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The number in my pocket: the power of mobile technology for the exchange of indigenous knowledge

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The last decade has seen the development of online databases becoming an established norm throughout the world for the preservation of indigenous knowledge. However, in the absence of desktop computers and ubiquitous Internet access, Africa is limping behind in this quest for global information, with the digital divide ever widening and the wealth of indigenous knowledge fast disappearing for the people of this continent. In a bid to address these seemingly insurmountable obstacles, Africa is recognizing the potential of the mobile phone to enable the continent to catch up with the global information society. Since 2000 some 316 million new mobile phone subscriptions have emerged on the African continent. For them the cell phone has become an information hub, the primary interface through which to connect to Africa and to the rest of the world. A recent, promising development has been the introduction of browsers on mobile phones. This, combined with the 3G network all cellular providers have migrated to, means that ordinary Africans are accessing the Internet from their phones in ever-increasing numbers. The success of a number of Internet-based mobile applications means that the average cell phone user now associates his phone with more than just the calls he makes or text messages he sends. He can also play music, show video, find out where he is via GPS and access local and global information. This paper describes a concept for the development of user-generated content compiled in an online indigenous knowledge database, making use of current mobile and web technologies. Informed by empirical practice based on a South African case-study, the different tools are discussed, highlighting the interaction between the library, the community and the technologies. The participating role of local communities leading to enrichment of the database is juxtaposed against the library's anchor role as custodian of the knowledge resource. The preservation of context-related local knowledge creates a digital library of relevance to local communities. Technical functionality enables the social interaction that results from knowledge sharing. Short and long-term benefits that the community stands to gain are discussed and the limitations of the model pointed out.

1. Introduction

Digital information and communication technologies (ICTs) have revolutionized the ways in which knowledge is dispersed (International Telecommunications Union 2008). The Internet dominates the global information economy today. This global trend of using the Internet for preservation and dissemination of information causes a dilemma for the African information community. For the majority of African people, limited access to information communication technologies puts the Internet and online information beyond their reach.

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In terms of information and knowledge, African local content on the Web is very low, due to a lack of capacity to record, transfer and disseminate information (Greyling 2009). This puts Africa, and library and information centres in Africa, at a major disadvantage in the current knowledge economy, and leaves them poorly equipped to make a meaningful contribution to the global information society.

The paucity of African stories and community information on the web predicates the limited role of heritage and information practitioners in Africa as providers and gatekeepers of African information and curtails the part they should play in social transformation. African stories need to be part of the global information economy, regardless of the inherent difficulties in collection, preservation and dissemination.

Buy-in to digital resources by local communities remains low because of the dearth of local content, which contributes to the lack of digital skills development and retards socioeconomic transformation. There is a tendency for digital divide thinking to focus on getting 'global' information resources to the marginalized and on educating the marginalized to consume information in the way the globalised world does so (Bidwell, personal communication, 2011). However, in order to decrease the digital divide between the data 'haves' and the data 'have-nots' there needs to be an understanding of the processes by which people can assimilate information and can use that information. While ICTs can become a broad enabler of development when used in community informatics, 'community level development processes, which will allow them to use the resources in ways meaningful and significant to them in terms of their objectives' are not easy, because they are at a local level, where skills levels are often low (Gurstein 2010). Theron (2005, p. 106) adds:

> The desirable direction of focus of a development initiative should be prompted by the people's own experience of their reality. A micro-level intervention should entail the incorporation of indigenous knowledge systems (IKS) and appropriate development technology.

Over the last decade Internet usage increased globally by an average of 445%; this is in stark contrast with the meagre growth of 2.36% on the African continent over the last 10 years. Of the 28.7% of the world's population using the Internet, only 10.9% of Africans, and only 10.8 % of South Africans share in this global information resource (Internet World Stats 2010). In the African Telecommunication/ICT Indicators 2008 Report of the International Telecommunications Union (2008), the phenomenal growth in Africa's mobile sector is highlighted. Mobile penetration has increased from one in 50 people in 2000 to almost one-third of the population in 2007. While this statistic may not be representative of large parts of rural Africa, indications are that there is a significant increase in the use of mobile devices in urban, peri-urban and rural areas along city boundaries. Mobile technologies are currently being developed for a wide range of applications, with functionalities to allow potential users to interact (Southwood 2010). At the same time libraries have over the past number of years moved their focus more towards patron-focused services, in particular the provision of digital reference and information services (Griffey 2010).

Based on the premise that communities have access to the Internet, we developed a concept for the exchange of user-generated content compiled in an online indigenous knowledge database. The programme forms an integral part of local public library and information services in the eThekwini Municipal Area (EMA) in the province of kwaZulu-Natal in South Africa, and uses both conventional desktop and the latest mobile technologies.

