SISSA – International School for Advanced Studies Journal of Science Communication
ISSN 1824 – 2049 http://jcom.sissa.it/

RECEIVED: July 22, 2012
PUBLISHED: November 13, 2012

Article

Towards delivering e-health education using Public Internet Terminals (PIT) systems in rural communities in South Africa

Alfred Coleman

ABSTRACT: This paper investigated the potential of the Public Internet Terminal (PIT) system to promote basic health education for two rural communities in the North West Province of South Africa. A case study approach was used. Participants were selected from a population group of teachers, nurses, business people and students in the two communities. Observation, group interviews and questionnaire were used to gather evidence from the participants regarding their operational difficulties, social/economic difficulties and perceived usefulness of using the PIT system for basic health education. The findings revealed that a high number of participants could not operate the PIT system to search for relevant health information. Participants cited reasons of information overload and slow response of the PIT system. Further findings revealed that many participants lack awareness of the PIT services in these post offices. Participants indicated that the PIT system lacks local content specific information such as healthcare information on vaccination, personal hygiene, nutrition and pharmacies around their vicinities. The results from this study led to the recommendations which emphasized the incorporation of basic e-health education portal into the existing services on the PIT system and proposed a new user interface for the PIT.

Introduction

E-health emerged early in the 21st century and it is an all-encompassing term for the combined use of electronic Information and Communication Technology (ICT) in the health sector.[1] It is further pointed out that while some definitions associate e-health strictly with the Internet, the term broadly refers to any electronic exchange of health related data collected or analyzed through an electronic connectivity for improving efficiency and effectiveness of healthcare delivery.[1]

Thus, e-health is often used to describe virtually everything related to computers and medicine.[2,3,4] The concept of e-health is also used to describe the application of ICT across a whole range of functions which affect the health of citizens and patients.[5] The World Health Organization[6] defines e-health as 'being the leveraging of ICT to connect providers, patients and governments; to educate and inform healthcare professionals, managers and consumers or communities; to stimulate innovation in healthcare delivery and health system management, and to improve our healthcare system'. The emphasis of educating rural communities who constitute the citizens and the rural populace, such as those in Taung and Ganyesa, is the focus of this research study. The South Africa government, through the Department of Communication (DoC), in partnership with the South Africa Post Office (SAPO), has rolled out 700 Public Internet Terminals (PIT) in many post offices in rural communities as part of the DoC's national projects. The fundamental objective for the PIT is to create a communication infrastructure through which the public will have access to government information and services. A PIT is a stationary personal computer (PC) that is designed for public use with unique requirements of applications, software, hardware and connectivity for the users in a particular location.[7] In this research study PIT is defined as a standalone PC, which is set up in a public place to provide information and Internet services for the users in the rural communities in South Africa. The PIT has a high transactional power and high information availability like a kiosk that allows citizens to pay taxes and access public information. However the PIT which provides public Information to these rural communities excludes basic health information which is vital to give basic health education to them. The question is, how can the PIT be used to deliver basic

health education to rural communities in South Africa? To answer this question, this research paper investigates the potential of the PIT system to promote basic health education and based on the findings proposes specific efforts to integrate health education content into the PIT system and some strategies to direct people to utilize the content.

It is contended that electronic health education provides an opportunity to citizens to access information about alternative approaches to medical treatment.[1] Patients generally get only 10 minutes of face to face time with their physicians but through electronic health education patients can have access to thousands of healthcare Internet sites where they can gain unlimited health information.[2] Providing information to rural communities in Africa for rural health development can best be achieved through information technologies, especially those of electronic network and digital storage,[7] and South Africa's rural communities are no exception.

The purpose of this research paper is therefore to investigate the potential of the PIT system to promote basic health education.

Related work

The conceptualization of the PIT project was based on the pursuit of the DoC's mission statement, which is, "to strive towards a universal service to enable ordinary people to have access, not only to traditional media, but also the convenience of Information Technology". [8] According to the ICT[9] the provision of IT services to rural communities will create a flourishing information society that will improve the quality of life of South Africans and contribute to the economic growth of the nation. The PIT is a type of information kiosk and information kiosk is defined as a small rugged standalone structure which is often used as a news stand or bandstand for commercial enterprise.[10, 11] Rowley further defines a kiosk as a workstation that is specifically designed for public accessibility and it may be a standalone or networked to a larger computer system.

