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ROLE OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN HIV/AIDS HEALTH COMMUNICATION IN SLUMS (A Case of Kawangware Division, Nairobi Kenya)

Dr. Francis Ofunya Afande, PhD., FCIM (UK).
Dedan Kimathi University of Technology, P.O. Box 657, 10100, Nyeri Kenya

ABSTRACT

Purpose: Information and Communication Technologies are key elements of a civil society response to the HIV/AIDS epidemic, enabling advocacy, mobilization, and empowerment of People Living with HIV (PLWHA), women, and other vulnerable groups. This study sought to investigate the role of Information and Communication Technology (ICT) in HIV/AIDS Health Communication in slums through a case study of a project sponsored by AfriAfya in Kawangware division, Nairobi Kenya. AfriAfya, also known as the African Network for Health Knowledge Management and Communication, is a consortium of health NGOs namely: Aga Khan Health Services; African Medical and Research Foundation (AMREF); CARE Kenya; Christian Health Association of Kenya; HealthNet Kenya; the Ministry of Health, Kenya; PLAN International; and World Vision International, Kenya. AfriAfya was set up in April 2000 to explore the ways of harnessing ICTs for community health in rural and marginalized communities. The study was guided by the following specific objectives: (i) to analyze the ICT interventions and tools used in the fight against HIV/AIDS in Kenya; to examine the benefits derived from adoption of ICTs in the fight against HIV/AIDS in Kenyan slums; to assess the challenges faced in the adoption of ICTs in the fight against HIV/AIDS in the slums in Kenya; and to recommend strategies on how best to employ ICTs in the fight against HIV/AIDS in Kenyan slums.
Methods: The data collected by this study was analyzed by descriptive statistics such as percentages, frequencies and tables. In addition, standard deviations and mean scores were used to present information pertaining to the study objectives. The information was presented and discussed as per the objectives and research questions of the study.
Findings: Findings of the study indicate that all the four objectives were met as follows:- The tools used in the fight against HIV/AIDS in Kenya were established as being e-mail discussion groups, Internet, Dissemination of information on World Wide Web (www), Radio, Television, and Distance learning systems. The interventions used in the fight against HIV/AIDS in Kenya were established as being Prevention:-Dissemination of prevention messages as well as prevention services to target groups such as commercial sex workers; School Based Education:- Education and life skills training in the schools for effecting appropriate behavioral changes among youth; and Education of Health Care Workers :- ICTs are being used to improve access to information, education, and communication for health workers using, Internet, email discussion groups, and distance learning systems. The benefits derived from adoption of ICTs in the fight against HIV/AIDS in Kenyan slums were determined as being Social change; empowerment and reduction of vulnerability; advocacy, mobilization, networking and capacity building; Remote consultations and diagnosis; Information sharing; Remote mentoring; Facilitation of Distance learning teaching; and Online Counseling. The challenges of adoption of the ICTs in HIV/AIDS

Health Communication were established as being: - Limited connectivity; Poor ICT infrastructure status; High costs of accessing the Internet; and Language barrier.

Key Words: *Information & Communication Technology, HIV/AIDS, Community Based Organizations.*

LIST OF ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
AMREF	African Medical & Research Foundation
ART	Anti-Retroviral Therapy
CBO	Community-Based Organization
CD-ROM	Compact Disc - Read Only Memory
CORPs	Community' Own Resource Persons
CSO	Civil Society Organization
HIV	Human Immuno-deficiency Virus
ICTs	Information and Communication Technologies
IEC	Information Education Communication
IGAs	Income Generating Activities
NACA	National Action Committee on AIDS
NGO	Non Governmental Organization
PESP	Project Enhancement and Sustainability Plans
PLWHAs	People Living With HIV/AIDS
PMTCT	Prevention of Mother to Child Transmission
STD	Sexually Transmitted Disease
STI	Sexually Transmitted Infection
TAC	Treatment Action Campaign
TALC	Teaching-aids at Low Cost
TV	Television
UN	United Nations
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNICEF	United Nations Children's Fund
US	United States

VCT	Voluntary Counseling and Testing
WHO	World Health Organization

1.0 INTRODUCTION

1.1 Background of the Study

1.1.1 Information and Communication Technology and HIV/AIDS

According to the Joint United Nations Program on HIV/AIDS (UNAIDS); African countries carry a HIV/AIDS burden 100 times heavier than that of industrialized countries[1]. Tens of millions of adults live with HIV in Sub-Saharan Africa and the prevalence rate of youths (ages 15– 24) infected with the disease is alarming. This high overall HIV prevalence rate among African youth reveals the urgent need for HIV/AIDS educational and prevention programs targeted specifically at the unaffected young people. Driscoll (2001) argues that the use of Information and Communications Technologies (ICT) complements other Information Education and Communications (IEC) campaigns designed to effectively reach the populace. The same technology resources - e-mail, CD-ROMs, and the World Wide Web - that can link HIV/AIDS educators and activists around the world, also hold great promise for reaching the target population, who typically embrace the use of technology for entertainment, learning, and communication when given access to these resources (Kelly, 2006).

Ashcroft and Watts (2005) assert that more effective communication about HIV/AIDS and greater flow of information are central to the success of its management strategies and to reducing the vulnerability to infection. Gilhoney (2001) asserts that information and communication are sources of power in an epidemic characterized by a lack thereof: they confer the power to protect against infection, to influence decision makers, and to live lives of dignity and equality once infected. In a region often characterized by resource limitations and fragmented infrastructures, information and communication are two of the most critical and abundant resources available in the fight against HIV/AIDS (Adeya, 2003). Currently, there exists considerable consensus that an effective response to the epidemic should be a comprehensive one; requiring prevention, treatment, and the protection of human rights. These elements are part of a continuum, with prevention enhanced by the availability of treatment, which in turn reduces the stigma of an illness perceived to be a death sentence (Alpi and Bibel, 2004). Effective prevention also relies on the reduction of vulnerability to infection, in high-risk groups like women and youth, through the protection of human rights and other means. Information and communication are central threads running throughout this response, providing both form and content to prevention, treatment, and vulnerability reduction (Burnham and Peterson, 2005).

According to the Center for International Cooperation, Health and Development (2005), while resource limitations and infrastructural gaps hamper both extensive ICT connectivity and significant scaling up of a comprehensive response to HIV/AIDS, the African continent is rich in the human resources and initiative necessary to enable an effective response to HIV/AIDS. Chikonzo (2005) argues that significant obstacles to effectiveness of ICT interventions in the fight against HIV/AIDS

[1]UNAIDS, HIV/AIDS and Communication for Behavior and Social Change: Program experiences, examples and the way forward. Geneva, Switzerland: WHO/UNAIDS. [Online] Retrieved on 31 January 2006 http://www.unaids.org.

remain: limited resources, stigmatization and discrimination of People Leaving with HIV/AIDS (PLWHA), a lack of information to enable appropriate behavioral changes and to counter the dangerous social consequences of misinformation and myths about the disease, and continuing social and political silence and denial about the disease. Information and communication (and the technologies that facilitate them) are also key elements of a civil society response to the epidemic, enabling advocacy, mobilization, and empowerment of PLWHA, women, and other vulnerable groups. ICTs also increase democratic participation and provide greater accountability of national and international decision makers (Jensen, 2002).

1.1.2 Background of the Kawangware (AfriAfya) project

AfriAfya, also known as the African Network for Health Knowledge Management and Communication, is a consortium of health NGOs namely: Aga Khan Health Services; African Medical and Research Foundation (AMREF); CARE Kenya; Christian Health Association of Kenya; HealthNet Kenya; the Ministry of Health, Kenya; PLAN International; and World Vision International, Kenya. AfriAfya was set up in April 2000 to explore the ways of harnessing ICTs for community health in rural and marginalized communities. AfriAfya's vision is to have universal and equitable access to quality health information so as to create informed, empowered and healthy communities and subsequently contributes to social transformation. AfriAfya's main objective is improvement in health and social development in Africa through health knowledge management and communication. Specifically the objectives are 1) to increase community knowledge of up-to-date, relevant health information in target areas; 2) to ensure that methods of communication at community level are explored and developed; 3) to ensure that up-to-date, relevant health knowledge is generated and packaged appropriately for the target audience; and 4) to document and share experiences.

The "Harnessing of Information and Communication Technology for Community Health" project by AfriAfya partners who come in individually, which include, AMREF, CHAK, Health Net Kenya, CARE Kenya and World Vision International Kenya was a response to: 1) deterioration of health standards and the consequent reduction of life expectancy in various Kawangware slums communities due to rapid escalation of poverty; 2) emergence of HIV/AIDS that triggered the resurgence of diseases like tuberculosis and other opportunistic infections; and 3) persistence of Malaria as a leading killer disease in the Kawangware slum communities. The brunt of poverty, disease and health degradation is usually felt most by the vulnerable groups, the majority of whom are women and children.[2] The primary goal of the Kawangware ICT /HIV Project is to enhance the capacity of school going children, their teachers, CBOs with which they associate and other grassroots initiatives in the project areas.

The specific objectives of the ICT Project are: (i) To improve access to and utilization of quality information by children, youth (both boys and girls) and women; (ii) To enhance access to and proper utilization of appropriate technology by children, youth and women for improved communication services within the project area; (iii) To facilitate positive behavior formation and change among children, youth, women and men in the project areas through effective

[2] AfriAfya Mid-Term Evaluation Report, July 2007

communication; and (iv) To establish sustainable, collaborative communication networks to identify and respond to HIV/AIDS information needs.

AfriAfya has so far implemented the project in three different sites in Kenya, namely, Kawangware in Nairobi, Kombewa Division of Kisumu West District and East Kanyada of Homa Bay District. The implementation sites are located in public nursery and primary schools because of the readily available class room space and other learning materials. In addition, the schools serve as central meeting points for most of the community activities, which include meetings with the provincial administration. . This study broadly investigated the role of information and communication technology in the fight against the HIV/AIDS epidemic in Kenyan slums, with focus on the Kawangware ICT /HIV Project because out of the three sites, it is the only one in a slum setting. It was intended to increase the understanding of how information and communication technology offer key resources in the management of HIV/AIDS, and to suggest key actions to assist in combating the pandemic.

1.2 Statement of the Problem

Burnham and Peterson (2005) assert that HIV/AIDS is the most threatening health and development challenge that Sub-Saharan Africa has faced in the past decade. It is realized that there has been limited mechanism for generating, managing and sharing knowledge at community level through active institutional communication networks (Driscoll, 2001). Driscoll (2001) further argues that despite the plethora of health information on the Internet, very little is directly suitable for dissemination to poor communities as it is. It is therefore important that information be repackaged to ensure local suitability and relevance.

