running of ICT projects be appointed to operate such centres, not individuals who have no interest in selling the idea to other community members and including the latter in the running of a centre. One proponent of the collaborative model to community ICT centre development, Conradie (1998) states that community ICT centres require "local pioneer scouts" to run such centres, and that these development leaders should be trained in financial control and human resources management, if the centre are to succeed. Furthermore, the developmental and entrepreneurial activities at rural telecentres tend to operate according to the principles of Integrated Regional Development (IRD). This approach involves an investment in developing the knowledge, skills and entrepreneurial abilities of the local population, and requires considerable predevelopment activity (Conradie, 1998). There should be more cooperation and communication between members of the community and ICT centre managers as well as funders. In the ICT centre that has failed in its quest to develop the Cradock community, as far as this study found out – as explained in the results section – it is evident that the ICT centre manager failed to implement the *collaborative or stakeholder approach* to ICT centre development towards community development, hence the non-operational status of the Chris Hani District Digital Hub. Stakeholders should also highlight the value of community education.

The next section looks at ICT success factors which those who operate ICT centres should take cognisance of and apply when developing and running these centres.

4. Factors that Have Contributed to the Success of ICT Centres

Research in South Africa and other African countries have indicated that the following factors are some of the socio-economic conditions that contribute to successful development and running of technology centres for ICT skills training and education.

4.1 Increased role of public-private partnerships in e-centres, education and business development

Public-private-partnerships (PPPs) in establishing and operating ICT centres in rural and urban areas, have led to successful running of such centres and also e-skilling of citizens (Marshall & Taylor, 2005; Hamid, 2010). A public-private partnership (PPP) is "a cooperative venture between the public and private sectors, built on the expertise of each partner, that best meets clearly defined public needs through the appropriate allocation of resources, risks and rewards" (The Canadian Council for Public-Private Partnerships, 2008). In Australia, LaRocque and Latham (2003) define PPPs, at one extreme, as partnerships between public sector investors and businesses for the purpose of designing, planning, financing, constructing, or operating infrastructure projects that would normally be provided through traditional procurement mechanisms by the state. On the other extreme, they describe PPPs as any private and public cooperation or collaboration that aims to achieve a common goal, no matter whether the partnership is formal or informal. These developed countries' definitions of PPPs are slightly different in purpose from the South African definition and interpretation of this concept, which attempts to consider community needs and deficiencies, such as introducing an element of empowering the disempowered who did not necessarily fund the establishment of that ICT project but benefit from its inception and operation. The South African definition states that a PPP is a joint public and private sector development funding project "which is part and parcel of an empowerment programme with emphasis on community driven development" (Motshekga, 1999). These partnerships have been implemented in South Africa not only in the ICT sector but also in education, health and other sectors to serve public interests or meet public service obligations. According to the ITU InfoDev (2008) governments in both developed and developing countries are turning to the private sector for the delivery of infrastructure services because of the following reasons:

- a) Recognition that the private sector organizations have superior management skills, understand the market and marketing forces, are motivated and financially efficient, even though they are driven by financial profit and may have a limited tolerance for risk in challenging situations; and that
- b) Government has a mission and responsibility to meet social and developmental needs and service objectives which are in the public interest; it has financial resources it can invest in to secure skills and government direction or vision and financial reasons.

The private sector, after shifting fortunes in development theory and practice over the years, is widely recognized as the key to economic growth (Garforth, Phillips & Bhatia-Panthaki, 2007). There is a growing trend, internationally, to pursue and implement PPPs as ICT and telecommunications services delivery tools and the success of the PPPs in achieving development goals has yet to be assessed by future research in many developing countries. The growth in private sector participation has been a catalyst for the expansion of PPPs in the education sector, hence the explanation of this growing ICT-funding imperative and trend in this section in an elaborate manner.

