Attwood, H. et al. (2013). Telecentre functionality in South Africa: re-enabling to community ICT access environment.
The journal of Community Informatics, 9(4).
http://ci-journal.net/index.php/ciej/article/view/970/1060

Telecentre functionality in South Africa: re-enabling the community ICT access environment

Heidi Attwood, Kathleen Diga, Einar Braathen and Julian May

Introduction

Despite the availability and capabilities of Information and Communication Technologies (ICT) in low and middle-income countries, the use of these constantly evolving tools remains limited for the majority of resource-poor citizens. This is especially the case for internet-based tools. In South Africa, an upper middle-income country, the percentage of the population categorised as individual 'internet users' increased from 5.4 percent in 2000 to just 18.0 percent in 2010 (ITU, 2011). In order to overcome these low percentages, government intervention is frequently adopted, especially in rural areas, where it is not profitable for telecommunication operators to build infrastructure as a means to promote the uptake of internet use in poorer communities (USAASA, 2009: 47). In South Africa and elsewhere, government sponsored telecentres are a common non-profit mode of delivery, however there is much evidence of recurring problems (Gomez et al., 2012). Telecentres have many structural components (human, political and technical) which need to support each other in order to create a functional telecentre (Benjamin, 2001a; Heeks, 2002; Proenza, 2002). The failure of one or more of these components, as detailed by Roman & Colle (2002), Hulbert & Snyman (2007), and Parkinson (2005) can render telecentres non-functional. Such failures continue to plague the delivery of Public Access Computing (PAC) services in South Africa and elsewhere; and in the light of the growth of smartphones, it could be argued that telecentres are not a meaningful mode through which internet access can be delivered (Chigona et al., 2011; Gomez et al., 2012).
However, ICT4D has lacked a robust theoretical base (Flor, 2012; Urquhart et al., 2008) and the literature has been dominated by a rather 'structuralist' and supply-side approach with less attention to individual agency and the demand-side. By considering how elements of agency and structure combine in relation to ICTs, the Choice Framework (CF) developed by Kleine (2010) is a step forward. This approach facilitates the analyses of people's varied ability to empower themselves and improve their quality of life (QoL). Using this Framework, this article analyses the operational experiences of telecentre provision of computer and internet access, alongside user experiences that reveal how telecentre and other structural issues interact with the characteristics of users and their various sets of resources. Based on this analysis, we suggest that PACs should remain a part of the ICT debate, although we question the business model that has come to dominate their operation.

The article is based on a participatory action research (par[i]) project, "Community-based Learning, ICTs and Quality-of-life (CLIQ)", which investigated the impact of free computer training and telecentre use on individual QoL in poorer communities, at four telecentres in KwaZulu-Natal, one of South Africa's poorest and most populous provinces. Using data from project participants through the experience of implementing the intervention over a three-year period, we analyse structural and agency factors hindering or advancing the effective use of telecentres by the local community. Sen's capabilities approach (1999), which Kleine (2010: 676) drew on when developing her Choice Framework (CF) underpins our action research methodology and participatory design.

After providing an overview of findings regarding changes in QoL, as well as impact on participants from the intervention, this paper discusses seven broad factors which impacted on participants' use of telecentres as encouraged through project participation. Applying the CF, factors affecting participant and telecentre use are categorised with respect to the agency-structure divide. Examples of these structural and agency factors, together with other findings on empowerment and development outcomes are presented visually within the CF. We argue that telecentres can be a conduit to improve the well-being of resource-poor people by improving their access to ICT. Moreover, as a venue in which community interaction is possible, telecentres also can provide a socially empowering base for a myriad of personal and business information and communications needs. The paper concludes with recommendations for improving ICT service delivery and asserts that telecentre use can improve the well-being of poorer people, and that it should remain as one mode through which to strive for universal service access.

Access to ICT in South Africa

For more than a decade, the South African government has committed itself to achieving universal ICT access, particularly for the poor in under-serviced areas (Parkinson, 2005). However in order to make effective use of the opportunities resident in access to connected computers, a person needs to be ICT literate and have access to a functional and connected computer. This favours those living in urban areas where infrastructure is more available readily (for those who can afford connectivity) but even then, there are significant barriers to ICT access. The Census of 2011 presents the latest information on household internet use: 8.6 percent of households access the internet from home; 16.3 percent access from their cell phone; 4.7 percent from work; and 5.6 percent from elsewhere. The majority of households (64.8 percent) still have no access to the internet (Stats SA, 2012).

The Department of Communications (DoC) is expected to address the context of low internet usage. Falling under the DoC, the Universal Services and Access Agency of South Africa (USAASA) created the Universal Service and Access Fund (USAF) aimed at extending IT services to those most in need. USAF's main approach was to provide telecentres for those in resource- and service-poor areas. By 2000, USAASA had helped to establish 65 telecentres containing between one and four computers, telephone lines and internet devices, in mainly rural, disadvantaged areas. An evaluation in 2001 showed that 32 percent of the telecentres surveyed were not operating and only eight percent offered access to the internet (Benjamin, 2001b). Common problems with structural components leading to non-functional telecentres were: theft; technical problems; managerial

weakness and lack of financial sustainability. Despite acknowledging deficiencies with regard to functionality, the construction of telecentres in South Africa continued, with the DoC supporting a reported 154 telecentres and 362 cyberlabs (online computer facilities in schools) by 2009 (USAASA, 2010).

In recognition of previous problems, some changes were made over time. Telecentres built in the 2000s had ten computers on average and several new telecentres were integrated into government Thusong Service Centers (TSCs), designed to bring a "one-stop shop" for citizens to deal with government issues ranging from home affairs to social security. A key advantage to being located within a TSC is access to a satellite connection, through SENTECH[ii]. This eliminates telecentre responsibility for the provision, maintenance and payment of internet connectivity. In 2007, USAASA embarked on a programme to restore the functionality of existing telecentres before a planned 'handover' of the administration and maintenance of telecentres to local entities. However, difficulties were encountered both by USAASA and by the earmarked local entities. Revising their handover programme, USAASA's objectives for their 2011-2012 financial year emphasised partnerships with public and private stakeholders, where USAASA would play more of a facilitation role in the provision of ICT infrastructure (Gomez et al., 2012).

While more government-supported telecentres are being built to meet the growing information needs of underserved communities, community members face varying degrees of effective telecentre operations. State sponsored telecentres continue to show mixed results, with many struggling to operate effectively (Parkinson, 2005; Hulbert & Snyman, 2007), although there are some case studies showing financial sustainability, educational impact and/or community ownership (Snyman, 2007; Mphahlele & Maepa, 2003; Etta & Parvyn-Wamahiu, 2003). Given varied outcomes, an argument exists to end the policy of telecentre provision and look for alternatives. However this may overlook important roles that are played by providing PAC services, as well as the value that access to off-line computer applications (such as word processing) and printing holds for the digitally excluded.