UNAIDS (2005) estimates that currently, there are 25.8 million people are living with HIV in Sub-Saharan Africa, as compared to 25.4 million in 2004. This implies that although the region accounts for only 10% of the world's population, it is home to two thirds (60%) of all people living with HIV. Recognizing the potential of ICTs, the Swedish International Development Agency (SIDA) and its affiliate, Swedish Program for ICT in Developing Regions (SPIDER), commissioned research to explore the opportunities for using ICTs in mitigating HIV/AIDS in Southern Africa (Holly, 2003). Using a participatory approach, the study focused on Zambia, Botswana and Mozambique and sought to address two key questions: (i) how can ICTs contribute to the empowerment of people living with HIV/AIDS; and (ii) how can ICTs improve ongoing and planned HIV/AIDS programmes in the region. In this research, a literature review was conducted to explore current and existing research on the use of ICTs within the HIV/AIDS prevention, care and treatment programmes in southern Africa.

Similar studies have not been undertaken in Kenya and although Afriafya has been implementing the "Harnessing of Information and Communication Technology for Community Health Project" in Kawangare since October 2004, little is in public domain about the progress made so far. This study, therefore, sought to undertake an assessment of the whole project from its inception to the present, identify opportunities and make recommendations that would help improve the implementation and management of the project. Specifically, the study sought to identify the ICT tools and interventions used in the fight against HIV/AIDS; determine the benefits derived from

the adoption of ICTs in the fight against HIV/AIDS; establish the challenges faced in the adoption of ICTs in the fight against HIV/AIDS; and recommend suitable measures that could be used to overcome the challenges. The findings of the study are likely to be a milestone in an attempt to bridge the knowledge gap in as far as the role of Information and Communication Technology (ICT) in HIV/AIDS health communication in slums is concerned.

1.3 Objectives of the Study

1.3.1 Overall objective

The overall objective of the study was to investigate the role of Information and Communication Technology (ICT) in fighting HIV/AIDS by facilitating effective health communication in the slums in Kenya.

1.3.2 Specific Objectives

1. To analyze the ICT interventions and tools used in the fight against HIV/AIDS in Kenya;
2. To examine the benefits derived from adoption of ICTs in the fight against HIV/AIDS in Kenyan slums;
3. To assess the challenges faced in the adoption of ICTs in the fight against HIV/AIDS in the slums in Kenya; and
4. Recommend strategies on how best to employ ICTs in the fight against HIV/AIDS in Kenyan slums.

1.4 Significance of the Study

The findings of this study, it is hoped, will be beneficial to the following, among others: -

1. The Researcher - the researcher has gained useful skills and experience that will aid in carrying out future researches;
2. The stakeholders who include the government policy makers in ICT and Health sectors can also use the information generated by this project to identify any shortcomings of the current policies;
3. Projects using ICTs to combat HIV/AIDS have been initiated throughout Africa, but many are small-scale and operate in relative isolation. By documenting the innovative ways that some communities, such as the Kawangware one, have used ICTs to counter the health, social and economic impacts of HIV/AIDS, this project will contribute to the growth of a suitable knowledge base that will support similar programs in Africa and in other developing regions; and
4. Other academic researchers may also use the study findings to stimulate further research in the area of ICTs and HIV/AIDS and as such form a basis of good background for further researches.

Overall, this project will help make HIV/AIDS programs more effective by identifying best practices and any knowledge gaps, recommending improvements to strategies and policies, and

strengthening the networks of organizations involved in using ICTs to fight the impacts of HIV/AIDS.

1.5 Definition of key terms

Information and Communication Technologies (ICTs): According to Muswazi (2000), ICT is the abbreviation commonly used to refer to information and communication technology. While ICT often refers to "the new generation (of) information technology spawned by the merger of computers and telecommunications," it also encompasses traditional broadcasting media such as radio and television (Alexander et al, 2001). ICT can therefore be defined as "any information and communication technology involved in enabling the capture, processing, storage, transmission, and communication of information through electronic means" (Digs-Hobson, 2005). Maxfield (2004) defines ICTs as anything that enables the easy capture, processing, transformation and communication of information. According to Kasozi and Nkuuhe (2003), ICTs are being used to improve access to information, education, and communication for health workers, especially in community and rural settings, using CD-ROMs, Internet, email discussion groups, and distance learning systems.

HIV/AIDS: Acquired Immunodeficiency Syndrome (AIDS) is the common name for a group of diseases caused by the Human Immunodeficiency Virus (HIV) which weakens the immune system of the body, and the infected person becomes more fragile to any opportunistic diseases that may strike. Because of the inadequate immune system of the infected individuals, they cannot cope with viruses, microbes and sicknesses which will eventually lead to death (UNAIDS, 2001).

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter presents a description of the relevant literature surrounding the research problem, which form the foundation of the empirical study. The researcher discusses the adoption of ICT in the Health sector. Moreover, as a way of providing a fundamental and necessary framework for the study, different terms and concepts like ICT and HIV/AIDS are also discussed in this chapter.

2.2 Theoretical framework: Activation Theory of Information Exposure

Explanation of Theory: The Activation Theory of Information Exposure states that an individual will seek to satisfy their need for stimulation and information when attending to a message, before they seek to fulfill their need for information alone (Donohew *et al*, 1980). According to Christ and Medoff, (1984), Activation Theory of Information Exposure explains how individuals seek messages that fulfill their cognitive need for information as well as their desire to be entertained.

Metatheoretical Assumptions: Based on the metatheoretical[3] assumptions, the Activation Theory of Information Exposure is a humanistic theory (Finn, 1985b). Epistemologically[4], the theory holds multiple truths because the need for information and stimulation differs for all individuals, so one cannot say that all people seek stimulation and information before information alone, because some people prefer information before stimulation (Zuckerman, 1988). According to Anderson and Ross (1998), ontologically[5], the theory is based on freewill because an individual must choose to attend to messages that are both stimulating and informative rather than those that are just informative. Although the preference for information or stimulation is probably pre-determined, the individual chooses which message to attend to. Axiologically[6], the theory is value conscious because the individual may be aware of their values however they do not play a direct role in their decision to attend to a stimulating or informational message (Cragan and Shields, 1998).

Critique: According to Farrell's Criteria for a useful humanistic theory[7], Activation Theory of Information Exposure manifests many of the criteria. The theory has analytic consistency because it is easy to see how the researchers may have been interested to know why certain people attend to more stimulating messages before they attend to informational messages (Cragan and Shields, 1998). The theory has intuitive credibility and heuristic value because it can be applied in health communication when developing messages or advertisements for health related campaigns, and it can also be used in the field of advertising for other sectors, such as business, sports, or even finance (Griffin, 2000).

Application: Griffin (2000) suggests that this theory is very helpful to those in advertising and persuasion. Since they develop messages for individuals, it is important for them to meet the cognitive and emotional needs of their audiences. To illustrate how this theory works, West *et al* (2000) give the example of Erin and Kris who are teenagers that lead active lives and are faced with the normal peer pressures of any teen: drugs, sex, and alcohol. During their daily television

[3] Philosophical discussion of the foundations, structure, or results of some theory, such as metamathematics or a formal system that describes the structure of some other system (Collins Essential English Dictionary 2nd Edition 2006 © HarperCollins Publishers 2006).

4 Epistemology if the branch of philosophy that studies the origin, nature, methods, validity, and limits of human knowledge (Collins Essential English Dictionary 2nd Edition 2006 © HarperCollins Publishers 2006). Epistemology if the branch of philosophy that studies the origin, nature, methods, validity, and limits of human knowledge (Collins Essential English Dictionary 2nd Edition 2006 © HarperCollins Publishers 2006).

[5] The subject of *ontology* is the study of the *categories* of things that exist or may exist in some domain. The product of such a study, called *an ontology*, is a catalog of the types of things that are assumed to exist in a domain of interest ***D*** from the perspective of a person who uses a language ***L*** for the purpose of talking about ***D***. The types in the ontology represent the *predicates*, *word senses*, or *concept and relation types* of the language ***L*** when used to discuss topics in the domain ***D***. An uninterrupted logic, such as predicate calculus, conceptual graphs, or KIF, is *ontologically neutral*. It imposes no constraints on the subject matter or the way the subject may be characterized. By itself, logic says nothing about anything, but the combination of logic with an ontology provides a language that can express relationships about the entities in the domain of interest.

[6] Axiology is that branch of philosophy which focuses on the study of **values**. The values in question can be either aesthetic or moral. One branch of ethics is called axiological ethics.

[7] The focus of the humanistic perspective is on the self, which translates into "YOU", and "your" perception of "your" experiences. This view argues that you are free to choose your own behavior, rather than reacting to environmental stimuli and reinforcers. Issues dealing with self-esteem, self-fulfillment, and needs are paramount. The major focus is to facilitate personal development. Two major theorists associated with this view are Carl Rogers and Abraham Maslow.

viewing they watch many commercials and programs that are very entertaining. Periodically there are commercials that deal with serious issues such as drugs, sex, and alcohol. When the information is simply presented by someone talking at the viewers and presenting information, the teens change the channel. However, when the message has music or even an entertaining story line, they are more likely to watch the commercial and retain the information that is presented. The Activation Theory of Information Exposure states that Erin and Kris retain that information because their need for stimulation and information rather than just their need for information has been fulfilled (West *et al*, 2000).

2.3 HIV/AIDS pandemic in Africa

Despite the global existence of the HIV/AIDS pandemic, the vast majority of infections are in sub-Saharan Africa (UNAIDS, 2005). In 2004, 25.4 million people were living with HIV/AIDS in this region (ibid). In 2003, approximately 4.8 million people were infected and 2.9 million people died (UNAIDS, 2004). In 2002, nearly eleven million children orphaned by AIDS were living in Sub-Saharan Africa (UNAIDS, 2002). According to Longwe (1991), high-prevalence countries such as Uganda are experiencing dramatic drops in life expectancy, the ill and the dying are overwhelming already strained public health services, and millions of children are being orphaned, often without adequate social safety nets. The case of Kenya is not different. HIV/AIDS deepens household poverty, "threatens development, social cohesion, political stability, food security and life expectancy, and imposes a devastating economic burden" (Kasozi and Nkuuhe 2003).

Without effective reduction of its spread and impact, the epidemic will slash human and economic development on the continent, and undermine the aspirations – expressed in the Millennium Development Goals (MDGs) and by the New Partnership for African Development (NEPAD) – to vault Africa forward into a renaissance of development and reduced poverty (Adeya, 2003). The unmet needs of the epidemic are a colossal crisis and challenge for African states and the international community. The urgency and desperation of the situation requires that all effective strategies be utilized to reduce infections and to care for those infected, orphaned, or otherwise affected by the disease. Chikonzo (2005) asserts that to do so demand "urgent and exceptional national, regional, and international action".