The paper describes the different technologies that are used and outlines the interaction between the library, the community and the technologies. The participating role of local

communities promises to have the potential to enrich the website, while technical functionality may contribute to the social interaction necessary for the expression of identity. This in turn promises to build social capital in the community through establishment of a network of human relations (Mbaya 2010).

The library plays an anchor role as custodian of the knowledge resource through preservation of context-related local knowledge in a digital library that is of relevance to local communities. As Lor (2004) points out, libraries can assist with discovery and recording of the knowledge, organize it for use and promote its appreciation, including respect for the dignity of the communities that produce it. Knowledge management skills of librarians allow them to do data management and other forms of content management (Lor 2008). Short and long-term benefits that the community stands to gain from the model are discussed and the limitations of the model highlighted.

2. Goals and objectives

The Ulwazi Indigenous Knowledge Programme discussed in this paper, strives to create an enabling environment for disadvantaged communities in the greater Durban area, on the eastern seaboard of South Africa, to become part of the global information society. The rural and peri-urban areas around Durban fall beyond the urban perimeter or sustainability line (eThekwini Municipality 2005). These areas account for approximately 67% of the city's spatial footprint, translating into 1500 square kilometres and carrying a population of around 750,000. People live in dispersed settlements, often in traditional dwelling structures on communal lands, along the periphery of the EMA.

Communities living on the fringes of the EMA typically suffer from high levels of poverty and disease, low levels of sustainable income and are marginalized in terms of economic opportunities. Even though electricity and water infrastructure has improved dramatically over the past few years, rural areas in the EMA still suffer from inadequate transportation infrastructure and inferior roads, making it difficult for poor people to access services if these are located far away from where they live. These areas contain few social, physical or economic support amenities; many people have access to neither library and information services nor public ICT facilities such as computers, Internet or email; they are starved for information of all kinds (Greyling and Smith 2008). As Hart (2010, p. 81) notes, poverty is 'about social exclusion as much as [it is about] inadequate income. Poor people lack access to the resources that might aid their development'.

There is a growing demand for information and communication technologies (ICTs) and media literacy among rural communities along the EMA perimeter (Averweg and Greyling 2008). While local content is critical for local communities' full participation in the global knowledge society (Mutula 2008), the absence of information systems in digital/electronic format for IK, perpetuates the paucity of local content found on Internet web pages and the misperception of 'information-poor' societies. By harnessing ICTs, indigenous groups and local communities are empowered to cross the digital divide to become part of the global information society on their own terms, as is illustrated by the outputs of the Ara Irititja Project in Southern Australia (Hughes and Dallwitz 2006).

The Ulwazi Programme provides a framework for a digital library of local and indigenous knowledge, in which content is created by the community for the community, through using appropriate ICTs. Benefits to the community include not only access to a digital knowledge resource of local relevance, but also access to capacity building in digital and information literacy skills, constituting empowerment in terms of knowledge and ICT skills. The 'availability of better information helps to improve people's education, health services and general knowledge (life-long learning) and can reduce poverty' (World

Bank 2001). 'Combining their indigenous communications systems with appropriate use of modern low-cost communications technology, (rural) communities must strengthen their communication capacities for development' (Davids *et al*. 2005, p. 216).

The programme creates digital content for a library of local indigenous knowledge and as such is incorporated in a long-term strategy of the Library and Heritage Department of the Municipality that forms part of the Digital Collection Development function of the library. A department dedicated to the programme has been created, with permanent staff to manage and sustain it. Incentives are tied to contributions to ensure sustained interest from contributors. Thus a methodology for sustainable preservation, dissemination and sharing of local and global knowledge of rural or otherwise isolated communities is developed. The public digital library that is established through the programme serves as a permanent social service which is in step with global trends.

The social development dimension of the programme promotes a culture of community participation in local government structures, encouraging development of social capital and a sense of citizenship through the concept of a shared heritage. By employing social media the programme allows the local community more participatory ways of interacting with their own heritage. 'Heritage practices are experienced in our streets and neighbourhoods at grassroots level' and social media 'support forms of collection, curation and meaning-making that help explain and capture [their] own lived experience and leave a legacy for the future' (Giaccardi 2011, p. 18–19). Thus the programme adds a living dimension to the more conventional formal heritage practices of museums, because it takes care of things important to the community, with different selection criteria and different interpretations.

3. Research

The vision of the programme is built on the premise that people living in the eThekwini Municipality have ready access to cell-phones, and thus, the Internet. As the programme is practice rather than research-oriented, this practice was informed by small-scale surveys to investigate information needs and current access.