Theoretical framework

Castells (1998) raised the concern that many may be excluded from the new 'information society', leading to socio-digital exclusion and the much discussed 'digital divide'. This can be understood through the concept of multiple deprivations, where exclusion from various goods and services are intertwined and where exclusion from goods and services based on ICT constitutes digital poverty (Barrantes, 2007). Sen's capabilities approach (1999), used as a basis for the 'digital poverty' concept, argues that it is not the possession of an asset, in this case ICTs, nor the availability of certain utilities that creates well-being (cf. Warschauer, 2004). Rather, of value is what a person defines as his/her freedoms which allow him/her to use assets, as well as their own characteristics within their environment. From this perspective, the physical availability of ICTs and proper institutional coordination of its facilities (i.e. ICT structures) need to complement a person's ability to make use of the technologies, resulting in social practices that are meaningful to them. Sen's (1999) approach is congruent with 'bottom-up' or participatory

methodologies in which people decide and act on their values and vision of well-being (White & Pettit, 2004; Chambers, 2008).

Kleine's CF (2010: 680) operationalises a model of how individuals exercise choice given existing structures and their own agency (indicated by their resources rooted in personal characteristics), in order to work towards self-defined development outcomes. The degree of empowerment is dependent on the individual's unique combination of two elements: the 'resources' which give them agency and the 'structures' within which they operate. Sen's (1999) capability theory (seeing the ultimate development outcome as freedom and facilitated by participation as a means and an end) is reflected in the CF as degrees of empowerment leading to the primary development outcome of choice. Kleine's CF is specifically related to ICTs but also applicable more broadly to empowerment and development (Luttrell & Quiroz, 2009 and Aslop & Heinsohn, 2005).

Research methodology

Between 2007 and 2011, the CLIQ project provided local participants with **needs-based computer training and free computer use** through four state-sponsored telecentres in KwaZulu-Natal. The research sites chosen under the guidance of the provincial USAASA representative, were TC1 (remote rural), TC2 (peri-urban), TC3 (urban), and TC4 (remote rural). The first three were regarded as functional by USAASA when they were chosen and the latter was deemed "soon-to-be-functional".

A participatory action research (par) process entailing alternate activities of QoL assessment (including at least an initial, mid and final assessment) and computer training was undertaken in all four areas. Two phases of computer training were conducted at each telecentre[iii] - one after both the initial and then the mid quality-of-life assessments (QLAs). A total of 162 people were selected to take part and across the four areas, 113 of these participated sufficiently in order to enable QoL change analysis, resulting in an attrition rate of 30 percent. Overall more women than men participated although a concerted effort aimed for even numbers across gender. From the start of the first phase of computer training until the final assessment, participants needed to have access to working connected computers for computer training and the opportunity to use an allotment of 100 unscheduled free hours on computers in their local telecentre (see Table 1).

Table 1: Outline of CLIQ's participatory action research process (2008-2011)

Dates	Research Stage		Research Method and Topical Focus
June 2008	First Stage: Recruitment & selection of participants		Baseline socio-economic data (through a quantitative questionnaire) for participant selection. Practical information and communication data for logistics
July - August 2008	Second Stage: Initial QLA		Used participatory visual methods in groups focusing on nature and level of QoL, life goals, and information and communication patterns, as well as general area information.
October 2008 to May 2010 (Dates varied extensively)	Third Stage	Phase 1 computer training	Four separate computer-training sessions for each group of about 10 participants, focusing on computer basics; word processing; internet and email.
		Mid QLA	Used participatory visual methods in groups and individually, focussing on review of QoL; reasons for changes and review of life goals; individual communication and information patterns; action planning to reach individual goals and additional computer skills participants' wanted to learn.
		Phase 2 computer	Three separate training sessions for each group of about 10 participants on computer and in group discussion, focusing on 'getting a job'; 'further study'; 'running a small business'; general information searches; and networking.
March to May 2010	Fourth Stage: Final QLA		Using participatory visual methods individually, with limited group work covering an in-depth review of QoL changes over past two years; reflection on life goals; use of computers;
September 2011	Fifth Stage: Dissemination Workshop		Formal presentation of findings to participants and selected local representatives, supported by distributed copies of community report followed by self-facilitated participant-group reflection on findings and way forward.
Note: Shaded blocks indicate period of free computer use at local telecentre for up to 100 hours.			

Following the principles of participatory action research (within critical theory),participants were able to exercise choice in defining their own QoL objectives, as well as in how they used the ideas, insight, knowledge and skill that they gained from classroom-based computer training; from guided reflection on ICTs and QoL; and from interaction with peers and fieldworkers. Participation in CLIQ was centred round the premise that individuals only can empower themselves - they cannot be empowered by others. CLIQ aimed to foster an empowering environment through offering free classroom-based computer training and use, located within a two-year process with structured opportunities for self-reflection and interaction regarding ICTs and QoL.

CLIQ's three project goals are a useful departure point for understanding the different methods used for different aspects of the project and the related research outputs:

Goal 1: assist participants to improve their QoL through provision of free computer-training and computer use within a empowering process;
Goal 2: research changes in participant's QoL, with respect to the CLIQ intervention; and

Goal 3: build the capacity of participating telecentres and telecentre staff.

The first and second goals are the action and research components relating to the research question. Firstly, CLIQ set out to assist participants to improve their QoL by engaging with participants in an empowering process, which included participants' sharing and analysis of their own knowledge, views, experiences and goals (during the QLAs) as well as computer skills training and use. The second goal entailed the systematic recording and analysis of QLA findings on planning, pursuing and reflecting on life goals; the nature of QoL and changes in self-defined QoL; project participation; and the nature of project impact, which was achieved through iterative investigation of a variety of ICT-related, social and economic topics.

During QLAs (usually 3 days in length), a team of fieldworkers facilitated a range of participatory visual diagramming methods (including mapping, matrixes, visual planning, QoL ranking, Venn diagrams; and card sorting) with participants individually and in groups. This activity was guided by general participatory research principles, behaviour and attitudes, including flexibility, learning from others, respect, patience, recognition of diversity and bias, sensitivity, participation beyond information sharing, reflection and so on. Participant discussion during the creation of visuals (and explanations on completion) was recorded, capturing critical information to be analysed together with the visual. Observation, informal discussion and joint activities also yielded information. In addition, a questionnaire was used so that the participants contributed with data which could be used in a quantitative analysis.

Capacity building became the third goal in response to questioning around the benefit that telecentres would derive from their participation - other than direct payment for computer time used by participants (cf. Braathen, Attwood & May, 2012). The ability of telecentre staff to assist CLIQ with project implementation was not questioned prior to fieldwork although their willingness was discussed and secured. While assistance with the management of telecentres and the maintenance of computers were not formally part of the initial design, project management activities grew to include this type of assistance which constituted the bulk of CLIQ's capacity building efforts. The process of capacity building was needs responsive and varied between the telecentres, in most cases addressing the shared needs of the telecentre and the project - as CLIQ could not be implemented in the absence of basic telecentre functionality. The nature of the capacity building activity (like project management) was guided by participatory research principles. The 'by-products' of capacity building (being administrative, observational and communication records) as well as post-field reflection on the experience and perceptions with regard to project implementation, provided insight into issues affecting functionality.