Due and critical consideration of PPPs is also necessarily provided, in this section, because there is a paradigm shift in international communication and telecommunications sectors towards PPP-ICT project funding, a shift from previously either government-only or solely private sector funded. Fife, Hosman and Pereira (2008) attest that this shift towards PPP-ICT funding is globally viewed as a more effective way to manage development assistance than previous means and that although PPPs have been around for over a hundred years in the United States of America (US), growth in their use began in the 1980s and has continued in part because this kind of collaboration is thought to allow a more effective way to manage risk, garner capital for large scale efforts, and to deliver services in a cost-effective manner". What is clear thus far, and visibly observed by ICT researchers globally, is that there is a growing trend also in developing countries, of ICT private firms, such as Microsoft and Cisco pursuing ICT funding of development projects in developing countries. The World Bank also advocated the implementation of ICT PPP projects for the advancement of development initiatives (World Bank, 2006).

South Africa has adopted the ICT PPP trend, the purpose of which is to empower citizenry and develop ICT capacity at individual, group (in ICT4D centres such as the ones reported on in this article) and institutional, including schools, universities, post offices and libraries levels. The imperative to develop strong PPPs in the delivery of South African education is the result of the need to address educational challenges such as ICT skills shortages to ensure that the government's broader economic and social objectives are met. Private companies have advanced ICT skills, which government departments may not have and the private sector has taken it upon them to assist government in ICT skills development, e.g. Cisco and SAP (a technology development company). While PPPs are the key to education service delivery, what must be reconciled is the interest of government on the one hand to ensure service delivery at a low cost, with that of the private sector aimed at maximizing returns on investment (Lesame, 2009). The long term benefits of PPPs are that as a result of private sector participation in them, government can redirect extra resources to other priorities such as poverty alleviation, housing shortages and health challenges.

Langa, Conradie and Roberts (2006), concede that the South African government and private-sector bodies have responded to South Africa's digital disparities by launching a range of policies and programmatic interventions. These have mostly been attempts to increase access to digital ICTs in rural areas, including the provision of email or Internet access to schools and installation of infrastructure at centres that serve previously disadvantaged communities. Furthermore, ICT access provision projects established at universities, including Walter Sisulu University in Umtata (Eastern Cape Province). No one entity has the resources to fully address the imbalance of access to skills development for the underprivileged majority (Hamid, 2010). Some of the multi-stakeholders engaged in the new e-skills training initiative include universities, government Ministries of Higher Education and Training and Communications, civil society, and business and global development partners (e-Skills Institute, 2012). Universities participating in the ICT training programs in South Africa's nine provinces include the Durban University of Technology, the University of Pretoria, Walter Sisulu University, Vaal University of Technology, University of Limpopo, and the University of the Western Cape. Civil society organizations involved in the project include the South African Local Government Association, which represents local municipalities and ICT training requirements thereof; the telecentre organization, an institution representing the e-skill training needs of communities and telecentres located in such communities; and the International Computer Driving License (ICDL), an organization specializing in teaching computer and online courses for different occupations. Global developmental partners engaged in the projects include the United Nations Development Programme (UNDP), and the governments of Kenya and Rwanda. Business partners include the South African telecommunications incumbent, Telkom, private company, Cisco, which add both financial and human resources as well as advanced ICT expertise.

4.2 Organisational information sharing about community development issues and challenges

Another factor which is closely related to the formation of collaborative PPPs towards community development is the sharing of development and community information by the parties planning to introduce technology in rural areas. This is true especially for government agencies in South Africa such as the Universal Service and Access Agency of South Africa (USAASA), an organization that was legislated to establish community-based ICT centres since 1996, when the Telecommunications Act No. 103 was enacted and mandated this agency to establish ICT4D centres. This agency, USAASA, has gathered much information about telecom access deficiencies in South Africa such that it can share this wealth of information with other organizations which have interest in assisting government in the delivery of ICT facilities and services. Communities interested in developing ICT centres in their areas should also be willing to share their development challenges to organizations that are interested in assisting these communities towards rolling out ICT4D centres and related educational facilities in these centres.