Results from a library survey done in 2002 in the eThekwini Municipal Library in Durban, South Africa, led the authors to further investigate the information needs of the citizenry, with special reference to marginalized township and rural communities within the EMA. These communities differ from the deep rural areas of the kwaZulu-Natal hinterland in that people have more knowledge and contact with modern technologies and formal social structures due to the relative proximity of the urban environment as well as more frequent contact with family members who live and/or work in the city. They also have more ubiquitous mobile network coverage and mobile phones are common, particularly among the younger generation. Results of a recent survey among programme fieldworkers confirm that 75% of them have WAP-enabled phones with browsers and cameras. While perhaps invalid due to a possible bias in that people who have low confidence and familiarity with technology are less likely to volunteer as fieldworkers on a technology-based project, it highlights the trend among younger people from township and rural communities to use the latest mobile technologies, their need to connect and interact and their need for information. The keen need for access to local information is confirmed through focus group interviews with Ward councillors and elders in the communities.

4. Methodology

Results from the library survey, together with research into international initiatives around digital heritage preservation (e.g. Smithsonian Institution's Center for Folklife and

Cultural Heritage and national government policies on IKS preservation: see South Africa Department of Science and Technology 2005) informed the development of a model for the online preservation and dissemination of local and indigenous knowledge (Greyling 2009). The pilot programme is run under the auspices of the municipal library, which forms part of the Social Services Cluster of the eThekwini Municipality, second largest local government structure in South Africa. Forming part of an institutional outreach service it is sustained through an annual operational budget. As a platform the programme uses the established, multi-branch public library system, currently comprising 90 urban, peri-urban and rural libraries, all with free Internet available through desktop technology. The programme consists of three components, i.e. the community, the public library and the technology. The latest development on the programme harnesses the power of mobile technology to carry the exchange of knowledge further.

4.1. The community

Metropolitan areas in Africa are typically surrounded by peri-urban and rural areas, with large populations where there is little coherence in social structures, partly due to the dispersed nature of living environments and partly due to the poor economic situation prevalent in these areas. Korten (1990) points out those top-down social development strategies do not achieve sustained public participation and fail to develop social capital (Davids *et al*. 2005). The model on which this programme is based favours the micro-level approach (Davids *et al*. 2005), adopting a bottom-up philosophy, with the community as the most important member in this partnership (Coetzee 1996). Wenger's (1998) survey of community-oriented technologies proved the critical importance of a community-supporting platform in community building programmes. A major influencing factor is the possibility for potential participants to communicate with one another in a community-specific way, enriching social interaction processes and outcomes (Stanoevska-Slabeva 2002), thereby building social capital (Bidwell 2010). Putnam (1995) emphasizes the role of social bonds within ethnic groups and the vital importance of social networks for the attainment of economic outcomes.

4.1.1. Community leaders

Leaders from the community play a pivotal role in the establishment and continuation of the programme. Protracted engagement of local leaders in discussions around the strategic importance of indigenous knowledge ensures alignment of targets to current sentiments, which is imperative to sustained community interest in the programme. Thus, before any work is done in an area local leaders are consulted to obtain their input and cooperation. Experience has shown that political leaders are less concerned with programme details than with acknowledgement of their pivotal position in the community. They are, however, all positively interested in the technological skills benefits that the programme offers. So even though the programme engages with the community on various levels, it is not community driven as such.

4.1.2. Fieldworkers

Volunteer fieldworkers are selected from the immediate community. Local leaders provide names of interested people, with the understanding that final selection rests with the programme manager. Fieldworkers are typically younger people from the community with some measure of ICT skills – often with better mobile skills than PC skills – and a keenness

to develop new skills. They have intimate knowledge of the community and are in a position to build up trust relationships with members of the community. Fieldworkers are the link to the older generation and their store of indigenous knowledge, and their role is to collect the stories by means of personal interviews. With this methodology the limitation of illiteracy is overcome through audio recordings and video interviews. In many ways the oral practice of storytelling conveys tacit aspects of the narrative better than a mere electronic report of spoken words (Bidwell *et al*. 2011). However, one cannot deny that high levels of illiteracy limits potential for direct participation in the programme, particularly from the end-user perspective.

For new fieldworkers, full-day training workshops in oral history interviewing theory and practice are run. In the theoretical part the aims and objectives of oral history is explained and guidelines on the selection of interviewees and interview topics, as well as codes of behaviour given (Thompson 2000, Ritchie 2003, Denis and Ntsimane 2008). The practical section addresses interview protocols, with hands-on play-acting practice sessions in which fieldworkers set up and perform interviews with each other. These sessions are recorded on video and played back and critiqued with fieldworkers. Basic training in PC skills, digital photography, audio recording and web-based content management is done on a one-to-one basis before fieldworkers go out into the communities to collect information. A structured work plan is used as a guideline to ensure continuity, with small incentives such as stipends and cell phone airtime to encourage workers to adhere to the plan where possible. This model has been extended to include mobile fieldworkers, discussed later in this paper. Various methods are used in data collection:

- Short journalistic style reports.
- Oral histories and stories.
- Research on high-interest themes and recording of the information.
- Posting of articles and images to the website.
- Informal social networking among the community.
- Submission of articles via email from mobile devices.
- Assisting community members to post their own information to the website. This way digital skills transfer is achieved widely throughout the community.