Results: empowerment and development outcomes

Overall, two thirds of the total of 113 participants noted that their QoL had improved between mid-2008 and mid-2010, while one third noted unchanged or declined QoL (22 percent and 12 percent respectively). Reasons for changes in QoL related to engagement with the CLIQ intervention as well as the normal course of life. The three main reasons for improved QoL were: a) got a job or improved nature of job; b) started or improved an own

business; and c) a family member's income increased. The three main reasons for unchanged or declined QoL were: d) no change in opportunities; e) lost a job or got and then lost a job; and e) business declined or had to shut down.

The outcomes of participants' engagement with CLIQ show a range of impacts, each supported by a unique story. Three quarters of participants (77% of 113) noted that CLIQ impacted on their lives[iv] , with just over a third (36% of 113) directly linking this impact to their change in QoL. From the list of more than 20 different CLIQ impacts, the most common impacts mentioned were:

a. felt empowered or increased self-esteem, hope, direction, happiness and/or confidence;
b. more friends, networks and social interaction;
c. attained computer skills;
d. free use of computers; and,
e. acquired greater knowledge of the world or increased access to information.

The research design, participatory methods and project ethos were key to the empowerment of participants, particularly individual goal setting and review methods, as well as participants' ongoing interaction with their peers and with CLIQ fieldworkers (Attwood, 2013). Some of the variation in impact was due to the varying degrees of intensity of project implementation in the four areas. An implementation ranking was created based on the experience of project implementation (including capacity building activity), supported by data on realised dates of planned activities; information from in-depth interviews on participants' experience of telecentre use; and observation of evolving relationships between fieldworkers and participants.

An analysis of individual participation across all activities produced a ranking reflecting which areas had the highest and lowest proportions of participants achieving consistent participation in project activities. Input data on individual participation were derived from project management records detailing for each participant and for each activity, whether they participated fully, partially, or not at all. The results in both cases placed TC1 as the best area, followed by TC2 and then TC3, with TC4 reflecting the lowest levels of participation and implementation. Table 2 shows nature of change in QoL by area. TC1 and TC2, with higher intensities of the intervention and better participation, recorded a higher proportion of participants with improved QoL (around 75 percent), when compared to TC3 and TC4 (with QoL improvement for around 60 percent).

Table 2: Changes in quality-of-life

Code names for telecentres	TC 1	TC 2	TC 3	TC 4	All Areas
Percentage of participants with improved QoL	73 %	70 %	65 %	57 %	65 %
Percentage of participants with un-changed QoL	12 %	20 %	17 %	35 %	22 %
Percentage of participants with declined QoL	15 %	10 %	17 %	8%	12 %
Number of participants (percentage of total sample)	33 (29%)	20 (18%)	23 (20%)	37 (33%)	113
Individual participation and area imple-mentation ranking (where 1st = best and 4th = worst)	**1st**	**2nd**	**3rd**	**4th**	

Source: Authors' collation of data draws on participants' individual analysis of QoL changes between mid 2008 and mid 2010 (for 78% of cases); while analysis of QoL changes for 22% of participants was over a shorter period (between 6 months and one year) due to their limited participation.

This quantitative analysis shows that more effective implementation of the intervention led to an increased proportion of participants with improved QoL and an increased proportion of participants linking the project impact to their reasons for QoL change. Good participation was more likely to lead to a direct impact on reasons for QoL change, which in turn is more likely to lead to an increase in QoL (Attwood et al., forthcoming). The main impact findings from CLIQ (see Figure 1) correspond to Kleine's examples of secondary 'development outcomes' (2010: 680). Issues regarding implementation relate to Kleine's definition of 'structure', while factors affecting levels of participation relate both to her notion of 'agency' and to some aspects of 'structure'.

So why did implementation and participation differ between sites, when CLIQ was implemented by the same team of people, guided by the same action research process? Methodologically, this was expected due to the par principles of flexibility (with respect to local conditions) and evolving process (incorporating lessons and insights from on-going reflection on implementation), as well as the ever-present diversity of human nature. From participants' reasons for occasional non-participation and the experience of implementing the research together with telecentre staff, key factors aiding or inhibiting effective use of telecentres emerged.

Factors affecting telecentre functionality and use

Operationally, the functionality of a telecentre is dependent on a myriad of interconnected factors. The CLIQ research identified factors on both 'supply' and 'demand' sides, as being critical. The supply factors are similar to those identified in most other studies of telecentre functionality: the technology and equipment; organisation and governance of the telecentre; telecentre purpose, policies and vision; the motivation and skills of the telecentre staff; and the mode and efficiency of state support. These are all elements of structure. On the 'demand' side, ICT skills and internet awareness; social spaces, mobility and physical access; socio-cultural factors associated with age and gender; and the financial cost and opportunity cost of using the telecentre, were key factors. These multiple key factors are addressed in the next section. These factors often have both an agency element - being the resource(s) held by individuals - and a structure component -

being the formal and informal regulations or norms impacting on the potential use of the resource(s) in question.

Issues affecting telecentre use generally and participation in CLIQ specifically are discussed below, grouped under factors or headings that best reflect the way information and insight emerged from the research[v] . Examples from the analysis are then located and presented visually within the CF (see Figure 1). The grouping of factors for discussion has not been altered to correspond with Kleine's five specific factors of structure as shown in her CF because this would not be in keeping with the principles of par or of emergent and complex logic models (Rogers, 2008) of which the CF is an example. Furthermore, the interconnected nature of factors influencing use often means that examples from experience fit into the CF in more than one place.

Technology and equipment

Recurring technical problems, identified by Benjamin (2001a) to be a major cause of telecentre failure, were present at telecentre study areas. Users at the three operational sites reported incidences when the telecentres were without internet access, once lasting for several months at TC2. Others issues included the quality of connectivity; maintenance of hardware; selection and maintenance of software; ability to secure and evaluate qualified technical services; stability of electricity supply and security.

USAASA provided a SENTECH satellite connection for TC2 and TC3. While at TC3, the skills to interact with SENTECH when needed were available, this was not the case at TC2, where none of the telecentre facilitators had these skills. This included the administrative skill or technical knowledge to effectively outsource assistance. For example, a TC2 facilitator contracted a local technician to install an anti-virus programme. The technician installed free anti-virus software, but had charged the telecentre for the 'purchase' of the software. At TC1, USAASA provided furniture and computers but not connectivity. This led to the national non-governmental organisation (NGO) associated with the telecentre entering into an agreement with a private software company who installed a GPRS internet connection. However, this connection came with a package including computer interface software, a voucher payment system for controlled access, and remote computer maintenance by the company. This software caused numerous problems at the telecentre for both users and facilitators and was eventually removed. It emerged that neither the NGO director who secured the software, nor the USAASA representative who supported its installation, had adequately evaluated the package prior to installation.

A refurbishment centre at the digital hub at TC3 ensured that staff were able to maintain their own computers. However, USAASA's ownership of the telecentre facility and ICT equipment proved to be problematic. When the telecentre began leaking after a storm, USAASA did not fix the leaking facility or repair the broken computers. The board of the managing NGO was not prepared to pay for repairs of equipment or housing structures that they did not own, and the telecentre was closed until USAASA were able to address the problem. At TC4, theft of computers on two separate occasions within the fieldwork period, together with a lack of technical and managerial expertise meant that the

telecentre was only functional towards the end of the fieldwork period (in the month of May 2010).