ICT appears to be both a unifying and a divisive force as far as socio-economic factors are concerned. This means that in spite of its advantages, the use of ICT by governments will exclude those who lack access to these services and information or those who do not use them effectively. This situation is often referred to as the 'digital divide'.[12,13] However, it is asserted that an information underclass cannot be defined in terms of "have and have-not" access without including both socio-economic factors such as low income, low level of education, and lack of technology skills; and socio-personal factors like low level of awareness, interest and acceptance of ICT usage.[14,15]

Again, Norman[16] points out that the use of any device or tool is underlined by among others, the mental or conceptual model of the user. According to Norman, this is a usability challenge. Another factor that influences the use of ICT is local acceptability. Nielson[17] defines acceptability in terms of both practical and social acceptability. Social acceptability is implicitly concerned with whether or not a system's intended users and other stakeholders think that the system is a legitimate, worthwhile or ethical use of resources, regardless of how well it works by other criteria; while practical acceptability, is defined in terms of utility, usability, cost, compatibility and reliability.[17]

Methods

In order to address the purpose of this study without sacrificing the relevance, a qualitative research strategy was used. A case study design was then applied. Olivier[18] states that the ability to collect a variety of information from case studies is, in fact, one of the major strengths of a case study method.

Setting

The research study was conducted in two rural communities, Taung and Ganyesa in the Bophirima Region of the North West Province in South Africa. These two communities were selected because the context and characteristics of the two rural communities are similar to all other rural communities in South Africa in terms of health care needs and geographic position of the two communities. Again these

two communities were selected because the population demographics (teachers, nurses, business people and students) found in these two communities can be found in all the rural communities where the 700 PIT workstations have been installed. The post office found in each of these villages hosts a PIT system as seen in figure 1 below.

Figure 1. PIT at Taung Post office.

Selection of participants

Purposive sampling was applied to select participants for this study from both Taung and Ganyesa. The participants were selected based on their relevance to the research study. The participants who were selected from the population of teachers, nurses, business people and students were chosen because they could read and write within the rural communities. There were 5 participants selected from each community, making a total of 10 participants. The participants were initially approached telephonically to seek their readiness to participate voluntarily in the research. The total number of 10 participants who were reached heuristically volunteered to participate in the research. This means the participants were selected from a population group of teachers, nurses, business people and students. The participants were 60% males and 40% females with demographic characteristics indicate in the table below.

Age	*Frequency*	*Percentage*
21–30	2	20
31–40	3	30
41–50	3	30
51–60	1	10
60+	1	10
Total	10	100

Table 1. Participants demographics.

The table above shows the age distribution of the participants. The information from the table indicates that a clear majority of the participants [60%] are 31 years and above.

Data collection tools and process

The main data collection tool that was applied in the study was observation, which was supported by group interviews and questionnaires. A total number of 5 people in each village were observed while performing a task on the PIT system. The same set of 5 people were interviewed and later requested to complete a questionnaire (each participant completed one questionnaire).
The table below indicates the number of participants and the instrument applied in each village.

Data collection Instruments	*Taung*	*Ganyesa*	*Number*
Observation	5 Participants	5 Participants	N=10
Interviewed	5 Participants	5 Participants	N=10
Questionnaire	5 Participants	5 Participants	N=10

Table 2. Data collection instruments and participants.

Observation

Each participant was given 20 minutes to use the PIT. A test was conducted whereby each participant was expected to perform a task on the PIT within a period of 20 minutes. The purpose of the task was to determine the operational difficulties experienced by users when using the PIT system. The task stated below was given to the participants to perform:
Find a government website on HIV/AIDS and request for a support centre to be built in your community.
The test/task was monitored in a form of direct observation by the researcher and a video and audio recording were used to capture data. A microphone was placed at the front of the computer to capture the user's voice and comments as each participant performed the task. The focus of the camera was on the monitor of the PIT computer. The direct observation was supplemented by brief handwritten notes by the researcher, and the video recorder was used for retrospective analysing and reviewing of the gathered information. In order to reduce anxiety among the participants, the participants were informed about the purpose of the research and the tasks were performed in an informal relaxed atmosphere. By adopting a task-based approach in gathering the data, the main focus of the task, as mentioned above, was to determine the operational factors which influence the participants when using the PIT system to search for health information and other government services.

