

How to build an Indigenous Digital Library through Community Participation: the case of the Ulwazi Programme*

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Abstract

African Libraries and Information Centres are poorly equipped to make a meaningful contribution to the current global digital knowledge economy. The paucity of African stories and community information on the web predicated the limited role of heritage and information practitioners in Africa. Low local content on the Web retards buy-in from local communities into digital resources, impeding ICT skills development and social transformation. These issues could be addressed successfully through provision of indigenous knowledge resources, sourced from the community, as part of public library services.

This paper describes a concept for the development of user-generated content compiled in an Indigenous digital library, making use of current mobile and web technologies. Informed by empirical practice based on a real African case-study, the innovative use of internet-based mobile applications that permits the exchange of information is explained, highlighting the interaction between the library, the community and the latest technologies. By re-aligning their services thus public libraries in Africa have the potential to reduce the digital divide and promote sustainable development.

Keywords

Indigenous knowledge, digital library, mobile technology, ICT solutions, mobile phones, community participation, online preservation.

Introduction

African Libraries and Information Centres are poorly equipped to make a meaningful contribution to the current global digital knowledge economy. Local African content on the Web is very low, due to a lack of capacity to record, transfer and disseminate information (Greyling 2009). This paucity of African stories and community information on the web predicated the limited role of heritage and information practitioners in Africa as providers and gatekeepers of African information. Furthermore the low local content on the Web retards buy-in from local communities into digital resources, impeding ICT skills development and social transformation (Greyling & McNulty 2011).

While internet usage in Africa is still lagging far behind other continents at only 10.9%, the African Telecommunication/ICT Indicators 2008 highlights the phenomenal growth in Africa's mobile sector. Mobile penetration has risen from just one in 50 people at the beginning of this century to almost one third of the population today (ITU 2008).

Mobile technologies are currently being developed for a wide range of applications, with functionalities to allow potential users to interact in a number of different ways (Southwood 2010). At the same time libraries have, over the past number of years, moved their emphasis 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 in one form or another, we developed a concept for the exchange of user-generated digital content compiled in an online Indigenous Knowledge database. The Ulwazi Programme, operates as an integral part of local public library and information services in the eThekweni Municipal Area (EMA) in the province of KwaZulu-Natal in South Africa, using both conventional desktop and the latest mobile technologies.

This paper describes the different technologies that are used and outlines the interaction between the library, community and technologies. The participatory 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 has the potential to build social capital in the community through the 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).

Goals and Objectives

There is a growing demand for information and communication technologies (ICTs) and digital media literacy among rural communities along the EMA perimeter (Averweg and Greyling 2008). Through harnessing ICTs, indigenous groups and local communities can be empowered to cross the digital divide to become part of the global information society on their own terms, as is demonstrated by the outputs of the Ara Irititja Project in Southern Australia (Hughes and Dallwitz 2006).

As a long term strategy of the Library and Heritage Department of the Municipality to provide an equitable information service to all sectors of the public of eThekweni, the Ulwazi Programme is designed to provide a framework for a digital library of local and indigenous knowledge, in which content is created by the community. Thus a methodology for sustainable preservation, dissemination and sharing of local knowledge of rural or otherwise

isolated communities was developed. The potential was created for access to a digital knowledge resource of local relevance and 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” (Lesame 2005) 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).

The 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.

Methodology

As a platform we use the established, multi-branch public library system, currently comprising ninety urban, peri-urban and rural libraries, all with free internet available through desktop technology. As mentioned earlier, the programme consists of three components, i.e. the community, the public library and the technology.

The community

The model on which we base the programme follows the micro-level approach (Davids *et al.* 2005), adopting a bottom-up philosophy, with the community as the most important member in the partnership (Coetzee, 2001). Wenger’s survey of community-oriented technologies proved the critical importance of a community-supporting platform in community building programmes (Wenger 1998). 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. For the collection of content communities are targeted through fieldworkers, through prominent individuals in the community and through schools.

Fieldworkers

We select volunteer fieldworkers from the immediate community to drive the programme at ground level. 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 an 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. 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). After they have been trained in oral history research and protocols, media production (digital photography, audio recording and web-based content management) and ICT, fieldworkers are sent out into the communities to collect information (Denis and Ntsimane 2008, Ritchie 2003, Thompson 2000). They bring their contributions to the central programme office in the form of short journalistic style reports, oral histories and stories as audio or video files, where they are taught and assisted to post their articles and images to the programme website. Alternatively they may submit articles via email from mobile devices. We follow a structured work plan to ensure continuity, with small incentives such as stipends and cellphone airtime to encourage workers to adhere to the plan where possible.

Community members

The community in all its complexity constitutes the natural resource that forms the basis of the model. Ownership of the knowledge rests with the community and sustainability of the programme is ensured through community participation. Special target groups in the community include the elderly, the youth, cultural groups including artists and crafters, professionals and technologists.

To engage with prominent members of the community, we arrange for an appropriate member of the community to do the interview while we take care of the videography. Contributions range from personal and community histories to customary practices, living circumstances and historical environments. Individual interviews may expand into group interviews. 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 part with and 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. Articles are released on the Internet through a Creative Commons Licence, with full acknowledgement of the owner of the knowledge. Leavy (2006) developed a set of ten protocols to provide guidelines for consultation with custodial owners in indigenous communities in Australia. This model is useful as a framework for capturing social heritage of local indigenous communities; point 3, which suggests that communities make their own decision on what stories they want to have represented as part of their digital heritage, underwrites the policy employed in the Ulwazi Programme.