Organisation and Governance

The initiating process of telecentres emerged as a key factor in the eventual functionality of a telecentre. The TC3 telecentre was born out of a strategic planning process whereby a locally-based national NGO (engaged in small business development and training) had identified the need for digital communication for small business operators. After initial discussions and a proposal to USAASA, the NGO was awarded a digital hub grant and proceeded to negotiate a contract with USAASA. TC3 became highly functional, offering accredited computer training and some free time for computer use by community members. TC3 was locally relevant and run on principles of good governance, however, their lack of ownership of equipment and housing structure based on existing USAASA policies (as noted above) led to a complete shutdown of TC3. The other three telecentres were initiated from outside of the community (by national government or nationally-based NGOs) and therefore were not based on locally identified needs nor were they appropriate given local socio-economic conditions.

The nature of origin of the telecentre also had an impact on the style of governance and on the ability of the telecentre manager to emerge as a clear driving force regarding telecentre development. The management style and ethos of the "parent" organisation responsible for the telecentre, strongly influenced by the telecentre manager in all four telecentre cases, is a way of capturing the discourse that informs the operation of the centre. Roman & Colle (2002: 6) list "(t)he value of having local 'champions' (innovators) who can mobilise others" in their list of ten themes for telecentre sustainability. This notion of a 'champion' in technology transfer was originally referred to by Chakrabarthi (1974) and adapted by Benjamin in describing an "energetic, responsible and trusted manager ... who will do whatever they can to make the project work, is known and accepted in the community, and who will bring people in to use the centre" (2001a:3).

Across the four sites, the telecentre managers varied greatly with regard to style, skill and vision. At TC2, the manager of the telecentre was also the chair of a local community based organisation (CBO) responsible for the telecentre. He exerted substantial influence over development activity in the area and his authoritative managerial style was a prevalent factor in the centre operations. Facilitators had no decision-making authority, and even though the manager lacked adequate technical knowledge, all communication regarding technical functionality was routed through him, which slowed the process of achieving solutions.

At TC1, the telecentre was housed within the local development centre. In 2008, the development centre was a contested space, with different groups claiming ownership, unclear reporting and accountability procedures and poor communication between the various parties. The development centre manager (also the de facto telecentre manager) at TC1 had relatively low social and political power which hindered her ability to carry out managerial functions. Her authority was also not recognised by the local businesses operating from the development centre (allegedly due to her non-local status) making her ineffective in direct governance issues.

At TC4, the organisation responsible for the telecentre was a national NGO. The provincial chair of the NGO (also the de facto telecentre manager) was also employed by the municipality of the local town and in 2010, became responsible for the management of all community development centres in the area. The politicised nature of the NGO and the municipality as well as his "dual hat" responsibility for the telecentre (through the NGO) and for the community development centre housing the telecentre (through the municipality), appeared to hinder his ability to establish and maintain a functional telecentre. His lack of a clear vision for the telecentre and its role in the local area, together with his apparent lack of managerial skills resulted in him being a poor champion of ICT in the area.

The TC3 telecentre was highly functional at the start of CLIQ activities and the NGO responsible for the centre was run along good governance principles. Together with local socio-political ownership of the centre, this greatly contributed towards its success in an area with politically aware and active community members and organisations. This manager was unique amongst the four in terms of her progressive view of development and ethical imperative to provide the community with ICT services, and was the only clear example of a strong champion of ICT. Her clarity of vision, rooted in the developmental reality of the area, informed the organisational structure and rules for the daily operation of the telecentre.

The payment, motivation and skill of facilitators (technical and administrative) are important factors in telecentre success (Benjamin, 2001a; Roman & Colle, 2002; Lorentzen, 1988; Hudson, 2001). At TC2, there was a high turnover of facilitators, with seven different facilitators working at the centre between March 2008 and July 2010. The facilitators were regarded as volunteers, with no contract, no guarantee of a regular stipend to cover their basic expenses, and no clear job description. Although facilitators in TC3 were paid a regular stipend, there was still a relatively high turnover. This was accepted by the manager who argued that "...the community appreciate that you use local people. But this often means that they lack skills, so you train them. But you don't have funds to pay them good salaries, so once they have acquired the skills, they move on to better jobs". The manager thus factored staff training into the budget and encouraged staff to seek opportunities to improve their lives, seeing this as the telecentre's contribution to the community. The personal motivation and interest of facilitators, as well as the extent of their inclusion in decision making (resulting from management style) is also a major factor in staff turnover across telecentres.

Where facilitators were motivated and interested, their actions facilitated participation in, and implementation of CLIQ. For example, a TC1 facilitator learned to keep basic computer use records and converted these to invoices on a monthly basis, in order to regularly claim payment for hours used by CLIQ participants. This was due to his motivation to get income into the telecentre.

Policies and Visions

USAASA served as the conduit for support of national government to the telecentres, and as the bridge between national policy priorities and implementation. However, between

2008 and 2010, USAASA had just one provincial representative dealing with 23 telecentres and 40 school cyberlabs in KwaZulu-Natal. All equipment purchases and service provider contracts had to be routed through the national head office, leading to long-term unattended requests for new equipment or solutions to virus problems. As the manager of TC3 commented, she did not rely on USAASA for anything, "because you'll be waiting forever." In 2006/2007, USAASA took a decision to hand over ownership of the telecentres to locally based organisations as they had recognised the uncertainty that was caused by their continued ownership of equipment and facilities, and particularly their inability to maintain them - among other problems with the current model. USAASA's handover programme (based on lessons learnt over the years, including Benjamin's (2001a) analysis of problems at 65 telecentres in 2000) would probably have had a number of positive effects However, if USAASA had continued with this handover, lack of local transparency around the process by which organisations were originally selected to run the telecentres, was likely to cause problems if not addressed, because these same organisations were mostly likely going to assume ownership.

The nature and implementation of state policy falls under structure in Kleine's 'policy and programmes' and 'institutions and organisations". CLIQ also found examples where USAASA's policy appeared appropriate, but where organisational weaknesses prevented effective implementation and monitoring.

A concern also related to the discourse within which telecentre activities take place, is whether the purpose of community telecentres is to function as a business or community service. It was recognised in TC3 that the centre could not operate as a business and the manager viewed its purpose as a community service. While they charge for computer training, computer use, photocopying and so on, the manager explained that, "...there are many times when a person would have spent all their money on transport and cannot pay for the photocopy, so what do you do? You can't turn them away, so they don't pay." The parent NGO subsidised the telecentre through their operation of an income-generating consultancy. In turn, by running the telecentre as community service, the NGO was able to operate an income-generating consultancy service, under NGO status. As the manager observed, this cross-subsidisation allows "children and people with 'crazy ideas' to come (to the telecentre) even if they can't pay."