2.4 The Information Society and Information and Communication Technologies

The world has been extensively connected electronically through telephone networks, the Internet, email, and globalized mass media making vast stores of information and knowledge electronically accessible (Burnham and Peterson, 2005). According to Fourie (2004), this technological revolution, centered on information technologies, is reshaping, and at accelerated pace, the material basis of society.

The information revolution and the applications of information and communication technologies are fundamental in conceptualizing information society (Ibid). The concept of the information society is defined through various perspectives. The key features of this 'society' are outlined in various academic writings, seminars, conferences, policy documents of government and several regional, international and global organizations. For example, the European Union High-Level Expert Group report of 1997, defines information society as:

> *The society that is currently being put in place, where low-cost information and data storage and transmission technologies are in general use. The generalization of information and data use is being accompanied by organizational, commercial, social and legal innovations that will profoundly change life both in the world of work and in society generally (Nassimberi 1998: 154).*

According to Nassimberi (1998), Information society refers to a situation where information and communication technologies are integrated in industrial production and information dissemination in all fields. Technology instigates a new approach to the production, distribution and consumption of information. Information society refers to a situation where information becomes a source of income generation; where employment is found mostly in the information sector. Furthermore, information society embodies the utilization of this information in the creation of knowledge (Ibid).

Webster (1997: 1) comments that the information society is noted in:

> *The emergence in recent years of an apparently new way of conceiving contemporary societies. Commentators have increasingly begun to talk about 'information' as a defining feature of the modern world. Much attention is now devoted to the 'informatisation' of social life.*

Mansell and When (1998) state that in the information society "*information work predominates, and information is the most valuable resource*". They further note that the key characteristic of information society is an exponential increase in the production and flow of information of all kinds.

2.5 Adoption of Information and Communication Technology in the Health Sector

ICTs are continually viewed as having the potential to address several challenges in Africa including in the health sector (UNAIDS, 2004). Mayanja, (2000) argued that with the convergence of ICTs, telemedicine[8] is becoming even more real. Several projects can be found in developing countries like Kenya and Uganda that aim to transport health information and services to the patients through ICTs. The technological tools are considered faster and less expensive than transporting either patients or doctors. They also enhance access to more accurate and timely information as opposed to the manual systems of storing and transferring information that are still commonly used in several hospitals in the developing countries (ibid). Telemedicine could involve the use of computers, personal digital assistants (PDAs), telephone (both fixed-line and mobile) and fax machines, amongst others (Huston and Huston 2000).

Maxfield (2004) further groups ICT applications available in the area of health into the following four categories: (i) ICT-enabled applications that encourage wider diffusion of health information from formal (e.g. community health workers) or informal (e.g. health opinion leaders) sources; (ii) The use of the Internet to enable advocacy coalition members to interact online, develop a shared identity and common agenda, exchange information, and mobilize to collective action. Furthermore, offline activities can also be coordinated via SMS (mobile phone text messages); (iii) The use of ICTs for distance education to enhance the traditional face-to-face TOT (training of trainers) model, while fostering networks which trainees can rely on as a resource when they return to the field; and (iv) Integration of new ICTs (e.g. computers and the World Wide Web)

[8] The use of medical information exchanged from one site to another via electronic communications for the health and education of the patient or healthcare provider and for the purpose of improving patient care. Telemedicine includes consultative, diagnostic, and treatment services. (http://www.medterms.com)

into programs utilizing traditional ICTs (e.g. radio, telephones and print) to increase the scale or scope of programs.

2.6 The benefits of adoption of ICTs in the fight against HIV/AIDS

Effective communication of valid and appropriate information is the specific remedy for infection rates attributable to a lack of information, and for many of the social ills associated with misinformation and myths about the epidemic (UNAIDS, 1999). Information can confer the capacity to act appropriately, whether by protecting oneself from infection or taking steps to influence decision makers. Information is the source of considerable personal and social power, with the capacity to shift some of the power differentials at the heart of the epidemic. This brings to mind Marshall McLuhan's famous observation in relation to mass media, that "the medium is the message" (Dennis, 2004).

Social change: The use of new technologies to disseminate information (the message) could lead to social change, and that we should also see the medium (mass media) as a force capable of exerting social change irrespective of its content (IT Web, 2004). While communication is the medium for conveying important HIV/AIDS-related information, as an activity that negates the silence that surrounds HIV/AIDS, it is also the message itself (Chikonzo, 2005). Baffour-Awuah (2004) noted that while information is the basic component of safer sex messages, effective prevention relies critically on overcoming obstacles posed by: misinformation and myths about the disease; silence and denial; stigma and discrimination; and limited knowledge about HIV/AIDS prevention services, including voluntary counseling and testing (VCT) and measures to prevent mother-to-child transmission of HIV.

Empowerment and reduction of vulnerability: Information and communication facilitate the empowerment and reduction of vulnerability of PLWHA, women, and other susceptible groups that form fundamental parts of the fight against AIDS (Driscoll, 2001). Reducing vulnerability includes providing an enabling and protective legal environment, which protects people's (and especially women's) rights to equality and non-discrimination. The intimate connection between health and access to information is reflected in international human rights law, which views access to health related information and education as an underlying determinant of health (Kickbusch *et al*, 2002).

Advocacy, mobilization, networking and capacity building: Information and communication technology are powerful tools for service organizations, human rights advocates, and PWLHA organizations, which use information and communication to facilitate advocacy, mobilization, networking, and capacity-building (Burnham and Peterson, 2005). According to Gendercide (2006), information and communication play critical roles in addressing some of the political factors that limit effective responses, by facilitating greater transparency and monitoring of government through civil society and mass media reporting, and by encouraging increased democratic participation. Information and communication offer valuable tools to hold countries to their political and legal commitments to HIV/AIDS, expressed internationally, regionally, and nationally (ibid).

Remote consultations and diagnosis: According to Kasozi and Nkuuhe (2003), ICTs have enabled doctors to conduct remote consultations and diagnosis, access medical information and coordinate research more effectively. They further argue that ICTs play a pivotal role in ensuring timely and speedy diagnosis as well as in improving and securing the quality of health care in most medical disciplines. ICTs also offer the option of remote, distant delivery of an increasing number of public health care services, despite physical distances and time zones existing between patients and health care providers (ibid). Patients can now consult doctors via the telephone (call or SMS) or email. Several patients use the mobile phone and SMS to book appointments with their doctors, call for emergency services in case of accidents and even set reminders for taking medication (Huston and Huston, 2003).

Information sharing: With the Internet, a platform for communication and information sharing is put in place for groups of people with a particular interest. For people living with HIV/AIDS, specific services such as HIV/AIDS newsgroups and forums as well as databases with contents on HIV/AIDS in the local languages can be made available. The people will be able to share and exchange experiences with peers, social and health care workers and is in a better position to gain control over their life (Kelly, 2006). Mwesigwa (2002) suggests that ICT-facilitated collaboration between physicians within and between medical sites is much easier. Physicians consult each other on patient treatment. This can help reduce the number of referral cases to main hospitals. Patients are then able to cut transport costs and unnecessary journeys that could result in further harm, especially to patients who are terminally ill. Data collection and research is also possible at a more cost effective form. Using email and going straight to the Internet help cut initial costs of travel in the process of data collection.

Remote mentoring and teaching: Nawaguna (2005) asserts that through the adoption of ICT, remote mentoring/teaching is possible. ICTs can enable transmission of skills from one hospital to another. He cites the case of Mulago Hospital and Butabika Mental Hospital which collaborate on various elements of psychiatry. He further explains that ICTs also enable distance learning for health personnel and others interested in researching on several health issues.

Distance learning: Advancements in ICT have made the application of new educational concepts for distance learning, problem oriented learning, self-assessment, awareness raising and mass education possible (Holly, 2003). ICTs can also be used as instruments for supportive processes such as financial management, student and learning program management, library information services management and human resource management strengthening the overall performance of schools and institutes of education (ibid).

Online Counseling: The online counseling and treatment guidance service is possible through the use of ICT in order to cater for the increasing need for state-of-the-art, anonymous and confidential services on counseling, treatment guidance support and online training through the Internet (Ashcroft and Watts, 2005).

2.7 ICT interventions in the fight against HIV/AIDS

The following sections elaborate on how ICTs are being used in relation to various aspects of the

HIV/AIDS epidemic, including prevention, health care provision, population research and epidemiology, advocacy and mobilization, treatment access, networking and empowerment of AIDS-focused NGOs and PLWHA, and improved governance and accountability.

Prevention: According to Hogan (2005), given the predominance of HIV among young people, and the startling figures showing knowledge gaps regarding HIV/AIDS, AIDS prevention strategies should include interventions targeted at this group. In addition, general prevention strategies must focus specifically on other high-risk groups, including women, sex workers, men who have sex with men, truck drivers, refugees, and migrant workers as identified by UNAIDS (ibid). He adds that such strategies include prevention messages (regarding safer sex, anti-discrimination, and accurate information about HIV/AIDS), as well as prevention services (PMTCT and VCT). This section focuses on school based education and mass media campaigns as two primary mechanisms for effectively using ICT in managing HIV/AIDS.

School Based Education: Education and life skills training in schools are fundamental parts of effecting appropriate behavioral changes among the youth. UNAIDS (2006) suggests that national AIDS programs should aim to provide one hundred percent of school children with AIDS education addressing effective prevention, non-discrimination, care as well as support for people with HIV/AIDS. Such education has been shown to help young people delay sex and avoid risky behavior when they become sexually active (Ra, 1997). While this may seem fairly obvious, children and young people are often denied AIDS education in schools due to religious or social sensitivities to sexuality and HIV/AIDS. Moreover, the availability of information does not guarantee its application: "in some places, schools may teach information on AIDS but not the behavioral skills needed for prevention and support" (Bloome, 2004).

UNAIDS (2002) also recommends that HIV prevention and health promotion programs should be started for children at the earliest possible age, and before the initiation of sexual activity, ideally with age-appropriate programs at the primary school level. This trend is evidenced by a World Bank initiative called *World Links*[9] that is establishing Internet learning centers in schools and community learning centers in several African countries; including Ghana, South Africa, Uganda, Zimbabwe, Botswana, Kenya, and Zambia (UNAIDS, 2004). The project provides participating students and teachers with online educational modules, addressing topics like basic facts about HIV/AIDS, social action, prevention, and myths and misunderstandings about HIV/AIDS (Chikonzo, 2005). The project specifically aims to reach rural youth by basing three-quarters of its Internet Learning Centers outside of capital cities and using mobile van telecenters[10] and satellite technology (ibid).