4.3 Progressive and inclusive ICT policy towards creating an information society critical and necessary

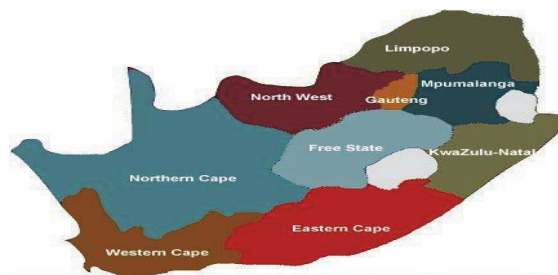
Technology changes rapidly. This necessitates that governments also catch up by developing ICT policy in line with advancing technology. The South Africa has failed to develop effective ICT policy, as stated in Section 3 of this article and this lack of ICT policy development for over a decade (between 2003 and 2013) has contributed to the slow growth of the national communications sector. Until the huge national urban-rural digital divide is reduced or eliminated, South Africa is not a real information society at this stage (Lesame, 2013a). The different economic, political, and social revolutions that have transformed South Africa into an industrial society have not changed the country into a fully-fledged information society. Neither is South Africa producing abundant information. A clear ICT policy is therefore required to ensure smooth transition from an industrial to an ICT-using and information producing society. The government also has national responsibility of running educational campaigns which should be geared towards educating those South Africans still unaware of what ICT is, as well those who show no interest in ICT usage as a results of ignorance and other factors, about what is it that ICT can do towards the improvement of those who use it.

The research methodology employed to gather and analyse data is described in the next section.

5. Research Methodology

Due to the diverse and enormous nature of urban, semi-urban and rural areas of South Africa, the study only targeted selected centres located at four rather than all nine provinces. The four provinces are KwaZulu-Natal (KZN), Gauteng, Western Cape and the Eastern Cape. These provinces were selected mainly because of their imbalances in terms of ICT development, with Gauteng and the Western Cape provinces being highly urban and having an advanced ICT infrastructure and ICT training programs; while the Eastern Cape and KZN have large rural areas and experience high levels of the digital divide with ICT infrastructure in these two provinces not as advanced as in Gauteng and the Western Cape provinces. Most advanced ICT services are found in the Western Cape and Gauteng Provinces while the Eastern Cape and KZN mostly have rural areas and poor ICT infrastructure. The provinces are depicted in Figure 1.

Figure 1: South African Provinces where Thusong Service Centres are located



Source: Government Communications and Information Services (GCIS, 2013)

Furthermore, in the four sampled provinces, three or four centres were conveniently selected by virtue of these centres being either urban or rural and also portrayed online as being operational. Choosing rural and urban centres would allow the researchers to make informed comparisons about e-skills taught at urban and rural areas due to the vast differences in ICT infrastructure and general community conditions including work opportunities offered by a centre to the members of the local communities. This article, however, reports on information gathered from the Eastern Cape Province and information collected from the other provinces will be reported in other articles, since the length of an article would be too extensive if all the congregated information is compressed into a single publication.

5.1 Research design and participants

To determine what ICT is used by the persons using the sampled ICT centres and for what purposes the users employ ICTs to, triangulation was selected and employed to conduct this study, combining personal interviews (a qualitative research method), and a semiotic analysis of selected online videos on the centres. Mouton and Marais (1988) define triangulation as the "use of multiple methods of data collection to increase the reliability of observations". The personal

interviews were selected because the researchers intended to have an in-depth understanding of what the users do at the centres, where the centres are located and what the geographical and social conditions of the villages and towns where the centres are located and also converse widely with the users about how the centres have improved education and lives of local people. Personal interviews were employed because they allow penetration into subtle social and personal meaning of the e-skill teachers and learners. In this research, the interviews were also employed to ask those e-skilling and e-skilled about the role of ICTs in e-literacy training at the centres. Personal interviews were also employed to ask respondents (and school children at Dwesa village) questions about what they learn at the ICT centres and how their use of the centres had changed their lives. Semiotic analysis was employed because, after conducting some field research (personal interviews) at the centres, the researchers experienced information gaps and felt a need to conduct more research on the activities happening at the centres and also on the role of the centres on community development online, especially concerning issues that the respondents present at the centre could not explain in detail, for example, a description of all the technology used at the Dwesa centre and its uses – the teachers the researchers spoke to could not fully explain what the technologies were but knew that the technology enabled them to access the Internet and communicate with people and organizations located in other parts of South Africa.