Schools

The Ulwazi Programme is piloted at township and rural schools where there are computer laboratories, focusing on raising awareness among the youth of the value of heritage and culture, while at the same time developing ICT skills and media literacy. We run the programme with Grade 10-12 learners with an interest in history, language or IT as an extramural activity in the afternoons, over a period of eight weeks. The programme has a practical task-based section and an online e-learning component, with a mentor assigned to each school. The mentors introduce the programme and show students how the website works. They also provide basic training on interviewing, story-writing, digital cameras and online research. Weekly themes for story collection (e.g. the story of my family, the area I grew up in, etc.) are set; students are expected to publish four stories with images to the website over the project period. A project specific blog is developed, where students can write posts about their experiences in using the Community Memory website. At the end of the eight weeks, students do an online test with questions that require them to use the Ulwazi Community Memory website to answer. There are also a number of questions to evaluate the ICT skills that students acquired through the programme. Competency Certificates will be handed out to all participants on completion of the project at each school.

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 receives an annual budget. 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, WSIS 2005) plans of action, which were developed to achieve the goal of providing equitable access to information and knowledge (Greyling &

McNulty 2011). From the Geneva Plan of Action (WSIS 2003), the action lines directly underpinning the programme described are briefly:

- 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.
- 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.
- 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.

Supporting data collection

Existing public library infrastructure is used as a platform from which the programme is launched. The programme is co-ordinated from a central programme office, from where training, data management and other centralized functions are performed. A central programme office assists with data capturing, transcriptions and translations, image processing and archiving. Team members meet once a month to review submissions. Branch libraries form the link to the communities and play a role in raising awareness, hosting topical outreach programmes, distributing promotional material and assisting in co-ordinating data collection within each community.

We encourage partnerships with other local institutions such as museums, community organizations, social development departments, communications and educational institutions, and local community development forums. 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.

Managing the data

Contributions are stored online in a ‘memory’ database. A content manager is responsible for editing, proofreading, translations and categorization. Following Mosimege (2005), the database employs the use folksonomies rather than controlled vocabularies that are used in formal library cataloguing systems where qualified cataloguers assign subject headings from a predefined, standardised 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.

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 is currently peaking at the 30,000 mark per month, with over two thirds of users coming from South Africa, most based in the eThekweni Municipal Area. Users are interested in Zulu language content, in particular content about traditional customs and practices.

The 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 (Farkas 2007).

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.

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.

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.

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" (Rahman 2007) of which the Wikipedia is currently the best-known example. In this "browser-based collaborative writing environment a community can create and exchange information 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 eThekweni 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 early 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 (www.wordpress.org), the blog is used to publish community news, recent submissions and information on new features. Blog posts are displayed in reverse-chronological order, with a built-in comment function. Linked from here are the Facebook fanpage and the Twitter account - which users can follow to stay updated on the latest activity from the Ulwazi Programme.

Going Mobile

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 cellphone usage in Africa, with popular statistics suggesting penetration close to 70% while the internet population is still only 10.9% (World Internet Statistics 2008). This marked discrepancy points to obstacles of unaffordability and inaccessibility preventing or hampering access to the internet through the conventional PC (Ford & 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 (a 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).

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.

Thus 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. We removed the image and cascading style sheet template design, replacing it 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.

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 we had solved the problem of how to make our content accessible to mobile phone users, we set about developing a model to collect indigenous knowledge material through mobile phones. While there is no one solution to this problem, 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.

The Mobile Field-worker

As an extension of the already successful field-worker programme, we initiated a mobile field-worker programme. Interested members of the community could 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 townships and rural areas of the eThekweni Municipality (Tshaba, personal communication), 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. We decided to adapt the WordPress blogging technology that allows remote posting to a blog via email (Codex 2011)

to suit our needs. By setting up a unique email address, post@ulwazi.org, and assigning it publishing rights in the WordPress database, emails sent to this address can be converted into entries in the database. 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.

How then do we generate interest in the programme and new submissions? While the volunteer field-workers are provided a monthly stipend, what incentive do the mobile field-workers 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 is a free initial starter pack of R50. Such incentives are 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.

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 of the eThekweni Municipal Library 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 has been recorded, of which 18,000 came from the Durban area. This suggests that the programme has been discovered and is used by eThekweni citizens. The capacity of the indigenous community of eThekweni to develop content in their own language has been proven.

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, goes a long way to sustain interest in the programme among fieldworkers. It is envisaged that the new, more direct incentive model will attract more participants.

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.

As with many development projects, the programme is labour intensive. Results are slow to come in. Content management is time consuming and need a relatively high degree of skill and experience. 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.

Training is a slow process. Don't assume that having a single big training session will cover basic training. Especially with fieldworkers training of small groups and one-on-one training is more effective, but time-consuming.

Communication with fieldworkers is generally problematic, often because of shortage of airtime. The new incentive model should address this problem effectively.

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.

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 21st 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 re-affirm its relevance in an era of technological advancements that threatens to render them redundant. 21st 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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