[9] As a pilot intervention to explore the impact of using ICT for HIV/AIDS education, the World Links' Program, a collaborative partnership between the World Bank Institute's World Links for Development (WorLD) Program and the World Links Organization, has been working with students and teachers in Africa since early 2000 to promote HIV/AIDS education and prevention activities.

[10] According to World Links for Development – Zimbabwe (2004), Mobile ICT Van. A large 3 tonne van was converted into a mobile information and communications technology telecentre which has been traveling around the countryside and introducing computers and Internet to schoolchildren and the general public in rural communities. The van has a rear projection video-screen, 10 networked computers, is wired for dial-up connectivity (when there's access to a phone plug-in) and comes with Windows and Office software, educational software and has World Links trained trainers on board.

Education of Health Care Workers: Information and communication technologies enable various aspects of AIDS related health care, including training health care workers to deal with HIV/AIDS in a knowledgeable and non-discriminatory fashion (Siddamallaiah, 2005). According to Kasozi and Nkuuhe (2003), ICTs are being used to improve access to information, education, and communication for health workers, especially in community and rural settings, using CD-ROMs, Internet, email discussion groups, and distance learning systems. The Internet offers almost unlimited access to journals and databases, information sharing with other health care professionals, and access to information with relevant local content and language (Cosgrove, 1994). Handheld computers are proving to be a useful and viable technology in rural settings for data collection, information dissemination, and access to medical reference materials (UNAIDS, 2004). Email publications and discussion groups are another significant source of HIV/AIDS-related information (ibid). The Internet and CD-ROMs enable distance education for health care workers; with digital and satellite radio emerging in a similar role (Bloome, 2001).

Information and Communication as critical elements of advocacy: the treatment access struggle: The Internet, email, discussion groups, and mass media are proving to be crucial tools for national and international advocacy, as exemplified in the treatment access campaigns waged in African countries and internationally. They enable the large-scale social mobilization that has played a key role in these campaigns, as well as effective communication regarding key legal and political battles (Ashcroft and Watts, 2005). The Internet serves multiple functions for organizations fighting for human rights, including: email lobbying of elected representatives, public officials, and policy elites; networking with related associations and organizations; mobilizing organizers, activists and members using action alerts, newsletters and emails; raising funds and recruiting supporters; and communicating their message to the public via the traditional news media (Human Rights Watch, 2001).

ICTs also offer the chance to reduce informational asymmetries that hamper appropriate and effective action by governments and civil society aimed at accessing lower priced medicines and diagnostics around the world (Development Gateway, 2002). Informational availability is facilitated by international organizations like UNAIDS, the World Health Organization (WHO), and the United Nations Children's Fund (UNICEF) , as well as the international NGO Medicins sans Frontiers, who publish up to date information on the sources and prices of antiretroviral medicines and diagnostics, as well as a list of manufacturers (O'Brien, 2003).

Networking and Capacity-Building for Aids Groups: As the treatment access movement exemplifies, use and ownership of ICTs are primary enablers of the networking required for effective mobilization. ICTs offer unprecedented opportunities for national and international networking by connecting communities and NGOs around the world to enable information sharing, education, and the transfer of skills (WOUGNET, 2004). ICTs are also excellent means of strengthening the capacity of AIDS NGOs across the African continent. They enable the "twinning" of African organizations with AIDS and human rights organizations elsewhere in the world in order to "enhance skills in human rights fact finding and documentation, share practical prevention materials and innovative intervention strategies…(and) learn more about publicity and media work, campaigning, mobilizing legal support, and reporting for domestic and

international audiences" (Moahi, 2005).

Greater transparency in National policy and decision-making: The free flow of information and communication offers greater transparency in national policy and decision-making on AIDS, as well as more effective governance: "good governance depends on the availability of adequate knowledge and information resources. Decision makers need this to make good decisions. The general public needs this to participate in the decision-making process and follow the implementation of agreed decisions" (Wald, 2000). ICTs are enabling even remote NGOs and communities to publicize human rights violations widely, as well as national and local policy and program failures, thereby increasing accountability (Human Rights Watch, 2001).

ICTs also facilitate "empowerment of stakeholders, consultation, and bottom up inputs into policy formulation" (Hogan, 2005). For example, in 2001, the Nigeria AIDS e-forum held a six month open electronic conference on key HIV issues in Nigeria, intended to mobilize stakeholders' input into the national response to the HIV/AIDS epidemic in the country. The discussions were intended to guide the National Action Committee on AIDS (NACA) as well as various other stakeholders in the implementation of the Nigerian government's HIV/AIDS strategy. In addition, key issues discussed and solutions proffered were summarized and published in book format for dissemination to wider audiences (Ofeibea, 2004)

2.8 Challenges faced by stakeholders in adoption of ICT in the fight against HIV/AIDS

For Sub-Saharan Africa, ICTs could offer a great deal of benefits since health care is one of its fundamental needs (Kelly, 2006). Health challenges in Africa include both the diseases and lack of supporting facilities in terms of human resource and physical infrastructure (Ra, 1997).

Limited connectivity: According to Gilhoney (2001), information and communication accessibility in Africa is limited by the dearth of ICT connectivity throughout Africa, which is greatest throughout the continent in rural areas, even within relatively well-resourced countries. This limited connectivity is a major obstacle both to comprehensive dissemination of HIV/AIDS-related information and to mutual communication of pressing needs and problems to and from rural areas (ibid). Kelly (2006) argues that greater connectivity in Africa is clearly a critical need requiring serious and sustained efforts. However, the need for access to information and communication within the epidemic cannot wait upon this progressive development (ibid). Kelly further suggests that interim measures using innovative strategies and targeted interventions should be implemented to ensure greater access to ICT and other information and communication resources and mechanisms.

Poor ICT infrastructure status: The poor ICT infrastructure status in less developed countries currently is unable to adequately support the potential benefits of ICTs in the health sector (UNAIDS, 2006). UNAIDS further noted that very few hospitals are computerized, and even when they are, Internet access is limited. According to Jensen (2002), another key challenge is reaching rural areas that have limited or no infrastructures for ICTs. There are both technological and non-technological solutions to this problem. For instance, technologies like digital and

satellite broadcasting, mobile telephones, and handheld computers have enormous potential to reach rural and remote communities.

High costs of accessing the Internet: Adeya (2003) explains that the cost of accessing the Internet, maintaining the equipment and buying new ones is also a challenge. She further noted that in other cases, costs of installing Internet facilities and maintaining them is also as challenging to the poor countries like Kenya.

Incompatibility of ICT equipment and software: According to Maxfield, (2004), several hospitals fail to work together because of the incompatibility of equipment and software. Related to this is the lack of adequate presence and availability of experts in real time. In cases where consultations have to be made across continents, there is also the issue of time difference and presence of experts when they are required (ITU, 2000).

Language barrier: Most of the information available on the Internet is in English or in languages not understood by the wider segments of the population. Even for those who can understand English, there exists the challenge of understanding medical jargon used in most of these sites (UNAIDS, 2000). According to Adeya (2003), several features in the African context suggest that a community oriented approach holds greater promise for bridging gaps in HIV/AIDS information and communication, especially because the primary contribution towards the response to HIV/AIDS is said to come from individuals, families, and communities confronted with HIV, rather than from national and international efforts. There is also a broad consensus that an effective response relies on community mobilization and active participation in all aspects of the epidemic (Kelly, 2006).

2.9 Summary and Conclusions

ICTs have direct and indirect intrinsic value in their capacity to empower users by building skills, and ultimately by increasing connectivity rates, which will encourage economic development and growth. The human and non-technological enablers of communication and information are equally critical and, in contrast to ICT, are abundant resources in the fight against the epidemic. The participation of PLWHA and communities is critical to the success of AIDS strategies in Africa.

Whereas ICTs offer a variety of opportunities, efforts have to be made in order to systematically harness the underlying potentials and opportunities. This is especially in terms of understanding the gender dimensions of particular projects to ensure that different issues, needs and concerns by different sections of society are adequately addressed. ICTs also need to be used to address several medical challenges and diseases especially HIV/AIDS. Mitigating HIV/AIDS will require an approach of concerted actions addressing areas ranging from prevention and education, care and treatment, empowerment of people living or affected by HIV/AIDS, to monitoring and research. It will require cooperation between a large group of stakeholders such as the Ministries for Health, Education, communication and transport, regulators, ICT service providers, HIV/AIDS service organizations and many others. Efforts need to be made for

translating the national policies on HIV/AIDS into effective ICT based interventions which are embedded in respective policies and plans. For instance: the objective to provide people in the rural areas with access to vital information does have an impact on the policies and plans for building the national tele and data communication infrastructures.

To combat the AIDS pandemic it is necessary to deliver timely, credible, and multi-sectoral information about HIV/AIDS. It has to reach not just clinicians and scientists, but a huge array of others, such as behavioral specialists, policymakers, donors, social activists, industry leaders as well as common people. There is a need for strong advocacy and political support at the national level. Educating the users in libraries how to access health information on the Internet has the potential to give them knowledge to maintain more healthy life styles, provide them with reliable information about their problems and make them aware of possible treatment options. One of the keys to successfully combating the HIV/AIDS epidemic is the creation of an infrastructure that concurrently develops healthcare networks, education programs, and community participation.

3.0 METHODS

3.1 Introduction

This chapter aims at defining the research design and methodology used in the study. It contains a description of the study design, target population, sample design and size, data collection instruments and procedure.

3.2 Research design

According to Brown *et al* (1998), research design provides the glue that holds the research project together. A design is used to structure the research, to show how all of the major parts of the project - the samples or groups, measures, treatments or programs, and methods of assignment - work together to try to address the central research questions (ibid). The current study is qualitative in nature. According to Cresswell (1994) a qualitative study is defined as an inquiry process of understanding a social or human problem, based on building a complex, holistic picture, formed with words, reporting detailed views of informants, and conducted in a natural setting. Alternatively a quantitative study, consistent with the quantitative paradigm, is an inquiry into a social or human problem, based on testing a theory composed of variables, measured with numbers, and analyzed with statistical procedures, in order to determine whether the predictive generalizations of the theory hold true.

Qualitative research places emphasis on understanding through looking closely at people's words, actions and records. The traditional or quantitative approach to research looks past these words, actions and records to their mathematical significance. The traditional approach to research (quantifies) the results of these observations. In contrast qualitative research examines the patterns of meaning which emerge from the data and these are often presented in the participants' own words. The task of the qualitative researcher is to find patterns within those words (and actions) and to present those patterns for others to inspect while at the same time staying as close to the construction of the world as the participants originally experienced it.