In contrast, TC2 operated on a semi-business premise. The local community paid for telecentre services, such as computer literacy classes. The telecentre manager recalled that "(t)he cost for a 'Computer Literacy' course is R20 an hour, for 30 hours. They pay not less than a 30 percent deposit. When people don't pay on time we charge them 10 percent extra, this often encourages them to pay on time." While TC3 had a clear vision for the telecentre and business plan to financially support an otherwise unsustainable telecentre, TC2 had no business plan and the manager's stated wish for the telecentre to be used to 'assist the community' did not match the business principles he applied to telecentre users. The business potential of telecentres in poor areas is low, as evidenced by the high failure rate of telecentres (particularly due to financial unsustainability). Liyanage (2009) in her review of five telecentre networks across four countries presents a number of social enterprise models for telecentre sustainability and TC3 shows that

financial sustainability is possible, with creative models of social enterprise. The challenge is to develop creative solutions for financial sustainability.

Gender and Age Norms and Psychological Resources

Gender norms, a structural issue according to Kleine's CF (2010), acted against the participation of women and their sense of choice, as these norms dictated that women should not use ICTs, or that if ICTs were part of the women's life, it should not interfere with their traditional reproductive role in the home. One male participant (24yrs) stated, "boys are usually considered as people who have a lot of spare time than girls because girls have more chores than boys and some of the girls are not allowed by either their parents or their partners to participate in other activities".

Some women stopped attending CLIQ activities in order to care for young children and others reported that family members were not comfortable with their participation in CLIQ, because as one participants' mother said, "the lady must always be cleaning the house and cooking" (mother of female participant, 33yrs). Some women were able to work around these societal norms and made immense use of the CLIQ opportunity, while others were not. This, as with persistence in the face of unhelpful facilitators, depends in part on users' psychological resources - one of Kleine's (2010) ten indicators of agency. A rural woman (20yrs), whose well-being had improved over the first year of fieldwork, was not able to overcome her parents' insistence that she stop attending CLIQ activities and stop all her small business activity stating, "my whole life has changed because I have a baby now and I have to respect my parents and do what they say".

Commonly held age norms were that older people should not, did not need to, or were not able to use computers. Three women from TC2 aged over 50 years, all demonstrated that older women can learn to use computers and the internet - and all of them improved their QoL, partly through computer use. One of these women started two new businesses during the fieldwork period, making use of her newfound computer skills to email customers and suppliers, and to access business information on the web. Her perception of the benefit of computer use to her business is partly demonstrated by the fact that she would pay to use internet cafes when away from her home area, in order to check her email.

Lack of ICT Awareness and Skills

Low awareness of the potential uses of computers with respect to participants' lives was a factor in reducing demand for computer use. At TC4, a number of participants had never seen a computer before and many had a very limited understanding of what computers were or could be used for. For example, participants were surprised that 'computers were not only used for games'; you could talk to someone overseas through the computer; and that national newspapers could be read online. At TC1 and TC4 (the two rural areas) some participants were not even aware that there was a local telecentre.

Perceptions of who can and should use computers (in additional to prevailing age and gender norms) as well as participants' own perceived eligibility to use computers, also had the potential to prevent use. There were those who felt that computer use was not for them at the start of the project stating, "I thought (computers) were only meant for rich

people and it was way too hard for a person like me to learn, until CLIQ came along and I realised that computers are for everybody and anybody can learn more everyday about them and make their lives easier" (woman, 21yrs). Issues of perceived ICT access fall within both structure (technology and innovation), as well as 'sense of choice' under degrees of empowerment (see Figure 1).

Social Spaces and Mobility

All telecentres were located within a community centre, which catered for a range of other community needs (except for TC3, which was adjacent to a small library and community meeting rooms), and served as a venue for CLIQ activities. Regular trips to the telecentre to participate in CLIQ represented a new activity for many participants, with the benefits of meeting new people and being exposed to a range of community activities. After empowerment, extended networks and/or more friends was the second most common impact of CLIQ (as noted above). This new activity was particularly beneficial for those (often women) who rarely ventured beyond the immediate surrounds of their homestead. A young woman from TC1 recalled that in 2008, "I was a bit of a loner. I didn't want to meet with people. My problem was that I was so depressed... [Participating in CLIQ] ...gave me an opportunity to do other things like coming to the telecentre and spend time there..." and in 2010 she noted increased social networks as a benefit from CLIQ. For those not living in the immediate vicinity of the telecentre, who had small businesses, it also opened new markets as they would discuss their business and market their goods to new groups of people, both en route to and at the telecentre.

New friendships developed between participants, some of whom would meet at the telecentre in between CLIQ visits. At TC1, a participant recalled, "coming to the telecentre in groups and typing whatever we came across. We did this so that we could practice our typing skills." The two facilitators at TC1 were very enthusiastic and supportive of CLIQ implementation and participants. By welcoming and assisting participants between CLIQ visits, the facilitator allowed the telecentre to become a social space where participants could learn and support each other, which built their social networks - referred to as 'social resources' under agency (see Figure 1)- and enhanced their ICT skills in an atmosphere of seeking knowledge and personal development. One facilitator spontaneously organised additional computer training for CLIQ participants, which she used to begin to develop her own training skills and in order to encourage local use of the telecentre. A project ethos of being supportive of, and interested in users' well-being greatly enhanced users' empowerment. Negative comments from participants about the dismissive and unhelpful attitude of some facilitators at TC2 and TC3 confirmed the importance of facilitator attitude, skill, and action in promoting effective use of telecentres.

Financial, Time and Opportunity Costs

The distance that people had to travel to get to the telecentre hampered their use of their free computer hours. At TC4, some participants had to walk for three hours to reach the telecentre, and at TC1 some had to pay up to R60 for public transport for a one-way trip to the telecentre. With half of all participants having R100 or less for their free disposal each month[vi] , such costs clearly prohibit regular computer use at telecentres, even before the issue of whether they have to pay for actual use or not, was considered. Furthermore,

many participants relied on irregular piecework or self-employment for income. For unemployed youth, this meant that when temporary jobs were available, they would opt to work rather than further their ICT skills. As expressed by a self-employed woman (34yrs) from a rural area, she did not attend some CLIQ activities because of her need to "put a plate on the table" - she was the only adult in the household that could earn any income, as her husband and mother-in-law were ill.