Interviews

The same set of participants (5) who performed the task on the PIT system was further interviewed. The purpose of the interview was to solicit answers to socio-economic difficulties of using the PIT for basic health education. Participants answered the question: "What socio-economic challenges prevent you from using the PIT for government services and information?".

All interviews were transcribed in Microsoft Word format and extensive notes were taken. Interview transcripts and notes were analysed systematically through iterative and repeated reading of the transcripts. This made it possible to gain an increasingly profound understanding of each interviewee's viewpoints and perspectives.

Questionnaire

The same set of participants was given questionnaires to elicit participants' perception about the usefulness of the PIT system in their communities. Out of the ten questionnaires given to the participants eight were returned. One participant claimed to have misplaced her questionnaire while the other participant claimed to have forgotten his questionnaire at home.

Data analysis

The data collected from the participants were analysed manually through the use of open coding approach. The aim of the analysis was to understand the various constitutive elements in the data through an inspection of relationships between concepts, constructs and variables and to see whether there were any patterns or trends.[19,20] To make the analysis simple and manageable the data were broken down into smaller units with each of the units arranged under an appropriate and specific theme. Themes were categorized under the headings: operational difficulties, socio-economic difficulties and perceived usefulness of the PIT system.

Results

The main purpose of this research paper was to investigate the potential of the PIT system to promote basic health education among the people in Taung and Ganyesa communities.

The findings are summarized under the following headings: observation results, group interview results and questionnaire results. Each of these headings is discussed in detail in the following paragraphs.

Observation results

The results of the direct observation of the participants as they performed the task were found to be as follows: 80% of the participants from the two communities could not perform the task of finding a government website on HIV/AIDS nor request for a support centre to be built in their community. The following difficulties were cited by participants as the reasons for their inability to perform the task on the PIT system:

- Overload of information on the website of the PIT system;
- The use of inconvenient language (not the mother tongue) on the website;
- The slow response of the PIT system; and
- The absence of an appropriate conceptual model.

Each of the above stated difficulties is discussed below.

Overload of information on the website of the PIT system

One of the problems that many of the participants faced when they were introduced to the initial page of the PIT website was the inability to distinguish between relevant and irrelevant information presented. The participants indicated that there were so much information and many hyperlinks on the user interface that they did not know where to start from. A direct quote from Participant 1:

"I am confused with all these icons and I don't know what is what".

The observation showed that the few experienced participants tended to ignore the general information on the PIT interface and rather concentrated on pop ups on the interface. The inexperienced participants found it difficult to recognize hyperlinks and separate them from plain text. The inexperienced participants read all the text from the top to the bottom of the webpage.

The use of inconvenient language (not the mother tongue) on the website

The participants further indicated that they did not understand the language on the website and one of the participants stated:

"I don't understand this English; it is too deep for me".

Participants from both Taung and Ganyesa could not understand the language on the website of the PIT system. The use of terminologies on the website proved to be one of the participants' difficulties when they attempted to find and utilize the services on the PIT system. This also includes the use of bureaucratic language which is found to be an obstacle to the user.

The slow response of the PIT system

Participants commented that the PIT system was too slow to open up a new webpage for them and delayed them from performing the task on time. In some instances when no responses were received within an adequate time, frustration set in and participants started performing other tasks such as highlighting other hyperlinks. Some participants even began to question their own actions by blaming themselves for the error that had occurred.

The absence of an appropriate conceptual model

The task also revealed that many of the users found it difficult to operate the PIT machine. This was caused by their lack of knowledge regarding the use of computers. Since many of the participants were inexperienced and first time users of the PIT they found it difficult to properly manage the task on the PIT system.