A case study was used to undertake the current research. Case studies involve collecting empirical data, generally from one or a small number of cases. It usually provides rich detail about those cases, of a predominantly qualitative nature (Yin, 1984). There are a number of different approaches to case study research (e.g. ethnographic[11], hermeneutic[12], ethogenic[13]) and the principles and methods followed should be made clear (Jimenez, 1999).
Yin (1984) defines the case study research method as an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used.

A case study generally aims to provide insight into a particular situation and often stresses the experiences and interpretations of those involved. It may generate new understandings, explanations or hypotheses. However, it does not usually claim representativeness. Therefore, researchers using case studies should be careful not to over-generalize (Ball, 1981). Case study research excels at bringing researchers to an understanding of a complex issue or object and can extend experience or add strength to what is already known through previous research (Hamel *et al*, 1993). According to Eisenhardt (1993), case studies emphasize detailed contextual analysis of a limited number of events or conditions and their relationships. Social scientists, in particular, have made wide use of this qualitative research method to examine contemporary real-life situations and provide the basis for the application of ideas and extension of methods (Miles and Huberman, 1984).

Many well-known case study researchers such as Stake (1995), Simons (1986) and Yin (1984) have suggested techniques for organizing and conducting the case study research successfully. This case study research draws upon their work and proposes the following six steps that should be used: (i) Determine and define the research questions; (ii) Select the cases and determine data gathering and analysis techniques; (iii) Prepare to collect the data ; (iv) Collect data in the field; (v) Evaluate and analyze the data; and (vi) Prepare the report. The study took a holistic, in-depth approach and as such, the case study was the most appropriate methodology. According to Feagin *et al* (1991), case study is an ideal methodology when a holistic, in-depth investigation is needed. Case studies are multi-perspective analyses. The researcher considered not just the voice and perspective of the actors, but also of the relevant groups of actors and the interaction between them. This one aspect is a salient point in the characteristic that case studies possess. They give a voice to the powerless and voiceless. When sociological investigations present many studies of the homeless and powerless, they do so from the viewpoint of the "elite" (ibid).

[11] In its widest sense, ethnography (etnos=people, race; grafia=writing, description) is defined as a systematic process, through which models of culture or subculture are observed, described, documented and analyzed. (Pelto and Pelto 1978, Agar 1981, Nikkonen and Janhonen 1995.) Atkinson (1990) considers ethnography a scientific genre, a scientific style of its own. In this study, I understand ethnography as a method of study and a result of such study, including the interpretation of findings and the written research report.
[12] Hermeneutic theory is a member of the social subjectivist paradigm where meaning is inter-subjectively created, in contrast to the empirical universe of assumed scientific realism (Berthon *et al*, 2002).
[13] Using ethogeny for the research process helps the participants to see the connections. They explore where each one fits in relation to other people and processes. The ethogenic process recognizes and values difference. It enables participants to say, "My role is different from that person's role but we are interdependent because I am walking beside them and they beside me and we are learning from one another (Maykut and Morehouse, 1994)

Specifically, through the use of case study design, the researcher managed to:- i) explain complex causal links in real-life HIV/AIDS interventions; ii) describe the real-life context in which the intervention has occurred; iii) describe the intervention itself; and iv) explore those situations in which the intervention being evaluated has no clear set of outcomes.

However, case studies tend to provide in-depth information about a limited number of subjects, and may produce new insights that generate additional studies. The major challenge expected in using the case study approach is that the researcher is required to have excellent knowledge of the topic when designing questions. The researcher approaches the subjects of study with an inquisitive mind and an openness that permits subjects to respond in an unlimited number of directions. This less structured approach may take the researcher down avenues he did not anticipate traveling and open doors to new kinds of understanding.

3.3 Population of the study

The Afriafya project has been implemented in four (4) sites in Kawangware division. The study focused on all the sites. The population of study was the Officials of the Community Based Organizations and the 4 Head Teachers of the schools where the sites are located. There were 3 respondents from each of the sites; the Chairman, Secretary and Treasurer of the Community Based Organizations (CBOs). The study focused on the Head teachers and CBO officials because they are the people responsible for implementing HIV/AIDS intervention strategies in the project. In order to get balanced data from the field, the users, who include the children, men and women, were interviewed through focus group discussions of at least eight respondents, who were identified by the CBO officials and the Head Teachers. The number of between 8 and 12 was considered manageable by the researcher in order to give each of the group members a chance to contribute to the discussions. The focus group discussions, held in classrooms in each of the project sites were undertaken in order to get consensus on issues pertaining to the benefits derived from the project and possible new interventions that could enhance the effectiveness of the project. In total, two sessions were undertaken in each of the four project sites, one comprising of children and another one comprising of adults (both men and women). These sessions were facilitated by a research assistant, with the assistance of a note taker.

3.4 Data collection

3.4.1 Secondary data

Desk study was undertaken in which a review of the relevant literature was carried out. Information pertaining to ICT and HIV/AIDS was critically selected and reviewed. The sources of information included various web sites, books, magazines, journals, project background documents and other documents/reports presented by the sponsors of the project, Plan International and AfriAfya and other documents generated by the partnering CBOs. The desk study enabled this research to be grounded in the current literature relating to the adoption of ICT in the fight against HIV/AIDS. The review ensured that the research did not duplicate other studies, and instead made a significant contribution toward the subject of study.

3.4.2 Primary data

Primary data was collected from the sampled respondents from the various CBOs with the aid of a semi-structured that were hand delivered to the respondents and collected after completion. The open ended questions in the questionnaire enabled the respondents to express themselves freely, which could have led to a variety of issues being discussed under each question. They were mostly used to solicit qualitative information. The closed questions addressed specific issues, where alternative responses were fixed (for example Yes or No). The closed questions, which were mostly used to solicit quantitative information, were used because of the ease with which they could be analyzed. The questionnaire was structured in two main sections. The first section captured the profile of the respondents whereas the second section captured pertinent issues touching on the subject of study.

Focus Group Discussions were used in all the four project sites in order to get consensus on issues pertaining to the benefits derived from the project and possible interventions that could enhance effectiveness of the project. One enumerator facilitated each discussion and two notes takers, who were hired for the assignment by the researcher. Two focus group discussions were conducted in each of the selected project sites with the pupils, youths and adults who have benefited from the project. In each site, one focus group involved the youth of various ages, selected with the aid of the Head teachers on basis of their level of understanding of issues of concern in the study and their ability to community fluently both in Kiswahili and English. The other focus group discussion involved both men and women of different ages, selected on basis of availability at the time of the discussions. The adults were mobilized by the CBO officials.

The researcher hand delivered the questionnaires to the respondents. A letter of introduction and questionnaire was enclosed in an envelope that was either delivered to the respondents The questionnaire was pre-tested on ten randomly selected respondents to enhance effectiveness and hence data validity. In addition to the above data collection methods, the researcher made both undisguised observations of the centers to have a first hand understanding of issues that would not have been adequately addressed in the questionnaires and personal interviews. The stakeholders were aware of the observations as the researcher communicated to them on the same during the focus group discussions and questionnaire administration.

3.5 Data analysis and presentation

According to Marshall and Rossman (1999), data analysis is the process of bringing order, structure and interpretation to the mass of collected data. For purposes of the study, the data was analyzed by employing descriptive statistics such as percentages, frequencies and tables. Statistical Package for Social Sciences (SPSS) was used as an aid in the analysis. The researcher preferred SPSS because of its ability to cover a wide range of the most common statistical and graphical data analysis and is very systematic. Computation of frequencies in tables, charts and bar graphs was used in data presentation. In addition, the researcher used standard deviations and mean scores to present information pertaining to the study objectives. The information was presented and discussed as per the objectives and research questions of the study.

4.0 RESULTS AND ANALYSIS

4.1 Introduction

This chapter covers the data analysis, presentation and interpretation. The data used was obtained from the following:- questionnaires distributed to the Officials of the Community Based Organizations and the 4 Head Teachers of the schools where the AfriAfya project sites are located, focus group discussions with the beneficiaries, and undisguised observations. There were 4 respondents from each of the sites; the School Head Teacher, Chairman, Secretary and Treasurer of the Community Based Organizations (CBOs). All the 16 questionnaires sent out were returned completed (100% return rate). The high response rate could be attributed to the researcher's good relationship with the respondents, who made a follow up of every questionnaire sent out. The information is presented and discussed as per the objectives and research questions of the study.

4.2 Profile of respondents

Project Sites: In order to establish the names of the project sites, the respondents were asked to indicate the name of the school associated with them in as far as project implementation is concerned. The findings indicate that the four project sites are: - Kawangware Day Nursery School; Muslim Primary School; Kinyanjui Primary School; and Riruta Primary School.

Position of Respondents: The researcher sought to determine whether the respondents met the criteria set for population of study by asking them to indicate their respective positions in the project. The findings indicate that all targeted respondents did participate in the study as shown in figure 4.1 below.

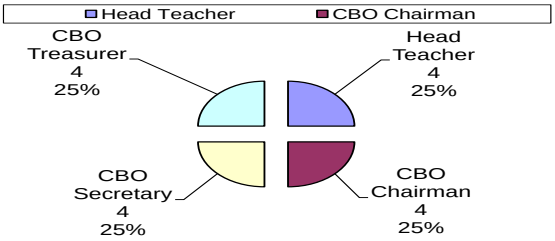

Figure 4.1: Position of Respondent

Period of time Respondent Worked on the Project: The findings indicate that only 4 respondents had worked in current position for less than 2 years. The respondents who had worked on the project for 2 years and above were 14, an indication that the period worked by the respondents on the project was long enough for them to have adequate experience and qualification to articulate issues pertaining to the fight against HIV/AIDs using ICTs. The respondents were thus expected to provide objective responses to the questions as per study objectives.

Gender Distribution of Respondents: The respondents were asked to indicate their gender, which is in line with the Equal Employment Opportunity proposal that encourages active participation of both genders in development activities. The findings show that whereas all the Treasurers of the four project sites were female, the Secretaries and Chairmen were all male. In addition, three out of the four Head Teachers were female. Further probing revealed the fact that all CBO Treasurer Positions were reserved for women, hence their active participation in the Project. Figure 4.2 below presents a summary of the findings.

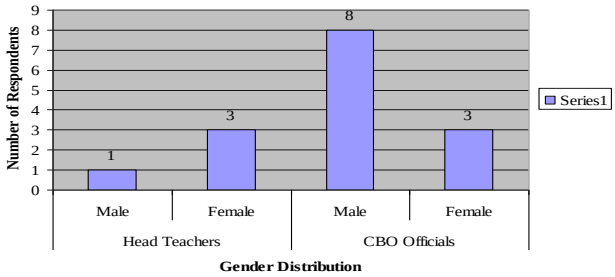

Figure 4.3: Gender Distribution of the Respondents

The findings show that the both men and women were involved in the running of the project from conceptualization to implementation, monitoring and evaluation.