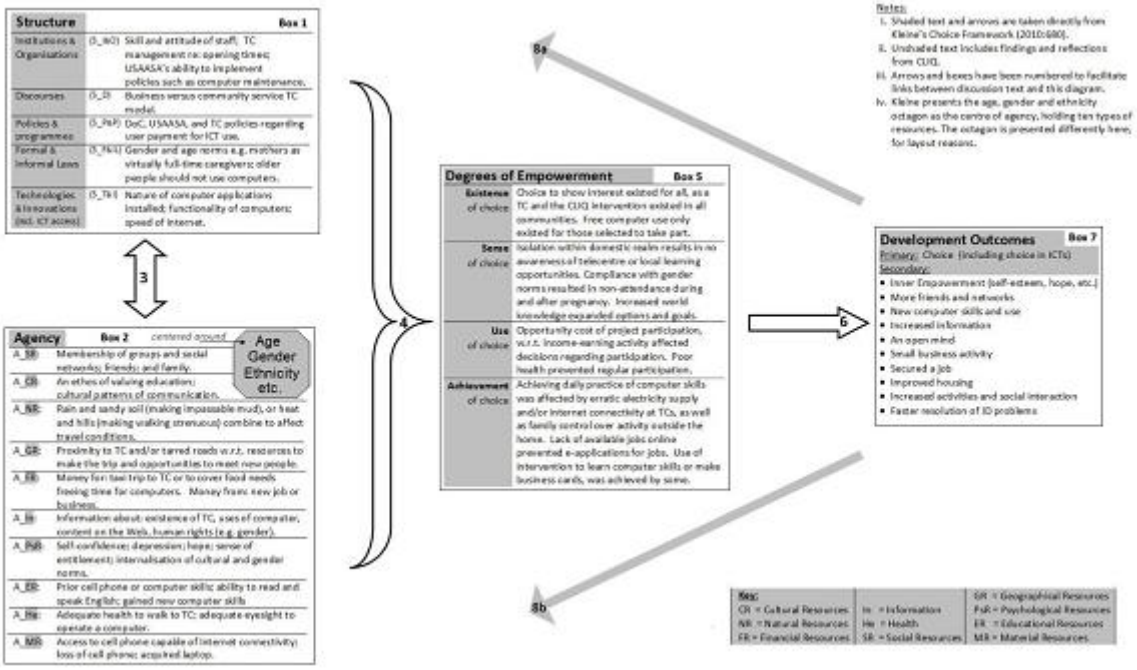
At TC2, TC3 and TC4, participants were not happy with the telecentre service. Some participants remarked that their telecentre was occasionally closed during normal operating hours or that often the computers or internet was not working. When combining the high monetary or opportunity cost of travelling to the telecentre and the lack of surety that it would be open, together with the possibility that the computers may not be working; deciding to make use of the facilities offered by telecentres is a costly and potentially fruitless exercise.

In summary, key factors identified as aiding or inhibiting the effective use of telecentres included: technology and equipment; organisation and governance; policy and vision; psychological resources, together with gender and age norms; lack of ICT awareness and skills; social spaces and mobility; and financial, time and opportunity costs. Understanding the interactions between these factors and the impact it has on decisions regarding ICT use, provides insight into the complexity of ICT access and use in pursuit of a better life. This complexity is well illustrated through the capabilities approach utilising Kleine's (2010) Choice Framework.

CLIQ findings within the choice framework

From a holistic view of identified quality of life impacts; individual empowerment outcomes; and key factors that influenced the implementation of and participation in the intervention; the compatibility of these research findings with Kleine's Choice Framework was evident.[vii] This section examines how the CLIQ findings fit within the CF.

Figure 1: CLIQ Findings through Kleine's Choice Framework



Source: Kleine (2010), adapted by authors

As illustrated in Figure 1, Kleine's five aspects of structure (shaded text: **Box 1**) can each be illustrated with examples found within CLIQ's research findings (unshaded text: **Box 1**). For example, the poor capacity of USAASA (S_I&O) to effectively implement their procedural guidelines, stipulating that all computer repairs and replacement needed to be facilitated through the national office (S_P&P) is an example of structural hindrances. Another structure example is the selection of inappropriate software at TC1 that delayed CLIQ training and otherwise discouraged and frustrated users (S_T&I). Furthermore, low awareness of the potential of computer use to improve QoL among potential local users was also a structural barrier (S_T&I) found particularly at rural telecentres. TC3's community development and service orientation is an example of a facilitating structure (S_D), as opposed to the business model adopted by other telecentres.

The CLIQ data also contains many examples (unshaded text: **Box 2**) of how all ten types of agency resources (shaded text: **Box 2**) affected an individual's level of participation in CLIQ (and ICT use), and subsequently, the influence on degree of empowerment (**Arrow 4**). Considering women from TC1 aged between 19 and 34 years, there were separate examples of poor participation due to limitations in a variety of different resources including: poor health; insufficient financial resources to replace income-earning activity with time for self-development; and a lack of self-confidence. Variation of outcome goes much further than this, though, as shown by examples of three other women from this same group who were able to maximise their participation in CLIQ. They specifically used their resources to reach some of their stated goals, such as: the ability to disregard parental views on women's place in the home; the courage to end income-earning business, and use financial resources to study; and the use of enhanced ICT skills to take over accounting tasks for an owned business. These examples illustrate the variety of outcomes among participants who share some similar personal characteristics and social environments. When adding aspects of difference like age, gender, cultural environment, family attitudes and so on, the potential for a variety of outcomes vastly expands.

Arrow 3 indicates an interaction between agency (personal characteristics and resources) and factors of structure. For example, gender norms prevented some women from continuing with CLIQ when they became a mother, while the same did not occur with new fathers. Thus, the combined impact of a person's gender (personal characteristics) with gender norms (S_F&I) disempowered women, but not men. The interaction of structural factors with individual resources directly influenced the nature and implementation of choice (**Arrow 4**). For example, when considering whether or not to use unscheduled free computer hours, those living within walking distance of the telecentre (A_GR) were less affected by the lack of certainty that telecentres would be open during normal operating hours, or whether the internet would be functioning (S_T&I). Those who lived further away had to commit more resources (A_FR or A_He) in order to check whether the telecentre was open or not[viii] , and therefore were exposed to a greater negative impact when they could not use the telecentre's computers.

CLIQ results also included numerous examples of the different degrees of empowerment(unshaded text: **Box 5**) beyond the 'existence of choice,'[ix] reached by participants which are included under Kleine's degrees of empowerment (shaded text: **Box 5**). "For any piece of research focused on a technology which is new to the respondents, the dimension of 'sense of choice' will play a significant role" (Kleine, 2010: 680). For participants who had never seen a computer prior to CLIQ, their 'sense of choice' for communication did not include emailing. Social factors, which change over time, also affected 'sense of choice'. Two young women (who were keen to join CLIQ and therefore having 'sense of choice') decided to participate in CLIQ (exercising 'use of choice'). They both made good use of their decisions to participate (with some 'achievement of choice'), but both later stopped attending computer training or using computers on the birth of their first child, cutting short 'use' of choice and effecting a removal of the 'sense' of choice. Despite both seemingly having family and friends to care for their child, they decided to operate within community gender norms (applied by a boyfriend in one case and parents in the other) and ended their CLIQ involvement. In these two cases, gender norms (S_F&IL) enacted through their social network (A_SR), reversed progression up the degrees of empowerment.

The degrees of empowerment reached by individuals have impact (**Arrow 6**) on the nature and extent of development outcomes. For example, for some just having the skills to use a computer (unshaded text: **Box 7**) - a secondary development outcome -improved their self-esteem (A_PsR) and this empowered them in their general approach to life. For others, new computer skills boosted their confidence and education, enhancing their personal resources (A_PsR and A_Ed). These enhanced resources contributed to 'use' and 'achievement' of choice, (e.g. to type a CV and apply for a job) which contributed towards a further development outcome of acquiring a job.

While goals are partly reflected by achieved development outcomes, they also fit within psychological resources under agency, as the existence, clarity and appropriateness of goals are a reflection of a person's mental ability to hope, envision, evaluate options and plan (Bandura, 1989). This reflects the dynamic nature of the model. Except for natural resources, CLIQ found examples where all nine resources changed over the two years of

fieldwork, or were impacted by participants' development outcomes (**Arrow 8a**) - representing a feedback loop or recursive causality (Rogers, 2008).