4.1.3. Community members

The community in all its complexity constitutes the natural resource that forms the basis of the model. Special target groups in the community include the elderly, the youth, cultural groups including artists and crafters, professionals and technologists. Ownership of the knowledge rests with the community and their protracted participation contributes to the programme's sustainability. Participation in the programme also contributes to the protection of local knowledge, by virtue of making it known to the world that the published information is from the particular community.

People submit information for publication on the web on a voluntary basis, and from a personal perspective, i.e. they decide what information they want to share and they interpret the facts of an event from own experience. Oral histories in particular are highly contextual (Grele 1991). Contributors sign an agreement to release the information for educational purposes only, including publications, exhibitions, presentations and the web, without relinquishing copyright or performance rights. Sensitive collective knowledge of a restricted-access nature is currently not published on the website whereas commonly known collective knowledge is acknowledged as such. Articles are released on the

Internet through a Creative Commons Licence, with acknowledgement of the individual or collective owner/s of the knowledge. Fieldworkers explain to participants the concepts of both the Internet and intellectual property. Brochures and release forms are available in the local vernacular, explaining the terms of usage.

However, this remains a contentious issue and more research needs to be done in this regard. Indigenous cultures typically have a complex system of restrictions, pertaining to or based on sensitivity, gender or seniority (Southwood 2010) and to manage a collection containing items with different restrictions remains a challenge. Leavy (2006) developed a set of 10 protocols to provide guidelines for consultation with custodial owners in indigenous communities in Australia. This model could prove useful as a framework for capturing social heritage of local indigenous communities and warrants in-depth investigation. Interestingly point 3 in Leavy's (2006) model suggests that the communities make their own decision on what stories they want to have represented as part of their digital heritage, which underwrites the current policy of the Ulwazi Programme.

4.2. The library

The public library is an appropriate anchor partner in a programme of this nature because of the stability of its position, both within the community and within the government structures through which it is established. The Ulwazi Programme has been institutionalized by the Municipality as part of regular library services and as part of social services, it is well positioned to ensure free and equal access to information and knowledge (Hedelund 2006). By virtue of their profession, librarians bring expertise to the programme in the form of information/content management skills. The open social-network platform on which the programme is built provides the potential to preserve the dynamic nature, social embeddedness and shared character of community knowledge; as such it is a living document, a 'work in progress' to which amendments can be made at any time, to keep the knowledge updated, while at the same time providing a historical window. This kind of heritage practice creates an opportunity to understand the cultural and historical value of information shared and curated in a socially distributed fashion across various technologies (Liu 2010).

More importantly, as a library outreach programme, it is in step with global goals as constituted in the African Charter for Popular Participation (United Nations 1990), the United Nations Social Development Plan (United Nations 1995) and the United Nations Millennium Development Goals (United Nations 2000). It is also in keeping with the World Summits' on the Information Society (WSIS 2003, 2005) plans of action, which were developed to achieve the goal of 'providing equitable access to information and knowledge for all'. From the Geneva Plan of Action (WSIS 2003), the action lines directly underpinning the programme are, briefly:

(1) Access to information and knowledge. This concerns policies relating to public domain information, community access points (including such access in libraries), alternative software models (open-source and free software). One of the actions envisaged is the development of digital public library services.
(2) Capacity building. This covers skills needed for the Information Society, including literacy and 'ICT literacy,' the use of libraries in e-literacy work and the empowerment of local communities to use ICTs.
(3) Cultural diversity and identity, linguistic diversity and local content. This action plan focuses on promotion of respect for cultural identity, traditions and religions

> and dialogue among cultures as a factor in sustainable development. Libraries feature prominently in this plan, most notably their role in providing access to content and indigenous knowledge. By implication the role of libraries is extended to promote cultural heritage, support local content development and to enhance the capacity of indigenous peoples to develop content in their own language.

In the Ulwazi programme existing public library infrastructure is used as a platform from which the programme is launched. The programme is coordinated from a central programme office, from where training, data management and other centralized functions are performed. Branch libraries form the link to the communities and play a role in raising awareness, hosting topical outreach programmes, distributing promotional material and co-ordinating data collection within each community.

4.2.1. Supporting data collection

Volunteer community fieldworkers use their local library as a base from where they go out to collect data. The library provides space for oral history interviews and free Internet access. Broad-based collection development is achieved through library outreach activities such as holiday programmes, storytelling forums, historical society initiatives, cultural events, craft workshops and exhibitions. The central programme office assists with data capturing, transcriptions and translations, image processing and archiving. Team members meet once a month to review submissions.