Age Distribution of the Respondents: Through the questionnaire, the respondents were asked to indicate their age group by ticking as appropriate against given choices. The findings show that none of the respondents was either below 18 years or above 55 years (the mandatory retirement age in the public sector in Kenya) Whereas 25% of the respondents were aged between 18 and 25 years, 37% were aged between 26 and 35 years, 25% were aged between 36 and 45 years and only 13% were age between 46 and 55 years.

4.3 The Role of Information and Communication Technology (ICT) in HIV/AIDS Health Communication in Slums

4.3.1 The extent to which AfriAfya Project has utilized ICT tools in HIV/AIDS Health Communication

To establish the extent to which Kawangware ICT/HIV Project had utilized ICT tools in HIV/AIDS Communication, the respondents were provided with a list of possible ICT tools that could be used in HIV/AIDS Health communication and asked to indicate the extent of usage in the project along a five point scale. The responses are summarized and presented in table 4.1 below.

Where: Very Much = **(5);** Much = **(4);** Somehow = **(3);** Neutral = **(2);** Not at All = **(1)**

Table 4.1: ICT tools used in the fight against HIV/AIDS

ICT tools used in the fight against HIV/AIDS	Responses						Mean scores	Standard Deviations
	Descriptive	(5)	(4)	(3)	(2)	(1)		

e-mail discussion groups	Frequency	4	4	6	1	1	1.084	2.168
	Percentage	25	25	38	6	6		
Internet	Frequency	3	6	5	1	1	1.140	2.280
	Percentage	19	38	31	6	6		
Dissemination of information on World Wide Web (www)	Frequency	0	1	1	2	12	2.485	4.970
	Percentage	0	6	6	13	75		
Storage of information on CD-ROMS and dissemination of the same	Frequency	0	0	1	2	13	2.771	5.541
	Percentage	0	0	6	13	81		
Radio	Frequency	5	6	3	1	1	1.140	2.280
	Percentage	31	38	19	6	6		
Television	Frequency	2	5	4	1	4	0.822	1.643
	Percentage	13	31	25	6	25		
Distance learning systems	Frequency	0	0	1	2	13	2.771	5.541
	Percentage	0	0	6	13	81		
N=16								

The findings show that in terms of usage, below is the order in which the above ICT tools were ranked, the most used coming first and in a descending order. Radio; Internet; e-mail discussion groups; Television; Dissemination of information on World Wide Web (www); Distance learning systems. The respondents indicated that the only available CD-ROMS are the ones that were used to install the materials on the computers and then kept in custody of the project staff and are thus out of reach of the beneficiaries. In addition, the beneficiaries are not allowed to use their own CD-ROMS on the project computers.

Responses from the beneficiaries

In order to counter check the answers given by the respondents and also get a clear picture of the project in line with the objectives of the study, the researcher held 8 focus group discussions with groups of between 8 and 12 beneficiaries (two focus group discussions in each of the project sites) . Below is a summary of their responses to the various questions:-

The beneficiaries' understanding of the ICT project: The researcher sought to determine the extent to which the beneficiaries understood the purpose of the project. The more the beneficiaries understand the purpose of the project, the more they are likely to support it and hence the higher the sustainability. The responses indicate that at least 75% of the beneficiaries had a clear understanding of the project and owned it.

Length of time the beneficiaries had been on the project: The longer the period one has been on a particular project, the more the person gets to understand the project. The least period of time recorded indicated that a beneficiary had been on the project for one year. More than one third of the participants had been on the project for at least four years. The beneficiaries had been on the project long enough to articulate salient issues that concern it and hence they were expected to give objective responses.

Selection criteria for beneficiaries: The beneficiaries indicated that all pupils in the project sites who were in standard five and above were automatically enrolled in the project. This means that pupils in standards 5, 6, 7 and 8 automatically became beneficiaries of the project. Epistemologically[14], the theory holds multiple truths because the need for information and stimulation differs for all individuals, so one cannot say that all people seek stimulation and information before information alone, because some people prefer information before stimulation. The fact that the pupils who were in class 4 and below were left out means that their need and comprehension of the information disseminated would most likely be different and hence the need to address it.

4.3.2 The ICT interventions used in Kawangware ICT/HIV Project

In order to meet the first objective of the study, "To establish the ICT interventions and tools used in the fight against HIV/AIDS in Kenya", the respondents were asked to indicate the extent to which listed ICT interventions were used in Kawangware ICT/HIV Project by rating along a five point scale. The responses are summarized and presented in table 4.2 below.

14 Epistemology if the branch of philosophy that studies the origin, nature, methods, validity, and limits of human knowledge (Collins Essential English Dictionary 2nd Edition 2006 © HarperCollins Publishers 2006).

Where: Not at all = **(1);** Neutral = **(2);** Somehow = **(3);** Much = **(4);** Very much = **(5)**

Table 4.2: ICT interventions used in HIV/Health Communication

ICT interventions used in HIV/Health Communication	Number of Respondents					Mean score	Standard deviation
	(1)	(2)	(3)	(4)	(5)		
ICT-enabled applications that encourage wider diffusion of health information from formal or informal sources	2	3	1	5	5	0.895	1.789
The use of the Internet to enable advocacy coalition members to interact online, develop a shared identity and common agenda, exchange information, and mobilize to collective action.	2	1	4	5	4	0.822	1.643
The use of ICTs for distance education to enhance the traditional face-to-face TOT (training of trainers)	1	3	3	5	4	0.742	1.483
Integration of new ICTs (e.g. computers and the World Wide Web) into programs utilizing traditional ICTs (e.g. radio, telephones and print) to increase the scale or scope of programs	1	1	5	6	3	1.140	2.280
Prevention:-Dissemination of prevention messages as well as prevention services to target groups such as commercial sex workers.	1	1	3	6	5	1.140	2.280
School Based Education:- Education and life skills training in the schools for effecting appropriate behavioral changes among youth	1	2	3	5	5	0.895	1.789
Education of Health Care Workers :- ICTs are being used to improve access to information, education, and communication for health workers using CD-ROMs, Internet, email discussion groups, and distance learning systems	1	3	3	5	4	0.742	1.483
N=16							

4.3.3 Benefits derived from adoption of ICTs in the fight against HIV/AIDS

In order to meet the second objective of the study, "To identify the challenges faced in adoption of ICTs in the fight against HIV/AIDS in the slums in Kenya", the respondents were asked to indicate the extent to which they agreed/disagreed that the Kawangware ICT/HIV Project had realized each of the listed benefits. The responses are summarized and presented in table 4.3 below. Where: Strongly disagree = (1); Disagree = (2); Somehow agree; (3) Agree = (4); Strongly Agree = (5)

Table 4.3: Benefits derived from adoption of ICTs in the fight against HIV/AIDS (Absolute numbers)

Benefits derived from adoption of ICTs in the fight against HIV/AIDS	Number of Respondents					Mean score	Standard deviation
	(1)	(2)	(3)	(4)	(5)		
Social change: Reduction in stigma and discrimination	1	1	4	6	4	1.084	2.168
Empowerment and reduction of vulnerability: Providing an enabling and protective legal environment, which protects people's rights to equality and non-discrimination	1	2	5	5	3	0.895	1.789
Advocacy, mobilization, networking and capacity building: Facilitates greater transparency and monitoring of government through civil society and mass media reporting	0	1	4	6	5	1.295	2.589
Remote consultations and diagnosis: ICTs have enabled doctors to conduct remote consultations and diagnosis, access medical information and coordinate research more effectively. Patients can now consult doctors via the telephone (call or SMS) or email	5	5	1	3	2	0.895	1.789
Information sharing: People are able to share and exchange experiences with peers, social and health care workers. Physicians can also consult each other on patient treatment	1	1	4	7	3	1.245	2.490
Remote mentoring and teaching: It can enable transmission of skills from one hospital to another.	1	5	3	4	3	0.742	1.483
Distance learning: ICT has made the application of new educational concepts for distance learning, problem oriented learning, self-assessment, awareness raising and mass education possible	1	1	3	7	4	1.245	2.490
Online Counseling: Online counseling and treatment guidance service is possible through the use of ICT	1	3	4	5	3	0.742	1.483
N=16							

4.3.4 The challenges faced in adoption of ICTs in the fight against HIV/AIDS in the slums in Kenya

In order to meet the third objective of the study, "To identify the challenges faced in adoption of ICTs in the fight against HIV/AIDS in the slums in Kenya", the respondents were asked to indicate the extent to which Kawangware ICT/HIV Project had been affected by each of the challenges listed. The responses are summarized and presented in table 4.4 below. ***Where:*** Not at all = **(1);** Neutral = **(2);** Somehow = **(3);** Much = **(4);** Very much **(5).**

Table 4.4: Challenges of adoption of ICTs in the fight against HIV/AIDS

Challenges of adoption of ICTs in the fight against HIV/AIDS	Number of respondents					Mean scores	Standard Deviations
	(1)	(2)	(3)	(4)	(5)		
Limited connectivity: Limited connectivity is a major obstacle both to comprehensive dissemination of HIV/AIDS-related information and to mutual communication of pressing needs	1	1	3	6	5	1.140	2.280
Poor ICT infrastructure status	1	2	3	5	5	0.895	1.789
High costs of accessing the Internet: cost of accessing the Internet, maintaining the equipment and buying new ones is also a challenge	2	1	4	5	4	0.822	1.643
Language barrier: Most of the information available on the Internet is in English or in languages not understood by the wider segments of the population	1	2	3	5	5	0.895	1.789
N=16							

4.3.5 Recommended strategies on how best to employ ICTs in the fight against HIV/AIDS in Kenyan slums

In order to meet the fourth objective of the study, "To recommend strategies on how best to employ ICTs in the fight against HIV/AIDS in Kenyan slums", the respondents were asked to suggest at least four ways in which the challenges listed under the third objective of study could be overcome so as to effectively employ ICTs in the fight against HIV/AIDS pandemic. Though the wordings were different, the various suggested strategies were summarized and presented as follows:

Limited connectivity: In order to address the challenges posed by limited connectivity on comprehensive dissemination of HIV/AIDS related information, the respondents indicated that there was need to put efforts place to facilitate the connection of the CBOs in the project area to such NGOs as AMREF in order to enhance networking.

Poor ICT Infrastructure Status: In order to address the obstacles to effective health communication posed by poor ICT infrastructure status the respondents indicated that there is need to update the existing ICT equipment, which include replacement or refurbishment of the available computers, which are old and slow.