Online video analysis, which is part of audio-visual qualitative research, and according to Kellehear (1993), has many traditions within it, including narrative theory, reader-oriented criticism, genre study, ideological analysis, as well as psychological and feminist criticism. Most of these traditions begin with a semiotic approach which focuses on analyzing images, graphics, language, voice, music and sound effects in online videos. This analysis was carried out in this study for the main purpose of determining the role of the centres on improving users' lives from the user's perspective. A combination of research methods also seemed desirable and useful for the main purpose of ensuring the validity and reliability of the results. The main reason for using triangulation is to gain more information from the respondents to answer the research question/s in a satisfactory manner and also to increase the reliability of the research results.

The questions asked in the interviews were arranged in an interview guide. The interviews were carried out during the course of 2013. The participants for the study included both centre managers (school teachers in Dwesa village, ICT trainers, ICT trainers and other stakeholders; $n = 16$), and school children ($n = 26$). Three personnel were spoken to at the Cradock ICT centre and no students; three women centre managers were interviewed at Cofimvaba ICT centre and two pupils; from the Dwesa data were collected from 24 pupils and 10 teachers, ICT trainers and providers as other related stakeholders. Total population, $n = 42$ (Eastern Cape only).

5.2 Research funding

To carry out the study, the researchers were granted research funding by the University of South Africa Management Committee (MANCOM), through the School of Humanities and the Research Office of the University of South Africa, the Women-in-Research Program (Bopape 2012)¹. The researchers travelled to the centres by air from Pretoria, Gauteng Province (where the researchers live and work) to East London in the Eastern Cape Province. From the city of East London the researchers travelled by car to reach the Dwesa village and the small towns of Cofimvaba and Cradock where the ICT centres are located.

5.3 Sampling techniques and data capturing

Consequent to selecting the urban, semi-urban and rural areas, further sampling of the centres was undertaken by using purposive sampling. A list of available and working e-centres was sought and emailed to the researchers by a staff member employed by the government agency responsible for deploying telecentres in communities, which is known as the Universal Service and Access Agency of South Africa (Mahlangu, 2013). This list, however, consisted of a few telecentres. This necessitated that more centres be identified in order to gather more data to achieve the aims of the study. Sampling of the centres was done objectively, by applying the non-probability sampling technique of purposive sampling, where the researchers purposively selected centres that were presented to them by the USAASA staff members responsible for e-centre development. However, some centres on the USAASA (Mahlangu, 2013) email list were not operating, so the researchers access the Internet in search of operating centres from the Government Communication and Information Service (GCIS) Web page (2013). It is on this Web site that the Cofimvaba and the

¹ The researchers acknowledge the financial support offered to them by UNISA MANCOM and the School of Humanities, through the promotion of Women in Research (W-i-R). The researchers also thank the University and the School for the academic support through promoting research initiatives among young and emerging women researchers.

Cradock centres were purposefully selected.

Multi-stage sampling is used as a general sampling technique for the research because it is necessary to choose a few samples at different levels of the research process, i.e. provinces; urban, semi-urban and rural areas; townships and villages; e-skills trainers and trainees, all had to be sampled in order to conduct the applied research scientifically to ensure objectivity and reliability of results. Data were captured and recorded through the use of media, an iPads and a digital camera, as well as note-taking on writing pads. Media such as the iPad and digital cameras are in their very nature objective tools of collecting data as they capture interviews and qualitative data such as digital pictures immediately during the interview time. They also capture dates and times of interviews so the information they capture is accurate and reliable.

5.4 Data analysis procedures

Data analyses were categorized into themes, as these themes and key ideas became apparent in respondent answers. Thematic analysis is therefore that qualitative data analysis method employed while a table is also used to report some respondent answers. To execute qualitative semiotic analysis of the data (and also interview responses), the following procedures (Kerlinger, 1986) were also executed:

- a) *Available material were assembled and put together and themes identified;*
- b) *Oppositional elements* in the data were identified (for example, village and town e-centres and so on);
- c) *The different accounts or answers of respondents are reported in a table, especially those that were memorable.* To execute this procedure, the researchers reported responded stories and accounts, and captured some respondents on video and pictures.
- d) *Critically apply the theoretical traditions* used as the basis of this study to interpret and reflect on the data, while being sensitive to and cognisant of socio-economic conditions the centres are located under having observed the locations and geographical condition during the site visits.