Just as some development outcomes influenced agency resources (**Arrow 8a**) so too do they have the potential to influence structure (**Arrow 8b**). The CLIQ intervention at TC1, created a group of local people capable of and interested in using computers, many of whom had experienced positive social, personal or economic impacts. Through the normal course of life, they 'marketed' the telecentre within the community. For example, a young male initially ridiculed by friends regarding CLIQ participation, later exposed these friends to potential benefits when he typed and printed their hand-written CV's. The encouragement of new users could increase telecentre use and ultimately improve telecentre sustainability, which in turn would improve access to ICTs for others (S_T&I). In addition, a local group of skilled computer users acted as a resource which the telecentre could draw on for facilitators (as happened at TC1, where an enthusiastic but unemployed participant became a paid facilitator in 2012) or as individuals that could assist the telecentre with providing the service of typing documents or teaching others to use computers.

Gender norms or biases (as well as age) are reflected in structure and agency. In structure, they are represented under formal and informal laws that operate amongst a group of people to regulate behaviour. Under agency, internalised gender norms and biases form part of psychological resources. A person will have an outlook on life that either conforms to norms (whether or not aware of, or agreeing with them) or resists these gender norms (S_F&IL). Working against social norms, especially ones as entrenched and pervasive as gender norms requires strength of character, self-esteem, clarity of thought or some kind of wisdom (A_PsR). It also requires other resources, like social support (A_SR). Examples of this from CLIQ include a woman who was encouraged to set and pursue a goal of starting a crèche because she heard another participant had successfully done so. Examples of empowerment from the CLIQ process unrelated to ICTs were those of women and men who felt empowered after befriending other participants who had previously also been relatively isolated in the domestic realm, due either to enforced or accepted gender norms (S_F&IL, gender, and A_PsR), or in the case of one young man, poor mental health (S_F&IL, A_He and A_PsR).

The multitude of interactions within and between various aspects of agency and structure is complex and potentially endless. Kleine's CF is a practical operationalised approach through which to analyse individual choice, based on combinations of structural factors and personal resources. This myriad of agency and structure is part of the process of empowerment, which could lead to a variety of desired development outcomes, and which further illustrates the key feature of emergence in programme theory and complex logic models (Rogers, 2008).

Conclusion and recommendations

While there is disillusion with the telecentre model (Parkinson, 2005; Hulbert & Snyman, 2007), the par approach adopted by CLIQ revealed that individuals can improve their QoL through targeted support of public access computing at telecentres. In spite of structural constraints on existing telecentres and participants' limited resources, our

research showed that telecentres provide opportunities for people to empower themselves to overcome these constraints when computer training and use is subsidised. Kleine's Choice Framework (2010) is useful in that it systematically operationalises the range of factors and impacts at play when considering the process by which individuals can use ICTs to improve their own QoL. By identifying aspects of structure and agency (and interaction between them) that limit telecentre usefulness, interventions can be designed to strategically target specific structures and resources that would allow for greater empowerment of individuals to actively pursue a self-defined better QoL. CLIQ altered both structure and agency. Structure was altered through CLIQ's assistance with aspects of telecentre management and computer maintenance. Agency was altered by providing prepaid computer hours, after computer training within a social and empowering process. CLIQs findings on problems with effective delivery and use of telecentres remain consistent with past (Benjamin, 2001a; Parkinson, 2005) and current findings (Gomez et al., 2012). Like Hubert & Snyman (2007), we contend that the action research methodology shows that these issues can be addressed if "the importance of the community as the most feasible departure point" (ibid: 17) is recognised, together with a developmental approach to capacity building. Rather than abandon the telecentre as a medium of ICT delivery, the exploration of alternative business and service-delivery models that address the structural issues identified, or foster aspects of agency with a view to empowerment, should be considered. Among these models, our analysis suggests that one option would be to re-invent telecentres as active citizen development centres. In addition to be being a public venue that provides access to the technical artefacts of ICT, the telecentre would be consciously developed as a place where local people interact with each other face-to-face and with others through ICTs. In this way, the telecentre can become an empowering social space within which users can engage with a wider range of people, ideas and information, to make more informed choices concerning the issues that they deem important. Resources to support this will need to be locally relevant and evolving, including needs-based website listings, information on basic human rights, and e-government information and services. This addresses issues of agency as well, avoiding purely technical solutions that may yield a perfectly functional telecentre, but with no users.

To be successful, this type of telecentre would need to be staffed by a community development worker with an empowering developmental perspective, who has the technical skills to provide training as as well basic computer and network maintenance, in addition to administrative skills and a personal ethic of good governance. In addition, there is a need to develop adequate empowerment strategies to assist telecentre facilitators to deal with the surrounding power relations (Braathen et al., 2012). This approach would also require a shift in discourse, from telecentres being a business to telecentres providing PAC services with a development focus.

A more fundamental shift would be recognising the complex relationship between information and human rights, and the potential for ICTs to promote human rights. Hence, the UN Special Rapporteur on the promotion and protection of the right to freedom recommended in his 2011 report that "each State" should see to it that "the Internet is widely available, accessible and affordable to all segments of population" (La Rue, 2011). From a human rights' perspective, an ICT grant that allows all citizens

subsidised (but not free) use of ICTs, should be considered as a way of addressing affordability concerns. This sees the telecentre as similar to a public library, based on citizenship rights, rather than dependent upon having the means to pay for access. Other options of social enterprise telecentres within a network of telecentres (Liyanage, 2009) could secure alternative sources of income to financially assist state-supported telecentres, as TC3 illustrates with its cross-subsidisation model.

Acknowledgements
Action research involves a substantial contribution from those that collect data and we acknowledge the work of the team of fieldworkers, trainers and participants. This journal article is based upon work supported by the South African Research Chair Initiative (SARChI) in Applied Poverty Reduction Assessment, the South African Department of Science and Technology, National Research Foundation (NRF) under Grant number 64492 and the Norwegian Research Council (NRC). Any opinion, findings and conclusions or recommendations expressed in this journal article are those of the author(s) and therefore the NRF and NRC does not accept any liability in regard thereto.

Endnotes

[i] Here 'participatory action research' (par) is used in the generic sense, as suggested by Jupp (2007: 122) as opposed to the 'branded' PAR with Freiren roots or any of the numerous other 'branded' participatory methodologies.

[ii] Sentech is a State-Owned Enterprise providing broadcasting and broadband infrastructure in SA, which includes internet connectivity to government departments, municipalities, and other institutions (www.sentech.co.za).

[iii] Only one computer training session was conducted at TC4 (delayed by over a year), due to the extended period of telecentre non-functionality.

[iv] Impact results were unclear for 19% of participants due to insufficient data and 4% indicated no impact from CLIQ.

[v] A coding process similar to that of Grounded Theory (cf. Strauss and Corbin, 1998) was followed.

[vi] This figure is based on data obtained from the initial baseline questionnaire administrated to all participants in mid-2008.