High Cost of Accessing the Internet: In order to address the problem of high cost of accessing the internet, occasioned by among others, the high costs of acquiring new equipment and maintenance of the same, the following measures were suggested:- There is need to supply the resource centers with electricity since the cost of fuel to run generators in some of the sites is very high; and the community members should be supported with seed money to establish income generating activities such as opening up cyber cafes that would offer such services as photocopying, email access, scanning and typing.

Language Barrier: In order to address the limitation to effective health communication caused by language barrier, among the measures suggested was that the communication materials ought to be translated into Kiswahili so as to enable the community members comprehend without seeking the help of translators. Most of the materials are currently available in the English language.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

From the preceding findings, the researcher makes the following conclusions:

5.1.1 The tools and intervention used in the fight against HIV/AIDS

Findings of the study indicate that all the four objectives were met as follows:- The tools used in the fight against HIV/AIDS in Kenya were established as being e-mail discussion groups, Internet, Dissemination of information on World Wide Web (www), Radio, Television, and Distance learning systems. The interventions used in the fight against HIV/AIDS in Kenya were established as being Prevention:-Dissemination of prevention messages as well as prevention services to target groups such as commercial sex workers; School Based Education:- Education and life skills training in the schools for effecting appropriate behavioral changes among youth; and Education of Health Care Workers :- ICTs are being used to improve access to information, education, and communication for health workers using, Internet, email discussion groups, and distance learning systems

The project approach through schools is effective as it allows many pupils to access ICTs. There are some signs that utilization and translation of information into significant improved health and development in the catchment areas through reduction of common illnesses such as malaria and HIV/AIDS because the information is being passed through the centres in the form of tapes, pamphlets newsletters and videos on HIV/AIDS and rights of children and intra-community communication. This too, is yet to be effectively achieved. There remains a gap on training in equipment repairs and maintenance. Community members can now access computers and enjoy their benefits. They also have access to T.V, video and ICT literature which were previously inaccessible either due to cost, distance, electricity and skill gaps. This has opened their way to accessing ICTs in future without any fear. The reported involvement of youths and children in some sites has exposed them to information that is bound to change their health and social behavior. Some of the youths are used by the centers as peers, who teach the others on behavior change.

5.1.2 The Benefits derived from adoption of ICTs in the fight against HIV/AIDS in Kenyan slums

The benefits derived from adoption of ICTs in the fight against HIV/AIDS in the Kenyan slums were determined as being Social change; empowerment and reduction of vulnerability; advocacy, mobilization, networking and capacity building; Remote consultations and diagnosis;

Information sharing; Remote mentoring; Facilitation of Distance learning teaching; and Online Counseling.
There is demand for ICT skills and knowledge in the wider community at which the sites are located. This demand can be harnessed to promote the fundamental objectives of the ICT project. The demand for training and ICT skills (Microsoft office packages) provides a rich opportunity to earn some income for the project and enhance its sustainability. The adult community members have also shown enthusiasm for scaling up the project through donation of their own resources, which include money and time. This can be tapped to scale up the project.

5.1.3 The challenges of adoption of the ICTs in HIV/AIDS Health Communication

The Health challenges in the slums areas, Kawangware being no exception include both the diseases and lack of supporting facilities in terms of human resource and physical infrastructure. The few available health facilities are not only ill-equipped, but also manned by inadequate staff. Among the challenges facing the slum communities include the following:-

Limited connectivity: This limited connectivity is a major obstacle both to comprehensive dissemination of HIV/AIDS-related information and to mutual communication of pressing needs amongst the community members. Internet connectivity in the area is not only limited, but the speed is also very slow, hence the whole exercise being time consuming.

Poor ICT infrastructure status: The poor ICT infrastructure status in the slums of Kawangware currently is unable to adequately support the potential benefits of ICTs in communication to the community members. Technologies like digital and satellite broadcasting, mobile telephones, and handheld computers have enormous potential to reach the slum communities and reverse the current scenario.

High costs of accessing the Internet: The cost of accessing the Internet, maintaining the equipment and buying new ones is a major challenge for the project. In addition, costs of installing Internet facilities and maintaining them are also a big challenge for the project. Collaborative efforts amongst like minded groups and initiatives could pull recourses to ensure expansion of the project and hence greater impact.

Language barrier: Most of the health communication information available is in English or in languages not understood by the wider segments of the slum communities. In addition, there exists the challenge of understanding medical jargon used. There is need to translate these languages to one that is understood by the slum communities.

5.2 Recommendations

5.2.1 Recommendations for Policy and Practice

In view of the findings of the study, the following measures are highly recommended:

The tools and intervention used in the fight against HIV/AIDS: In order to enhance the effectiveness of e-mail group discussions, Internet, Dissemination of information on World Wide Web (WWW) and Distance Learning Systems among the project beneficiaries, there is need to not only enhance connectivity, but also upgrade the existing tools and equipment. Connectivity can be enhanced by seeking networking and collaborative arrangements with Telecommunication service providers, information libraries and donors who may be called upon to donate ICT equipment and other recourses. In order to make health communication through the use of Television and Radio more effective, there is need to ease congestion by availing more Television sets and Radios. In addition, more classrooms should be availed for the purpose of hosting these sessions.

The Benefits derived from adoption of ICTs in the fight against HIV/AIDS in Kenyan slums

Social change: While information is the basic component of safer sex messages, effective prevention relies critically on overcoming obstacles posed by: misinformation and myths about the disease; silence and denial; stigma and discrimination; and limited knowledge about HIV/AIDS prevention services, including voluntary counseling and testing (VCT) and measures to prevent mother-to-child transmission of HIV. In order to ensure that positive social change is maintained, reminder messages, tailored to suit the target groups, should be continuously disseminated.

Empowerment and reduction of vulnerability: In order to facilitate the empowerment and reduction of vulnerability of PLWHA, women, and other susceptible groups that form fundamental parts of the fight against AIDS, there is need to provide an enabling and protective legal environment, which protects people's (and especially women's) rights to equality and non-discrimination. The intimate connection between health and access to information is reflected in international human rights law, which views access to health related information and education as an underlying determinant of health.

Advocacy, mobilization, networking and capacity building: Information and communication play critical roles in addressing some of the political factors that limit effective responses, by facilitating greater transparency and monitoring of government through civil society and mass media reporting, and by encouraging increased democratic participation. Greater emphasis should thus be placed on networking and capacity building so as to realize synergy, while advocacy and mobilization will lead to more effective participation by all the stakeholders.

Information sharing: Forums should be encouraged and facilitated for community members with similar interests to interact and share information. These could be interactive sessions online or such groups as People Living With HIV/AIDS meeting to share their experiences. These groups could also share and exchange their experiences with peers, social and health care workers, which will enhance their control over their lives.

Distance learning: In order to realize more benefits from distance learning, there is need to link the project to various libraries so that they can access information on line from the various sources.

Online Counseling and Remote mentoring and teaching: In order to enhance the effectiveness of Online Counseling, there is need for the project to link online to counseling services provided by experienced counselors all over the world.

5.2.2 The challenges of adoption of the ICTs in HIV/AIDS Health Communication

(i) In order to cut down on the costs of maintaining the ICT equipment, there is need for AfriAfya enhance capacity of the community members by identifying and training some of them in maintenance so as to take charge of basic repairs and maintenance of the ICT equipment; (ii) The target communities should be involved in project planning for the anticipated scaling up of the ICT project in order to enhance ownership of the project by the target communities and hence sustainability of the project; (iii) The project should collaborate with other organizations such as Telecommunication service providers with a view to improving on the connectivity and upgrade of ICT status in the area; (iv) In order to address the problem of high cost of equipment, there is need for collaboration with organizations that could provide the required equipment in the form of donations; and (v) Most of the pictorial presentations do not reflect the local situation. There is need for not only translating the communication materials from English to Kiswahili, but also to shoot films in the local area, which would make the communication more interesting.

Other recommended strategies on how best to employ ICTs in the fight against HIV/AIDS in Kenyan slums: There is need to supply all the resource centers with electricity since the cost of fuel to run generators in some of the sites is very high. This could be realized though collaboration with the Constituency Development Fund. There is need to enhance the capacity of the slum community members through training of more Community Own Resource Persons (CORPS) and do follow up trainings for the CORPs already trained. The training should include management of resource centers and maintenance of tools and equipment at the centres. There is need to introduce Income Generating Activities (IGAs) like commercial photocopiers and typing services in the resource centers so that the services may be accessed by other community members. The centers should also have a library section to allow pupils access books. In addition, the security of the centers should be improved to avoid theft of ICT equipment.

5.3 Recommended areas of further research

The findings of this study, it is hoped, will contribute to the existing body of knowledge and form the basis for future research. The following areas of further research are thus suggested: (1) Whereas the current study focused on responses from the CBO officials and Head teachers of the schools where the project sites are located, future studies should focus on responses from the beneficiaries; and (2) the findings of the current study should be replicated to other sectors of the economy.

REFERENCES

Adeya, N. C. (2003). *ICTs and poverty: a literature review*, IDRC

Agar MH (1981). *The professional stranger: An informal ethnography*. Academic Press, New York.

Alpi, K. M. & Bibel, B. M. (2004). Meeting the Health Information Needs of Diverse populations, *Library Trends*, vol.53,no.2, fall 2004, pp. 268-282.

Anderson, R., & Ross, V. (1998). *Questions of communication: A practical introduction to theory (2nd Edition)*. New York: St. Martin's Press. **N/A**

Ashcroft, L. and Watts, C. (2005). *ICT skills for Information Professionals in developing countries: Perspectives from a study of the electronic information environment in Nigeria*, IFLA journal.

Atkinson P (1990). *The Ethnographic Imagination: Textual Constructions of Reality*. Routledge, London.

Baffour- Awuah, M. (2004). "*Fiction as a tools to fight HIV/AIDS battle70th IFLA General Conference and Council*, 22-27 August 2004 [online] Retrieved 27 November, 2005

Ball, S. (1981). *Beachside Comprehensive: a case study of secondary schooling.* Cambridge, CUP.

Bateson Consulting Inc, D.S (2002), *Inc., Health, HIV/AIDS and Information and Communication Technologies*: A Needs Assessment, at 7

Berthon, P., Pitt, L., Ewing, M., and Carr, C., L. (2002). "Potential research space in MIS: A framework for envisioning and evaluating research replication, extension, and generation," *Information Systems Research* (13:4) 2002, p 416.