6. Data Analysis: Findings and Discussion

The individuals interviewed at the Dwesa and Cofimvaba ICT centres had positive comments about how the centres have improved their education, computer skills, business and related knowledge. In contrast, individuals spoken to at the Cradock ICT centre stated that the centre was "not operating" and had no impact on their lives since its establishment. The centre had been closed for a few years and computers at a laboratory could be seen through a window full of dust. The interviewees in the latter centre were indifferent about the current centre collapsed status and stated that its opening and function depended on the centre manager, who, on the contrary, was not communicating with community members on how to re-open and operate the "digital hub". One of the micro-managers working at the centre at the time of the research visit provided the researchers with a mobile phone number of the centre managers. The researchers phoned the managers who stated that he was attending another meeting and would call the researchers at a later stage, which did not happen. Follow-up calls made by the researchers to the same mobile phone number could not reach the manager.

Most of the gathered data were qualitative in nature as respondents spoke from the mind about their personal experiences at the centres. Information about the centres is reported next.

6.1 Dwesa village ICT centre

Dwesa village is a rural area in the former Transkei region of the Eastern Cape Province, which is located about 400 kilometres from the city of East London on the Wild Coast in a fishing community. The technology centre was opened in 2005 and is located at Mpume Secondary School in the Mbashe municipality next to the Dwesa-Cwebe Nature Reserve. Although Dwesa is situated in a beautiful country side, the gravel winding roads through which one travels to get the ICT centre are in a very bad condition. Multi-dimensional development is missing in this area and region, but it is necessary that government develop this area and start by developing the road infrastructure to ensure that travelers are able to reach Dwesa safely in the first place. There are also not many employment opportunities in this area and multi-dimensional development projects could bring much-needed jobs to alleviate poverty and destitution. Poverty and destitution can be seen as one drives through the many villages, even though some residents seem to be managing, judging by the few modern and electrified homes one sees along this route. It is also not practical, on the part of the Siyakhula Living Lab (SLL), to expect residents of some many villages to make use of one ICT centre as there are many people dwelling in the many villages one travels through to reach the Dwesa SLL. A personal interview with a female

teacher at the centre revealed that the ICT training centre is a PPP with partners including telecoms operator Telkom's Centre of Excellence, Dwesa SLL (local people), Rhodes University, University of Fort Hare, Cisco, Dwesa community and the local municipality, Reed House System (a software development company), SAP, Nokia, Microsoft, and some NGOs. According to the teachers, at least 17 local schools – teachers and school children - make use of this centre for ICT services. School children interviewed mostly cited using the Internet for research purposes to complete school projects and also using computers to access information and use social media. The centre users come from many villages including Nqabara, Mpume, Mthokwane, Nondobo and others. The total population residing in all the villages in the area is estimated at 25, 000.

Some school children that these researchers interviewed for this study are in Figure 2.

Figure 2: School children using the *Dwesa Siyakhula Living Lab*



Source: Seti (2013)

Residents of Dwesa village adopted ICT to promote development in the area, fostering ICT awareness and a sense of ownership by the community which are further viewed as crucial factors in community development and computer literacy education in the region (Mapi, Dalvit and Terzoli, 2006). That study by Mapi, Dalvit and Terzoli (2006) highlighted a difference between elderly people owning small businesses, who were the most interested in the possibility of integrating ICT into their activities, and young people, who were skeptical about the benefits of ICT; and that in general, females seemed to be particularly more enthusiastic about ICT, possibly seeing it as a way to gain status in a particular society. This research, however, revealed that all the Dwesa ICT centres users were positive and optimistic about the benefits they had derived from using the centre, especially improved education and ICT usage skills. Most elders using the centre were females but school children were equally mixed in gender; there were as many girls as there were boys, although the boys were mostly older (teenagers) and the girls younger than 10 years old. Technologies used for ICT services at this centre include WiMAX, Wifi and Very Aperture Satellite Terminals (VSATs) (Dalvit, Siebörger & Thinyane, [Sa]). Some responses from users of this centre are included in Table 1.