Partnerships with other local institutions such as museums, community organizations, social development departments, communications and educational institutions, and local community development forums are encouraged. Often communication and collaboration between experts and ordinary people are promoted by the interaction between librarians, academic researchers, fieldworkers and community members, sharing knowledge and ICT expertise.

4.2.2. Managing the data

Contributions are stored online in a 'memory' database. Content management done at the central programme office includes editing, proofreading and categorization. To ensure adherence to selection policies and intellectual property rights, the content manager reviews new input selectively on an ongoing basis. Content is broadly based on the three main subject categories Culture, History and Environment. Following Mosimege (2005), the model allows the use of folksonomies within these three broad categories. Folksonomies are shared categorization or tagging systems (e.g. del.icio.us) whereby content is given subject tags by the content author, in contrast to controlled vocabularies (e.g. the Library of Congress List of Subject Headings) that is used in formal library cataloguing systems where qualified cataloguers assign subject headings from a predefined, standardized list. When contributors create tags they are free to use traditional names for concepts unique to the community. The advantage of folksonomies, in contrast to a controlled vocabulary, is that it is open-ended and can respond quickly to changes in the way users categorize content (Hartman 2006). It thus promotes the forming of a social network among web users. The content manager is a member of the local Zulu community, with an intimate knowledge of the local language and culture and attuned to the nuances of the community. While the social software allows input in any language, selective translation ensures a wider audience. Information posted to the website is archived by the hosting company. Extended information is stored externally and made available on request.

4.2.3. Reviewing the programme

Regular review of the programme is the responsibility of the central programme office. The success of the programme is quantified through the following key indicators:

- number of database entries in the various knowledge categories
- number of pictorial material and video streams
- number of times the site is visited
- number of people registering on the site to add information
- amount of information collected from communities
- amount of information collected from established resources, i.e. local cultural and natural history museums, the botanic gardens and indigenous nurseries, and other local institutions
- number of people contributing to the website
- number of people involved in collecting of information
- number of people trained to moderate content
- number of community workers trained to collect and capture stories and information
- number of community members trained to capture information
- community surveys and opinion polls

Google Analytics provides a valuable indication of the user base of the website. Visits to the website are currently peaking at the 30,000 mark per month, with over two-thirds of users coming from South Africa, most based in the eThekwini Municipal Area. Users are particularly interested in Zulu language content, in particular content about traditional customs and practices.

4.3. Social software technology

Together with developments in information and communication technologies over the past few decades, which have prompted a shift from collection development to collection management in libraries (Rowley 2003, Lwoga and Sife 2006), the recent emergence of Web 2.0 technologies is now enabling large-scale collaboration in the creation of online data (Ford and Botha 2009).

In the Ulwazi Programme preservation of indigenous knowledge is achieved through establishing a community web portal using open-source social software technologies. These technologies are ideally suited to satisfy the dynamic aspects of the community's organizational structure and can be used to support such community activities (Stanoevska-Slabeva 2002, WSIS 2003). Social web technology is easy to use, as content can be added in plain text and in any language. In the pilot project English is used alongside Zulu, the local vernacular, to satisfy the preferences of all sectors of the local geographic community.

4.3.1. Open source

At the outset of the project, the Ulwazi Programme team made a conscious decision to use open-source software where possible. Programme content has been made freely available to the general public under a Creative Commons Share and Share Alike licence. The decision to use open-source software was fed from two concerns. The first was ensuring financial sustainability; recurring license fees associated with proprietary software could cripple the programme's budget at a later stage. The second was that the aims of the programme – openness, sharing and collaboration – echoed those of the open-source

community. By using open-source software the programme aligned itself with a movement that shares similar ideals to those the programme hoped to foster through the project. Ideally, the Ulwazi Programme would want a group of volunteers submitting content through the wiki with the information collated to be as widely available as possible.

The Ulwazi Programme runs its own LAMP server. LAMP is an acronym for Linux, Apache, MySQL and Php, four popular open-source server technologies (Dougherty 2001). This combination of technologies allows us to run a number of content-management frameworks that serve a various functions. As the main portal (www.ulwazi.org) we run a Joomla! website. Linked from this site is the Community Memory, developed with MediaWiki (Rahman 2007), and the programme blog, created using WordPress (www.wordpress.org). All three are open-source projects with large developer communities.

As an additional communication tool, the programme decided to utilize the social media technologies that a large part of our target audience was already using. Thus also linked from this portal are the Facebook fanpage and the Twitter account, as well as the photo-sharing group on Flickr and the video channel on Vimeo.