Group interview results

The group interviews solicited answers to the question:
What socio-economic challenges prevent you from using the PIT for government services and information?
The participants provided the following response:
Lack of awareness of the various services that the PIT can offer to the community.
The findings showed that 70% of the participants visit their local post office three times or more per week. However, many of the participants who visit the local post office have never used the PIT system because they are not aware that a PIT system is located in their post office for Internet usage which can offer information on government and healthcare services. Few participants acknowledged the presence of the PIT system in their post office, but indicated that the PIT system lacks local content specific information such as healthcare information on vaccination, personal hygiene, nutrition and pharmacies around their vicinities. Furthermore, participants indicated (in their responses during the interviews) that the major factor hampering them from using the PIT system is the lack of direct webpage which deals with direct health issues. Below is a direct quote from Participant 2:
"Had there been a webpage relating to health I could have got it easily".
Additionally, lack of confidence was cited as a hampering factor as well as the fear of technology. Participants further indicated that they lack ICT skills, confidence and fear of technology.

Questionnaire results

The same set of participants was given questionnaires to establish participants' perception about the benefits a PIT system can offer to their community.
The following were stated by participants as some of the perceived benefits the PIT system can offer to their communities if used.

- Assist the community members to search for jobs;
- Link the community to the outside world;
- Help their children's education;
- Help them obtain relevant government information; and
- Obtain basic health information if available.

However, the participants cautioned that these benefits can be realized if the PIT services were extended to include basic health education in their mother tongue, which is "Setswana".

Discussion

Operational issue

The commonly observed operational issue of the PIT included overload of information on the webpage of the PIT system, the use of language which is not familiar (not the mother tongue), the slow response of the PIT system and the absence of an appropriate conceptual model.

Overload of information on a webpage could be a usability problem which describes the efficiency of the interface (can the interface be used in a timely manner?) or the users' lack of awareness about where the desired information or services are stored on the webpage. The main factor which hinders the use of Internet kiosks is users' lack of awareness about where the desired information or services are stored on the webpage.[21] This means that when an individual user visits a website, he/she is presented with a fixed set of choices and it is only by stepping through the offered choices and conforming to the prescribed organization of the webpage that the user can reach the document that he/she desires.[22] This overload and navigation problem requires computer skills and experience,[23] which many of the people in the rural communities of Taung and Ganyesa may not possess.

Furthermore, many participants found it difficult to read and understand the English language and terminologies displayed on the interface of the PIT system. A project "hole in the wall" in India succeeded in twenty-two rural villages, partly because the website for the children provided understandable language, interesting subjects, entertaining and easy to read programmes when it was first introduced in the villages.[24]

Therefore, the web interface of the PIT must have an alternative local language, Setswana, and to the extent possible, be visually oriented and interesting to the local people. Information displayed must be meaningful and relevant to the local community people.

Many of the participants were inexperienced and first time users of the PIT and therefore, found it difficult to properly manage the task on the PIT because of navigation difficulties and the website environment. It is pointed out that in an unfamiliar website environment such as the PIT, users are confronted with a lack of plan of action which will enable them to navigate through the website.[21] Norman[16] further explains that the operation of any device, whether it is a can opener, a power generating plant or a computer system, is learned and used more readily if the user has a good conceptual model about that device. To be able to resolve the problem of navigation difficulty and way finding in the web environment, the user should possess an appropriate conceptual model of the website. To this end, it requires that the principle of operation be observable and that the visible parts of the device must reflect the current state of the device in a way that is consistent with the mode.[16] Therefore, in order to ease the mental activities of the user, colour, font, and graphics must be used as way finding cues.[21]

Socio-economic issues

Lack of awareness was cited as the major social factor which prevents the participants from using the PIT despite their regular visits to the post office. It was also evident that the lack of ICT skills and confidence contributed to the prevention of the usage of the PIT. This finding indicates that a lack of awareness can contribute to digital exclusion of any individual or community.

This lack of awareness of the community members indicates that the placing of the PIT workstations in these post offices were done without the involvement of the community members. Introducing ICT into rural areas without adequate consultation with the local communities is likely to fail in achieving the objectives for setting up the ICT infrastructure.

Perceived usefulness of the PIT system

Despite the fact that many of the participants were unaware of the presence of the PIT system in their post office, they responded through the questionnaires that it would benefit their communities. This expresses the social acceptance of the PIT system by the communities. The value of ICT should be found in

community-owned activities and community space where issues of importance to the community are addressed. This implies that for the PIT system to be acceptable and useful to the communities of Taung and Ganyesa, it should contain issues that are of value to these communities. These issues of value as the communities have already indicated include the delivery of basic health education to the rural communities through the PIT system.