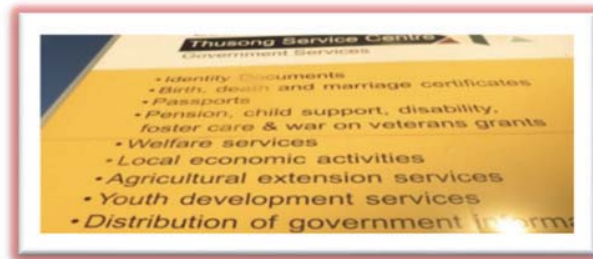
6.2 Cofimvaba Thusong Service Centre

Cofimvaba is a small town located in the Chris Hani District Municipality in the Eastern Cape Province. The town is situated about 200 kilometres from the bigger and more affluent Queenstown, where the researchers resided during the period of their visit. Queenstown is located a further 200 kilometres from East London. The population of Cofimvaba is estimated at 8, 793 people (Wikipedia, 2013a). Interviews with the three female managers of the centre revealed that government departments established the ICT centre, for example, the GCIS², Department of Home Affairs and also other departments which offer members of public services at the centre. ICT centres established by the GCIS are called Thusong (meaning Help in South African Sotho language) Service Centres (TSCs). Information services offered by the centre include the Internet, e-government (applications for birth and death certificates, identity cards, passports and so on), health information, employment opportunities, access to information about universities (for example, the University of

² GCIS: Contact Information – Cofimvaba Thusong Service Centre http://www.thusong.gov.za/provincial_maps/escape/cofimvaba.htm
Retrieved on 19/07/2013

South Africa), computer, photocopying, facsimile and printing services. Other services offered by this centre are depicted in Figure 3. There is no doubt that most local people make use of this centre to access different technological and information services.

Figure 3: Information services offered by the Cofimvaba TSC



Source: Lesame (2013b)

6.3 Cradock

Cradock is a small town located about 292 kilometres from Port Elizabeth and about 200 kilometres from Queenstown. The town is an administrative hub of the Inxuba Yethemba (Place of Hope) Municipality. The estimated population of Cradock is 28, 689 (Wikipedia, 2013). Cradock's economy is supported by agriculture and farming and involves the production of wool, beef, dairy, fruit, lucerne and mohair. There are also game farms surrounding the town which promote tourism. However, observation and analysis of the town revealed that the town has a few historical buildings and businesses that employ some citizens but there are also many unemployed citizens that can be observed idling in the town. The ICT centre is situated in the residential area just outside the town centre. The centre is called Chris Hani District Digital Hub – in Figure 4.

Figures 4: The Chris Hani District Digital Hub in Cradock, Eastern Cape Province



Source: Lesame (2013c)

The researchers were relieved to see the ICT centre building upon arrival at the site. However, this relief was short-lived once it became clear that the centre is closed and no ICT training is offered at the centre. The two officials (male and female) working in the office busy themselves with administrative tasks such as typing, printing and managing the office. The male respondent stated that the centre had been closed for a while but the manager of the centre, who also owned the building was the only person who could explain why the centre was closed. The office was used to assist local persons to start small and medium-sized enterprises, working with the local municipality and government departments. No technology is used for ICT skills capacity building and the computer laboratory is locked and deserted. The ICT centre has totally failed and it is apparent that the community and community organizations are not involved in activities of the "centre". Reasons for the failure of this imaginary "digital hub" (Figure 4) could not be established as the owner failed to contact the researchers as he had alluded to telephonically, nor were the researchers able to contact him as his phone was no longer accessible. This centre is also called the "Institute of Science and Technology". The "hub" or "institute" could be revived if the "owner" could form links with community organizations, government departments, business and

other partners to ensure that the “digital hub” works and assists community members with ICT services. In their analysis of the effectiveness and sustainability of ICT projects in Asia, Songan, Harris, Bala and Khoo (2000) conclude that a prerequisite for success of ICT centres is a *collaborative approach* (Ishmael, 2013), in which the community participates fully in all the stages of the project. In South Africa this approach is known as a *multi-stakeholder or collaborative approach* to ICT development.