4.3.2. The portal

The Ulwazi portal is a website that allows users to immediately access the different components of the Ulwazi Programme. It also provides information on the programme, submission procedures and contact details of team members. Linked to this is the Community Memory, which is developed as a wiki. A wiki is a piece of software that is used for collaborative content creation (Farkas 2007). Wikipedia, currently the best known example of a wiki, has as its slogan 'The free encyclopaedia that anyone can edit'. It is now the largest multilingual encyclopaedia available online – containing over two million articles – and still growing. In this browser-based collaborative writing environment a community can create and exchange information on particular topics, and anyone can contribute without having web programming skills (Rahman 2007).

The Ulwazi Programme is running a local installation of MediaWiki (the open-source framework used to run Wikipedia), restricted to indigenous knowledge collected within the borders of the eThekwini Municipality in the kwaZulu-Natal Province of South Africa. The software is powerful and ideally suited to the aims of this project. While anyone can edit or add to the database, the software also keeps a record of all changes made, allowing a content manager to track activity on the site and revert to an earlier edit, if needed. It has a user management system whereby users can be grouped together and assigned different permissions. This is useful for creating a hierarchy of authority to ensure that submissions are of an acceptable standard. MediaWiki software also has a flexible taxonomy, allowing categories and sub-categories to be created to accommodate the types of content collected. This can be expanded when needed, both vertically and horizontally, to create a set of folksonomies that promotes online social networking.

Directly linked from the Ulwazi Portal, and the final of our core components, is the Ulwazi Blog. Created with WordPress, the blog is used to publish community news, recent submissions and information on new features. The regular entries of the blog site are displayed in reverse-chronological order, with a built-in comment function. The blog has been operational for over two years and has proven to be a great success, with steady interaction created with Ulwazi's users in a more informal environment. It is the hub for the Ulwazi Programme's social media accounts (Web Trends 2011). Linked here is the Facebook fanpage – where users can 'like' the Ulwazi Programme and add links, photographs and comments to the wall – and the Twitter account, which users can follow to stay updated

on the latest activity from the Ulwazi Programme. Also accessible from the blog is the Ulwazi Flickr group, where users can view photographs from the project and add their own archival photographs or other images that fall under Ulwazi's mandate. Lastly, users can also view the Ulwazi Vimeo channel, a collection of video material (mainly oral history interviews) produced by the project.

Even if communication protocols among the older and more rural people are not well supported by currently available media (Bidwell 2010), the online social networking culture is spreading at a pace through the younger generations, to the extent that it has become unstoppable. The potential significance of this phenomenon in the future preservation of indigenous identities and cultures in a globalised world poses a challenge to designers of social media tools to enable local people to reproduce their own system of social capital (Bidwell 2010). Giaccardi (2011, p. 17) adds that 'ubiquitous technologies change how experiences and memories are constructed, valued and passed on in a society' and with it how the very practice of heritage at grassroots level is changing.

4.3.3. Going mobile – the number in my pocket

In the utilization of this combination of open-source and social media applications for archival and heritage purposes, the Ulwazi Programme is unique in South Africa. However, we are very aware of the unprecedented increase in cell phone usage in Africa, with popular statistics suggesting penetration close to 70% while the Internet population is still only 10.9% (Internet World Stats 2010). This marked discrepancy points to obstacles of unaffordability and inaccessibility, preventing or hampering access to the Internet through the conventional PC (Ford and Botha 2009). Features like minimal dependence on stable electricity supply, easy maintenance and easy to use audio and text interfaces have attracted the ICT-marginalized communities of Africa and are now the driving forces behind the mobile revolution that is sweeping across the continent. Millions of Africans are resorting to 'the number in their pocket' to connect with people and information; mobile phones are fast becoming the African PC.

A recent, promising development in mobile technology has been the introduction of browsers on mobile phones. This, combined with the 3G network all mobile providers have migrated to, means that ordinary Africans are accessing the Internet from their phones in ever-increasing numbers. The success of a number of Internet-based mobile applications, such as MXit (an instant messaging service for mobile phones developed in South Africa) and M-PESA (a mobile phone-based money transfer service developed in Kenya but now available in South Africa) means that the average mobile phone user now associates his phone with more than just the calls he makes and text messages he sends. It has affirmed its suitability and convenience as a tool to 'amplify and enable decentralized interaction' (Donner 2010, p. 11).

Locally in Durban, the recent survey among Ulwazi fieldworkers revealed their preference for Internet-enabled cell phones. The most recent Quality of Life Survey of the eThekwini Municipality (2011) indicates that 90% of households in the EMA have access to electricity, so charging of mobile phones is easy and affordable. The latest trend among people from the community is to carry sim cards for all three main networks and to share cell phones between members of a household, both are cost-saving strategies (Kgwete, personal communication, 2011).