Recommendations

Incorporation of basic e-health education portal into the existing services on the PIT system

The current existing PIT system offers services like e-mail, sms, Internet, educational and business services. In order to deliver basic health education to the communities, it is recommended that the PIT services be extended to include basic-health education, sector specific information, training services and other local contents on the PIT system. The PIT interface should also have information presented to the communities in their local language. A PIT model that the researcher has proposed to embrace the extended basic health education service is indicated in figure 2.

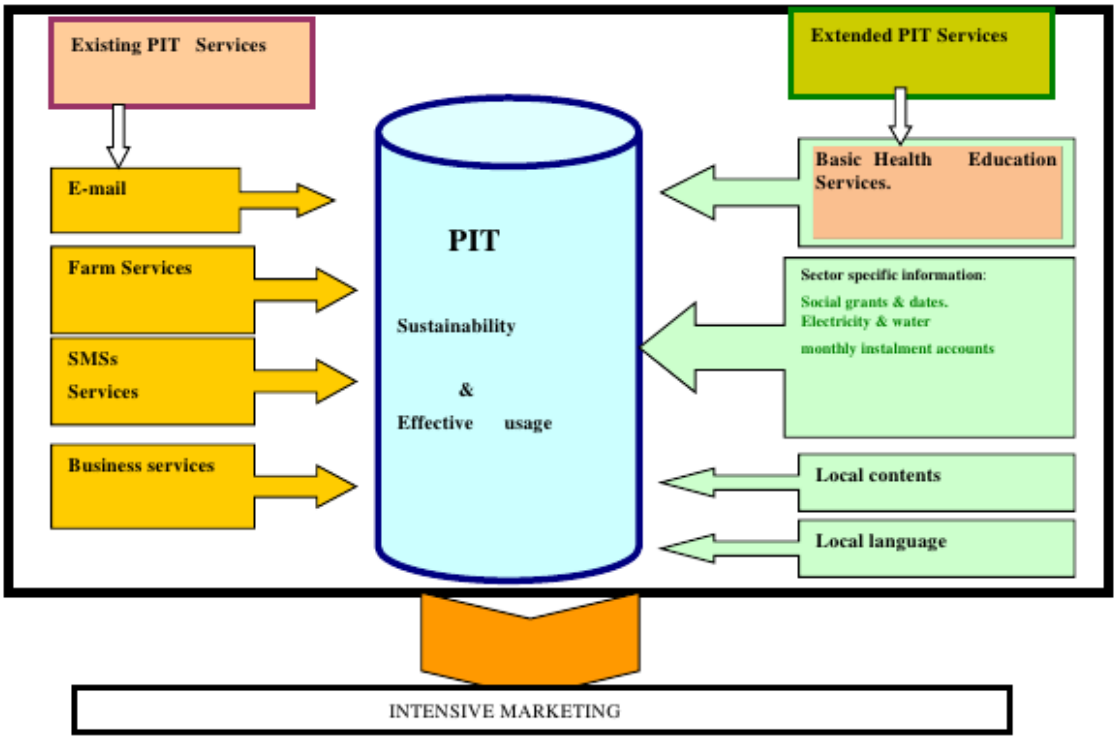

Figure 2. Extended PIT Model.

To be able to sustain basic health education to the rural communities through the PIT system, the North West Health Department needs to create a health portal which the community people can always see on the PIT screen as the initial interface whenever they visit the PIT. A typical example of such a portal that can meet the needs of the people in Taung and Ganyesa is a model that has been designed by the researcher and labelled North West Health Portal is illustrated in Figure 3 below. The portal will have sections like “My Health” which will host information on babies and children’s immunization and other health improvement information. Other sections of the portal will also provide education on “My Life Style” which will deal with information on nutrition, exercise, basic personal hygiene, drugs and alcohol; “My Environment” where the community members can obtain information about the pharmacies, clinics

and hospitals within their vicinity, safety and risk information regarding chemical and biological threats found in their environment; "Health Problems" which will provide education on prevention of common diseases like HIV/AIDS, STDs, influenza and other infectious diseases. The other sections which are "Care For Me" and "Health in the North West" will provide education on patient safety, government health policies and new health programme initiatives in the province. The adoption of such a portal in rural areas like Taung and Ganyesa will have the potential to promote basic health education among the community members. Figure 3 illustrates the proposed portal on the PIT system.