[vii] Examples of secondary outcomes provided by Kleine (2010: 680) are easier communication, increased knowledge, greener environment, increased income, increased mobility, more personal time, more voice, and more autonomy.

[viii] Given the poor satellite connectivity, calling the telecentre facilitator was not an option.

[ix] All participants had the 'existence of choice' given that their community had a telecentre and CLIQ facilitated an intervention at their telecentre, selecting them as participants.

References

Aslop, R., & Heinsohn, N. (2005). Measuring empowerment in practice: structuring analysis and framing indicators. World Bank Policy Research Working Paper, 1-31.

Attwood, H. E. (2013). The influence of quality-of-life research on quality-of-life: CLIQ case studies from KwaZulu-Natal, South Africa. In J. Sirgy, R. Phillips, & D. Rahtz (Eds.). Community quality of life indicators: best cases VI (Vol. 4, pp. 1-18). London: Springer Dordrecht Heidelberg.

Attwood, H., Diga, K., and May, J. D. (forthcoming). The complexities of establishing causality between an ICT intervention and changes in quality-of-life: The case of CLIQ in four poorer communities in South Africa. In Ofwona Adera, E., Waema, T. M., May, J. D., Mascarenhas, O., & Diga, K. (Eds.), ICT pathways to poverty reduction: empirical evidence from east and southern Africa. Practical Action Publishing: UK.

Bandura, A. (1989). Human agency in social cognitive theory. American Psychologist, 44(9), 1175-1184.

Barrantes, R. (2007). Analysis of ICT demand: what is digital poverty and how to measure it? In H. Galperin & J. Mariscal (Eds.), Digital poverty: Latin American and Caribbean perspectives (The Regional Dialogue on the Information Society) (pp.29-53). Ottawa: International Development Research Centre.

Benjamin, P. (2001a). Telecentres in South Africa. Journal of Development Communication, 12(2), 1-6.

Braathen, E., Attwood, H., & May, J. (2012), The role of politics in telecentres: cases from South Africa. International Journal for ePolitics, 3(3), 1-20.

Castells, M. (1998). The information age, Vol.3: end of millennium. Oxford: Blackwell.

Chakrabarti, A.K. (1974). The role of champion is product innovation. California Management Review, 17, 58-62.

Chambers, R. (2008). Revolutions in development inquiry. London: Earthscan.

Chigona, W., Lekwane, O., Westcott, K., & Chigona, A. (2011). Uses, benefits and challenges of public access points in the face of growth of mobile technology. EJISDC,49(5), 1-14.

Etta, F. E., & Parvyn-Wamahiu, S. (2003). Telecentres in South Africa. In F. E. Etta, & S. Parvyn-Wamahiu (Eds.), Information and communication technologies for cevelopment in Africa - Volume 2: the experience with community telecentres (pp.115-126). Ottawa: International Development Research Centre.

Flor, A. (2012). ICTD praxis: bridging theory and practice. In A. Chib, & R. Harris, Linking research to practice : strengthening ICT for development research capacity in Asia (pp. 49-57). Singapore: Institute of Southeast Asian Studies.

Gomez, R., Pather, S., & Dosono, B. (2012). Public access computing in South Africa: old lessons and new challenges. The Electronic Journal of Information Systems in Developing Countries, 52(1), 1-16.

Heeks, R., (2002) Information systems and developing countries: failure, success, and local improvisations. The Information Society: An International Journal, 18(2), 101-112.

Hudson, H. E. (2001). Telecentre evaluation: issues and strategies. In Latchem, C., & D. Walker (Eds.), Perspectives on distance education - Telecentres: case studies and key issues. Vancouver: The Commonwealth of Learning.

Hulbert, D. & Snyman, M. (2007). Determining the reasons why ICT centres fail: six South African case studies. Mousaion, 25(2), 1-20.

ITU. (2011). World telecommunication/ICT indicators database. Retrieved 16 February 2012, from http://www.itu.int/itu-d/ict/statistics/

Jupp, D. (2007). Keeping the art of participation bubbling: some reflections on what stimulates creativity in using participatory methods. In K. Brock, & J. Pettit, Springs of participation: creating and evolving methods for participatory development (pp.107-122). Rugby, Warwickshire: Intermediate Technology Publications.

Kleine, D. (2010). ICT4what? - using the choice framework to operationalise the capability approach to development. Journal of International Development, 22(5), 674-692.

La Rue, F. (2011). Report of the UN Special Rapporteur on the promotion and protection of the right to freedom of opinion and expression. UNHRC. Retrieved February 16, 2012 from http://www2.ohchr.org/english/bodies/hrcouncil/docs/17session/a.hrc.17.27_en.pdf

Liyanage, H. (2009). Sustainability first: in search of telecentre sustainability. Kotte: Sarovdaya Fusion.

Lorentzen, l. (1988). Technological capacity: a contribution to a comprehensive understanding of technology and development in an international perspective. Aalborg: Aalborg University Press.

Luttrell, C., & Quiroz, S. (2009). Understanding and operationalising empowerment. ODI Working Paper 308. London: Overseas Development Institute.

Mphahlele, M., & Maepa, M. (2003). Critical success factors in telecentre sustainability: a case study of six telecentres in the Limpopo province. Communicatio, 29(1), 218-232.

Proenza, F. J., (2002). Telecentre sustainability: myths and opportunities. Journal of Development Communication, 12(2), 110-124.

Parkinson, S. (2005). Telecentres, access and development: experience and lessons from Uganda and South Africa. Ottawa: International Development Research Centre.

Rogers, P. (2008). Using programme theory to evaluate complicated and complex aspects of interventions. Evaluation, 14(1), 29-48.

Roman, R, & Colle, R. (2002). Themes and issues in telecentre sustainability. Development Informatics Working Paper Series, No.10, Institute for Development Policy and Management, University of Manchester, Manchester.

Sen, A. (1999). Development as freedom. Oxford: Oxford University Press.

Snyman, M. (2007). Information resource centres in South Africa. In Bothma, T.J.D., Underwood, P., and P. Ngulube (Eds.) Libraries for the future: progress and development of South African libraries. Pretoria: LIASA.

Stats SA. (2012). Census 2011: statistical release. Pretoria: Statistics South Africa Retrieved from http://www.statssa.gov.za/Publications/P03014/P030142011.pdf.

Strauss, A., & Corbin, J. (1998). Basics of qualitative research: techniques and procedures for developing grounded theory. London: Sage Publications.

Urquhart, C., Liyanage, S., & MO Kah, M. (2008). ICTs and poverty reduction: a social capital and knowledge perspective. Journal of Information Technology, 23, 203-213.

USAASA (2009). Corporate plan 2009 to 2014. Universal service and access agency of South Africa. Midrand: Republic of South Africa.

USAASA (2010). 2009/10 annual report: accelerating universal service and access in South Africa. Midrand: Republic of South Africa.

Warschauer, M. (2004). Technology and social inclusion: rethinking the digital divide.MIT press: Boston.

White, S., & Pettit, J. (2004). Participatory approaches and the measurement of human well-being. ESRC Research Group on Wellbeing in Developing Countries (WeD Working paper 08). UNU-WIDER.