With this in mind, we approached the problem of how we could adapt the existing components of the Ulwazi programme for use through mobile phones. The two main restrictions when designing interfaces for mobile devices is screen size and bandwidth. Most mobile

screen sizes are a tenth of the size of a computer monitor and while the 3G network in South Africa is fast (particularly in urban areas), data transfer is costly. This is a concern, particularly for the poorer communities we serve, who mainly use prepaid mobile phone services.

One of the strengths of a database is that the information that it holds can be presented in a number of different ways. For example, if a user is accessing the portal from a browser on a personal computer then a template design optimized for this user environment can be applied to the data. Currently, this is the normal way that this portal would be accessed, with this user-environment capable of handling graphic-rich pages with high functionality. If, however, a user were to try to access the same database (using the same skin) from a low-level mobile device, such as a mobile phone, it would be unusable due to a number of factors. This includes the time it takes for large images to download and the lack of functionality-support on a mobile browser.

With its smaller size and processor capacity, a mobile device requires an interface design that is optimized for its particular user-environment. This means, for the data to be accessed in a usable manner, images must be removed or drastically resized, most scripting should be deactivated and functionality kept to a minimum. So, a scaled-down interface was developed for the mobile interface. This consisted of a simple hyperlinked menu linking to the main sections of the website with the body copy situated below. Thus the image and cascading style sheet template design was replaced with plain HTML. We also removed embedded videos, all content in the sidebars (Flickr images, links to Twitter, informational links) and script-based functionality, such as the Facebook 'like' button. This stripped down version of the portal still has essential functionality including the ability to quickly navigate to pages or sections, full searching features and the ability to comment on blog posts. Small edits may still be made through the wiki but these need to be done in text/mark-up format as the WYSIWIG (Tsai 1998) will not work on a mobile device.

The mobile version of the Ulwazi portal, wiki and blog can be used on the simplest of mobile devices. With a WAP-enabled phone with a browser users can view and interact with the content stored on the Ulwazi programmes. Mobile versions of Facebook, Twitter, Flickr and Vimeo (developed by the websites themselves, some available as downloadable applications) means that a mobile phone user can now interact with these components of the Ulwazi Programme as well.

So, now that the problem of how to make the content accessible to mobile phone users was solved, we set about developing a model to collect indigenous knowledge material through mobile phones. While there is no one solution to this problem (for example, you could use Facebook and Flickr mobile to collect content; an application could be developed using the Java Mobile platform to collect data) we followed a similar approach to the development of the web components of the project, i.e. what would be the easiest solution, using freely available and user-friendly technology.

4.3.4. The mobile fieldworker

As an extension of the already successful fieldworker programme, a mobile field-worker programme could be initiated. Interested members of the community would need to register with the Ulwazi Programme, and would receive an information pack and clear instructions on how to conduct a mobile submission. With the convergence of communication technologies, many people use their mobile phones to make calls, send text messages, take photographs, record video and send email. This is particularly true of young people living in the townships and rural areas of the eThekwini Municipality (Tshapa, personal

communication, 2010), whose only electronic device is usually their phone. Email has become ubiquitous technology, with most people having an email address and many using it every day. The WordPress blogging platform allows submissions via email and we decided to adapt this technology to suit our needs. By setting up a unique email address, post@ulwazi.org, and assigning it publishing rights in the WordPress database, all emails sent to this address can be converted into entries in the database. This is technology that has been developed by WordPress to allow for remote posting to a blog, via email (Codex 2011). From the Ulwazi blog's control panel we entered the name of the mail server and port number of our hosting provider. We then entered the login name and password for our specially created email account. A UNIX cron job (Kietzman 2011) was set up on the server to ask the blog to periodically check for new mail.

The WordPress framework accesses the mail server with any emails sent to this address posted to the blog. The subject of the email becomes the title of the page, the content of the email becomes the copy of the page and any attached images are inserted into the page. When a new submission via email is made, the page is kept in an unpublished format until the content manager (automatically notified via email) has a chance to check it and assign it to the correct category in the Community Memory (although using the blog technology as the collection point, it is simple to transfer the digital submission from the blog database to the wiki database). For interested users without a browser or email application on their phone, an SMS gateway – which receives a text message and converts it to an email – could be deployed.

How then to generate interest in the programme and new submissions? A poster campaign, distributed through the 90 public libraries in the eThekwini Municipality and online through the Ulwazi Programme portal would highlight this new initiative, list the types of content required and possible subject matter, and provide a step-by-step guide on how to make a submission. While the volunteer fieldworkers are provided a monthly stipend, what incentive do the mobile fieldworkers have to use their time to collect articles and money to send them in? For all approved and published submissions, the authors are credited with R50 airtime, electronically transferred to their phones through M-PESA. An attractive addition to this model could be a free initial starter pack of R50. Such incentives would be in step with the programme vision to empower isolated communities to join the global information society.