Figure 3. Proposed North West Health Portal.

This health portal is then set to interact with a Provincial health database where health information can be transported to the portal. Such communication can use an appropriate transport protocol, such as HTTP for Internet communication and TCP for intranet communication for sending messages. An HL7 messaging standard can be adopted as the messaging standards for the health information transmission.

The next paragraphs discuss other recommendations which are essential strategies to direct the people to use of the PIT system in these rural communities.

Strategies to direct people to utilize the PIT in rural communities

The use of local Setswana language. The findings revealed that some of the participants from both Taung and Ganyesa could not understand the language on the webpage of the PIT system. It is therefore, recommended that information stored on the portal be made more relevant to the local users by adding an alternative local language, Setswana, to the interface of the PIT system and to the extent possible, be visually oriented. Information stored in the server must not only be meaningful and relevant to the local community people but should also display other issues that are essential and of interest to the community as shown in Figure 3.

Create awareness of the PIT and the e-health portal.. One of the major findings was the lack of awareness of PIT services among the participants of Taung and Ganyesa. It is therefore, important that the availability/existence of the PIT system and its services (health portal) and usefulness be marketed to the community members. This can be done through various media such as local radio stations, local tribal meetings and other workshops in a bid to increase visibility and awareness of the PIT system. Attempts

can also be made through partnerships with the chiefs to allow representatives from DoC and SAPO to give presentations about the usefulness of the PIT and its services to the local community people during traditional tribal meetings.

Training of community members. Another problem which became evident during the study was the inability of the participants of both Taung and Ganyesa to operate the PIT machine. This is due to the lack of ICT skills of the participants. Thus, it is recommended that training be given to the local community members to assist them in the use of PIT and the e-health portal. This can be done by appointing a trained human assistant or any trained computer user(s) in the community. It is also suggested that SAPO should employ a human assistant for each community who will assist people who may encounter difficulties when accessing information from the PIT system.

Promote local ownership of the PIT and the e-health portal. Participants indicated their acceptance of the PIT system in both the Taung and Ganyesa communities, and for them to be effectively involved in the usage of the PIT system, it is recommended that any new application or program introduced on the PIT system must be done in collaboration with the local community people through the community leaders. It is equally recommended that programmes must reflect the needs of the communities. Communities like Taung and Ganyesa will highly accept programs that give them information on social grants and the days of payment of such grants and pension funds, and medication supply to the elderly.

Conclusion

The results from this study have provided three major contributions to the field of e-health. Firstly, the results from the study indicate that a need exists for the PIT services to be extended to include a community basic health education portal to educate the community members on basic health issues and to allow them to access health services and information. Secondly, a model (Figure 2) has been designed to illustrate how the extended services can be incorporated into the existing PIT system. The interface of the extended PIT system is depicted in Figure 3. Thirdly, recommendations for the sustainability of the PIT system have been provided. These include the need to create community awareness of the PIT through the local chiefs and community radio stations, train community members in ICT skills and in the usage of the PIT and to promote local ownership of the PIT through partnership with the local communities.

These recommendations and the model are to promote basic health education in these rural communities and to assist any other communities which experience difficulties in accessing basic health education and information. Although this study has a limited number of participants, the findings were unexpected, and therefore, of interest to those who intend to implement online basic health education initiatives in rural communities.

Notes and References

[1] P.J. Harrison and A. Lee (2006), *The Role of E-Health in the Changing Health care Environment*, *Nursing Economics* **24**: 6–283.

[2] J. Deluca and R Enmark (2000), *E-health: The changing model of healthcare*, *Frontiers of Health Services management* **17**(1): 3–15.

[3] T. Kind and T. Silber (2004), *Ethical issues in pediatric e-health*, *Clinical Pediatrics* **43**(7): 593–599.