Table 1 provides some questions asked to the respondents and some answers from a few respondents.

Table 1: Selected respondent answers

ICT Centre	Research participant response
Dwesa SLL	“After finishing matric I did not get a job and went to work as a domestic worker in East London. My future was not clear. Then this centre opened and I came back to study computers and the Internet at this centre. Now I teach other people computer skills and study with Rhodes University”.
Chris Hani District Digital Hub, Cradock	“Nothing is happening here. This place closed a long time ago”.
Cofimvaba TSC	“Most of the services we offer are government related services. People apply for IDs (identity documents) here and get birth certificates at this TSC. School children type their school work here. Sometimes we use the Internet when it is working. We get Internet connection from USAASA but today it is not working. We also students who study at Unisa and send their assignment online here when the Internet is working”.
Dwesa SLL	Most people in Dwesa are not educated, so we are working with Rhodes University, the University of Fort Hare Hare and this company called Reed House Systems to make Xhosa software so that people at the centre can write documents in Xhosa because they do not know English”.
Dwesa SLL	“We learn about computers and find information about school projects”. “The town is far so people get information here”.
Cofimvaba TSC	“We work with government departments like Home Affairs and Social Development. Home Affairs delivers IDs, birth and death certificates to people here. Social Development offers advice and information on HIV/Aids and counseling, empowers victims of domestic violence and abuse; they also help with social and disability grants (together with SASSA or the South African Social Security Agency) and help with advice on substance abuse and other challenges that we ask them to help us with”.
Cofimvaba TSC	“We also give people government newsletters and pamphlets with information about jobs and other projects. One of the newsletters they get is Vuk’uzenzele which one can also get from the Internet”.
Dwesa SLL	“I am happy when I use the computer because they show us many things and we can come here in the afternoon when the centre is open. I have learnt many things here, I even learnt about Web art”.
Dwesa SLL	“The Internet is changing our lives” I registered my catering service company for the schools online form from the Ministry of Finance at this centre. My business is growing slowly but surely. Thanks to the people who brought this centre here, our lives have changed for the better” (woman in her fifties).

7. Ethical Considerations

The researchers are aware that ethical considerations have to be seriously considered throughout the study. As a matter of principle, the researchers respected the right to privacy and anonymity of the respondents as well as confidentiality of respondent information. Respondents were informed that data gathered from them would be used for academic and teaching purposes, and that the results would be published in academic journals.

8. Conclusions

Detailed analysis and experience around the world reveals ample evidence that, used in the right way and for the right purposes, ICT can have a dramatic impact on achieving specific social and economic development goals as well as assist in pursuing broader national development interests. The real benefits lie not in the provision of technology per se (as in the failed Cradock ICT centre), but rather in how technology is applied to create powerful social and economic networks by dramatically improving human communication and exchange of information – as experienced by the individuals and groups using the Dwesa village and Cofimvaba town technology centres. This research found that the Cradock ICT centre is dysfunctional and has no development impact on its immediate community while the Dwesa village and Cofimvaba ICT centres play very significant and positive role in the improvement of the lives of people who use these

centres for the different purposes stated in this article. ICT, therefore, in these two communities plays a significant contribution to personal and community development, and in some instances is contributing to educational improvement and economic growth. The challenge on the Cradock residents and community organizations is to follow the successful approach to ICT4D, and thus adopt a multi-stakeholder approach to development rather than expecting a one-man show to run a technology centre that is supposed to develop a community. Proper adoption and use of ICT is important and remains a critical challenge. Properly diffused and used, telecom technology has the potential to improve user education and promote community development, as well as facilitate e-government and distance education (or e-education) which are prime South African development goals.

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