Bloome, A (2001), "Wireless School Internet Connectivity," January/March 2002 & "Big Blue's Coming To Town," July/August 2001

Bridges.Org, "Evaluation of Satellife PDA Project (2002), Testing the use of handheld computers in Ghana, Uganda and Kenya"

Brown, M., Askew, M., Baker, D., Denvir, H. & Millett, A. (1998)'Is the National Numeracy Strategy Research-Based?' *British Journal of Educational Studies*, 46, 4, 362-385 [A review of the evidence for and against the numeracy strategy]

Burnham, E. & Peterson, E.B. (2005) Health information Literacy: A library case study. *Library Trends.* Vol. 53, no.3 winter, pp.422-433.

Campbell, C. (2004), Creating environments that support peer education: experiences from HIV/AIDS – prevention in South Africa. *Health Education*, vol.104, no. 4, pp.197-200

Center for International Cooperation (2003 – 2008). *Health and Development, Integrated Epidemiological Surveillance Support Project*, Phase 2.)

Chikonzo, A. (2005). Librarians and the use of information communication technologies in the provision of HIV/AIDS information in developing countries. 71st IFLA conference and Council, August 14th –18th 2005 Affective state and the selective exposure to and use of television. *Journal of Broadcasting*, 28, 51-63.

Cosgrove, T. L. (1994). Planetree Health information services: public access to the health information people want, *Bulletin of medical library associations*, 82(1), January, pp 57-63

Coumba, M.G (2005). *Exploring the Gender Impacts of World Links in Some Selected Participating African Countries: A Qualitative Approach*, at 10 (2001), available at http://world-links.org/english/assets/gender_study_v2.pdf

Cragan, J. F., & Shields, D.C. (1998). Understanding communication theory: The communicative forces for human action. Boston, MA: Allyn & Bacon. N/A

Davies, P. (1999). 'What is Evidence-Based Education?' *British Journal of Educational Studies*, 47 (2), 108-121.

Development Gateway, (2002). *The Expanding Role of ICTs in HIV/AIDS Program Design and Implementation (October 29, 2002)*, at http://topics.developmentgateway. org/hiv/sdm/preview Document.do~activeDocumentId=366014

Digs-Hobson, M. (2005). Providing Health Information to community members where they are: Characteristics of the culturally competent Librarian. *Library Trends*, Vol.53, no. 3, pp.397-410.

Driscoll, L. (2001). *HIV/AIDS and Information and Communications Technology*, International Development Research Council, November 2001.

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, 14(4), 352-550.

Feagin, J., Orum, A., & Sjoberg, G. (Eds.). (1991), A case for case study. Chapel Hill, NC: University of North Carolina Press.

Finn, S.(1985b). Information-theoretic measures of reader enjoyment. *Written Communication*, 2, 358-376.

Fourie, I. (2004). Librarians and the claiming of new roles: how can we try to make a difference. *Aslib Proceedings*, vol. 56.no.1,pp. 62-74

Gendercide (2006). *Case study: female infanticide: focus on India and China.* Available at http://www.gendercide.org/case_infanticide.html (25th March 2006)

Gilhoney, D. (2001). *The Role of ICT in the Response to HIV/AIDS, Presentation before ICT Against HIV/AIDS Coalition Working Group* , slide 11 (Nov. 20, 2001), available at http://www.sdnp.undp.org/ictaids/UNDP_nov20_ict_hiv.ppt

Griffin, E. (2000). *A first look at communication theory (4th Edition).* Boston, MA: McGraw-Hill. N/A

Hamel, J., Dufour, S. & Fortin, D. (1993). *Case study methods.* Newbury Park, CA: Sage.

Hogan, T. P. (2005). Information preferences and practices among people living with HIV/AIDS: results from a nationwide survey, *Journal of medical library Association*, 93 (4), October, pp. 431-439

Holly, L., (2003). "*Satellife, HIV/AIDS Related IT Programming*," Presentation at ICT Against HIV/AIDS Coalition Meeting (undated).

Human Rights Watch (2001). *World Report 2002: Special issues and campaigns.* HIV/AIDS

Huston, T. and Huston, J. (2000), Is TeleMedicine a practical reality? Communications of the ACM, 43 (6):91-95

ITU (2000). *TeleMedicine and Developing Countries. Telecommunications Development Bureau*, Document 2/116, Geneva: International Telecommunications Union (ITU)

ITWeb (2003). *South Africa: AngloGold Rolls Out IT Against Aids (April 29, 2003),* at http://www.africapulse.org.za/index.php?articleid=1195&action=viewarticle

Jensen, M. (2002). *The African Internet a Status Report*, February 2002

Jimenez, R.T. & Gersten, R. (1999). 'Lessons and Dilemmas derived from the Literacy Instruction of two Latina/o Teachers'. *American Educational Research Journal*, 36, 2, 265-302.

Kasozi, M. & Nkuuhe, J. (2003). Uganda Chartered Healthnet promotes healthcare using PDAs. In I-Network Uganda, *A quarterly Newsletter of I-network Uganda: ICTs in health*, 2(4): 3-4

Kelly, M.J. (2006). *The Response of Information Technology to the Challenge of HIV/AIDS in Higher Education Institutions in Africa, Ad Hoc Expert Group Meeting on the use of Information and Communications Technology in Africa*, Nairobi: November 19-21

Kickbusch, I, Caldwell, A. & Hartwig, K. (2002). "*Health Literacy, Empowerment and HIV/AIDS: Striking a Balance on an Uneven Playing Field*," July 2002, White Paper prepared for UNESCO, the U.S. National Commission on Libraries and Information Science, and the National Forum on Information Literacy

Longwe, S. H. (1991). *Gender awareness: the missing elements in the Third World development project.* In Wallace, T. with March, C. (eds.) Changing perceptions: writings on gender and development. Oxford, Oxfam.

Mansell, R & When, U. (eds.) (1998), *Knowledge Societies: Information technology for Sustainable Development.* New York: Oxford University Press.

Martell, C. (1989), Achieving high performance in Library Work. *Library Trends*, Vol.38, no.1, Summer, Medical library Association, in draft 2003,

Maxfield, A. (2004). *Information and communication technologies for the developing world. Health Communication Insights. Baltimore: Health Communication Partnership based at John Hopkins Bloomberg School of Public Health / Center for Communication*

Programs.

Mayanja, M (2002). *Uganda School-Based Telecenters: An African Approach to Rural Access to ICTs.*

Maykut, P. & Morehouse, R. (1994). *Beginning qualitative research: A philosophic and practical guide*. London: The Falmer Press

Miles, M. B. & Huberman, A. M. (1984). *Qualitative data analysis: A sourcebook of new methods.* Beverly Hills, CA: Sage.

Moahi, K. H. (2005). *A study of the Status of the provision of sexual and reproductive health services (SRH),* including HIV/AIDS information to the youth in Botswana

Muswazi, P. (2000). HIV/AIDS information resources and services: A Swaziland case study. *Library Review,* pp.31-37

Mwesigwa, P. (2002).*Overview of the Uganda Telecommunication Sectorand Strategiesfor Migration to 3G Technology*. Paper presented at a regional seminaron ICT in Abidjan, Corted'voire,9–12September2002.

Nassimberi, M (1998). The Information Society in South Africa: From Global Origins to Local Vision. *South African Journal of Library and Information Science,* Vol. 66 (4)

Nawaguna,P.(2005).E*asternstudentsgetcomputerskills*.NewsstoryintheNewVision,14Nov2005.http://www.newvision.co.ug/D/9/35/465671.

Nikkonen M & Janhonen S (1995), Ethnography and Ethnonursing in nursing research. Two examples from the field. *Vård i Norden* 15(2): 21–25.

O'Brien, M. (2003). School Libraries - Breaking Down Barriers: International Association of School Librarians 2003 Annual Meeting. *Library Hi Tech News,* vol. 20, no.9

Ofeibea, O. (2003). *Mbeki Still in Denial Says HIV Treatment Activist* (May 29, 2003), at http://allafrica.com/stories/200305290027.html

Pelto J & Pelto G (1978). *Anthropological Research. The Structure and Inquiry*. Cambridge University Press, Cambridge. (2nd edition).

Ra, M. (1997). *Creating a consumer health Information network,* Collection Building, vol. 16, no.4, pp 167-172

SIDAREC (2004). *Youth Programmes*, at http://www.sidarec.or.ke/html/community.html (SIDAREC stands for "Slums Information Development and Resource Centres").

Siddamallaiah, H.S. (2005). *Community-based health literacy model for libraries in India* [online] Retrieved 31 January, 2006. http://www.icml9.org/program/track6/public/documents/H-114031.doc

Simons, H. (1980). *Towards a science of the singular: Essays about case study in educational research and evaluation*. Norwich, UK: University of East Anglia, Centre for Applied Research in Education.

Stake, R. E. (1995). *The art of case study research*. Thousand Oaks, CA: Sage.

UN Integrated Regional Information Networks (2003). *Still Waiting for the Information Revolution (May 15, 2003),* available at http://allafrica.com/stories/printable/ 200305150744.html.

UNAIDS (2001), HIV/AIDS and Communication for Behavior and Social Change: Program experiences, examples and the way forward. Geneva, Switzerland: WHO/UNAIDS. [Online] Retrieved on 31 January 2006 http://www.unaids.org.

UNAIDS (2002), Report on the Global HIV/AIDS Epidemic, at 23 (2002), available at http://www.unaids.org/NetTools/Misc/DocInfo.aspx?href

UNAIDS (2004). *Report on the Global AIDS Epidemic*, at 23 (2004)

UNAIDS (2004). *School Based Interventions and Services, in summary booklet of best practices*, at 173 (1999),

UNAIDS (2006). *HIV/AIDS and Communication for Behavior and Social Change: Program experiences, examples and the way forward*. Geneva, Switzerland: WHO/UNAIDS.

Wald, M. (2000), Information and literacy in a time of AIDS: observations of Ethiopia today: a case for Grey literature, *International Journal on Grey Literature*, June vol.1 no. 2 pp. 87 – 89

Warner, D. & Procaccino, J. D. (2004). "Toward wellness: Women seeking health information" *Journal of American Society for information Science and technology*", 55(8):pp. 709-730.

Webster. F. (1997). *The Theories of Information Societies*. London: Routledge.

West, R., & Turner, L. H. (2000). *Introducing communication theory: Analysis and application.* Mountain View, CA: Mayfield. N/A

WOUGNET (2004). *Women's health: the role of ICTs*. Report of a workshop held on 19 August 2004 at Hotel Africana, Kampala, Uganda.

Yin, R. K. (1984), Case study research: Design and methods. Newbury Park, CA: Sage.

Zuckerman, M. (1988). *Behavior and biology: Research on sensation seeking and reactions to the media*. In L. Donohew, H. Sypher, & E. T. higgins (Eds.), Communication, social cognition, and affect (pp. 173-194). Hillsdale, NJ: Lawrence Erlbaum Associates.

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