[4] S. Kwankam (2004), *What e-Health can offer?*, World Health Organization, *Bulletin of the World Health Organization* **82**(10): 800–802.

[5] ERISA - European Regional Information Society (2004), *A Guide to eHealth Applications for Regions*, IANIS, www.ianis.net, accessed:10/5/2009.

[6] WHO - World Health Organization (2003), *e-Health Report by Secretariat*, 58th World Health Assembly A58.

[7] M.D. Karcher (2001), *Public Internet Kiosks offer web access, Leatherneck* **84**(11): 80–83.

[8] DoC - Department of Communication (2003), *Public Internet Terminals (PIT)*, http://www.doc.gov.za/PIT_Sumy.htm, accessed: 18/08/2006.

[9] ICT charter (2004), *ICT Empowerment Charter: Working Group Research Unit*, http://www.ictcharter.org.za, accessed 13/10/2006.

[10] G. Morris, T. Sanders, A. Gilman, S.J. Adelson and S. Smith (1995), *Kiosks: Technological Overview*, Los Alamos CIC-3: LA-UR-95-1672.

[11] J. Rowly (2000), *Loyalty Kiosks: Making loyalty cards work*, *British Food Journal* **102** (5): 390–397.

[12] C. Raab, C. Bellamy, J. Taylor, W.H. Dutton and M. Peltu (1996), *The information Policy: Electronic Democracy. Privacy and Surveillance in Information and Communication Technologies: Vision and Realities*. Oxford University Press, Oxford, U.K.
[13] R. Civille (1995), *The Internet and the poor, in Public Access to the Internet*, US: MIT Press Cambridge, MA, U.S.A.
[14] M. Castells (1998), *The information Age 3: End of Millennium*, Blackwell, Oxford, U.K., pg. 92–95.
[15] P. Foley, X. Alfonso and S. Ghani (2002), *The Digital Divide in a World City*, published by the Greater London Authority, London, U.K., http://www.casa.ucl.ac.uk/cyberspace/london_digital_divide.pdf, accessed: 13/10/2006.
[16] D.A. Norman (1998), *The psychology of everyday things*, Basic Books, New York, NY, U.S.A.
[17] J. Nielson (1993), *Usability Engineering*, Academic Press, Cambridge, MA, U.S.A.
[18] M.S. Olivier (2004), *Information Technology Research: A practical guide for Computer Science and Informatics*, Van Schaik Publishers, Pretoria, Sudafrica.
[19] J. Mouton (2004), *How to succeed in Your Master's and Doctoral Studies. A South African Guide and Resource Book*, Van Schaik Publishers, Pretoria, Sudafrica.
[20] J.W. Creswell (2007), *Qualitative Inquiry and Research Design. Choosing among five approache*, 2nd ed., SAGE Publications, London, U.K.
[21] P.I. Santosa (2003), *Observing a User's mental model of an information website*, paper presented at 9th American Conference on Information Systems, Tampa, Florida, FL, U.S.A., pg. 2223–2230 http://aisel.aisnet.org/amcis2003/286, accessed 18/09/2006.
[22] L. Raymond, F. Giovanni, P. Christine and Z. Victor (1997), *WEBGALAXY: beyond point and click- a conversational interface to a browser*, *Computer Network and ISDN system* **29**: 1385–1393.
[23] R.P. Darken, T. Allard and L.B. Achille (1999), *Spatial orientation and way finding in large-scale virtual spaces. Teleoperators and Virtual Environments*, *Presence* **8**(6): 3–5.
[24] P. Inamdar (2004), *Computer skills development by children using 'hole in the wall' facilities in rural India*. *Australasian Journal of Education Technology* **20**(3): 337–350. http://www.ascilite.org.au/ajet/ajet20/inamdar.html.

Author

Dr Alfred Coleman is a PHD holder in Information Technology and a senior lecturer in school of computing in University of South Africa. His specialization areas include e-health and business Informatics. Affiliation: School of Computing, University of South Africa. E-mail: colema@unisa.ac.za.

HOW TO CITE: A. Coleman, *Towards delivering e-health education using Public Internet Terminals (PIT) systems in rural communities in South Africa*, *Jcom* **11**(04) (2012) A01.