The Google Analytics report for the website reveals that 5.4% of visitors access the portal on a mobile device with most users being based in South Africa. There has been a slow but steady increase in the number of mobile users since November 2010.

5. Results

From a technology point of view, the aim to employ mobile technology for the exchange of indigenous knowledge indicates potential success. The initiative showed that cell phones could be used productively as a tool in the exchange of indigenous knowledge and that platforms, that make provision for the various capabilities needed for recording and uploading of information to the website in an ordered, structured and controlled way, can be successfully achieved.

On a strategic level, the actions advocated in the Geneva Action Plan of the 2003 World Summit on the Information Society (WSIS 2003) have been achieved. The main strategic actions envisaged include the development of digital public library services, the empowerment of local communities to use ICTs, and promotion of respect for cultural identity, traditions and religions and dialogue among cultures as a factor in sustainable development.

On a practical level, the Ulwazi programme has succeeded in providing access to digital content and indigenous knowledge. Currently there are 681 articles on the website, of which roughly half are in Zulu. Between July 2010 and July 2011 62,000 visits have been recorded, of which 18,000 came from the Durban area. This suggests that the programme has been discovered and is used by eThekwini citizens. The capacity of the indigenous community of eThekwini to develop content in their own language has been proven.

6. Lessons learnt

Expect a high turnover of fieldworkers. Since they come mostly from the unemployed sector of the community they leave the programme as soon as an employment opportunity arises, placing additional stress on the recruitment and training aspects of the project. Incentives, however small, go a long way to sustain interest in the programme among them. Communication with fieldworkers is generally problematic, often because of shortage of airtime. The new incentive model should address this problem to some extent. Training is a slow process. Especially with fieldworkers, training of small groups and one-on-one training is more effective, but time-consuming.

As with many development projects, the programme is labour-intensive. Results are slow to come in. Content management is time-consuming and needs a relatively high degree of skill and experience. With a multilingual memory database it is necessary to do selective translation, albeit on a limited scale. Content managers need to have a good grasp of the languages used. Whereas development of ICT skills is generally slow among rural communities, there is a much faster grasp of the mobile technology; this should enhance overall digital skills notably.

Marketing and advocacy is time-consuming. The best way to promote the programme is through presentations to small groups and one-on-one discourse with potential stakeholders. Interactive outreach sessions at community libraries and schools should help to spread the word about the new knowledge resource.

Ordinary people in the community are generally keen to share their history and knowledge. The programme gives them a voice, bearing testimony to the need of ordinary people to be heard, to feel their contribution is valued; this way they become part of a bigger information society.

7. Limitations

The Ulwazi Programme is not a research unit and does not conduct extensive in-depth research into user needs, but rather relies on available research. This results in perhaps too broadly defined assumptions being made about technological and mobile understanding and use. Another limitation relates to levels of literacy, both technological and print, and the rural community's lack of understanding of the Internet and social media technologies. Participants' poor grasp of intellectual property rights, particularly in relation to the Internet, makes it a difficult concept to convey and occasionally there are some misgivings as to the potential impact. Generally however, because we try to steer clear of highly sensitive or contentious material, this has never been a big issue.

8. Conclusions

The power of mobile technology has the potential to put communities in a position to preserve and manage their own indigenous knowledge in an environment that is sustained

through local government structures on the one hand and through global technology developments on the other.

Through this programme disadvantaged communities stand to gain online access to their indigenous knowledge, along with the prospect of participating in the global information society and bridging the digital divide. Economic empowerment of communities through skills development, knowledge provision and social networking, carry the potential of job creation and progress in poverty alleviation. This promises to lead to enhancement of self-esteem and self-confidence, impacting on advancement of social capital and democratization.

Knowledge provision carries the seeds to behaviour changes and informed decision making, and creation of new knowledge within the community. It has the potential of stimulating innovative thinking, aiding learning and promoting indigenous technologies. Formal and informal knowledge levels in the community could be enhanced, contributing to an informed society.

Collaboration and knowledge sharing promises not only to contribute to the preservation of culture but also to bring about cross-cultural understanding and tolerance and improve social cohesion in the community.

In using affordable, easy-to-use mobile technology to provide an online, contextually-based information service to local communities, public libraries in Africa will ensure future-oriented access to cultural heritage resources through twenty-first-century information communication technologies. They will be instrumental in creating a future for the people of Africa by preserving the richness of the past and linking them to the cultural heritage on which their identity is founded. Through this mobile technology an opportunity is also created for the public library as an institution to reaffirm its relevance in an era of technological advancements that threatens to render them redundant. Twenty-first-century technologies are used to the advantage of the library to overcome the many practical, often insurmountable obstacles of maintaining traditional-style public libraries in remote rural areas.

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