

Networking for Health: a r/evolution

Using new ICTs to support health professionals in developing countries

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Abstract

This study examines how new information and communication technologies (ICTs) are being used and should be used for and by health professionals in developing countries. In the context of participatory health, education and communication theories and by examining current projects in this field, it attempts to answer the following two questions:

- How are new ICTs being employed to support health professionals in developing countries?
- What can we learn from these experiences about best practice in using new ICTs to support health development professionals in their work?

Each application of these technologies is discussed in turn: professional development, information dissemination, information access, information and knowledge management, telemedicine, and networking and collaboration. Each is illustrated with examples, which are used to suggest good practice in each area. Three case studies in particular are discussed in depth to demonstrate some of the most exciting applications in more detail and to cull their best practices.

The research methods included a critical literature review, structured and unstructured interviews with project managers via telephone and email, and qualitative and quantitative analysis of project web sites and email discussion lists.

Overarching promising and best practices particularly relevant to using new ICTs to support health development professionals include participatory planning, making services accessible, integrating and networking with existing programmes, establishing personal contact with users, providing ongoing training and support, using local agents to adapt and disseminate locally relevant content, and evaluating the services.

The study concludes that new ICTs have great potential to support health development professionals, and that this potential has already been put into practice in some of the projects discussed here. In particular, they have revolutionised two areas. One is information dissemination. By making anyone with a computer, Internet connection, and a modicum of technical skill a potential publisher, new ICTs have multiplied the voices in the health and development discussion, with much-needed amplification of input from the South, and have exponentially improved access to information for those with direct or indirect access to new ICTs. The other is communication capacity; new ICTs have for the first time enabled many-to-many communication, making it possible to create global networks of health development professionals in participatory knowledge sharing and generation.

Investing in these two applications of new ICTs for health professionals can greatly further the health development agendas of less developed countries and, in fact, aid the setting of it in the first place.

Acronyms

ACU	Association of Commonwealth Universities
AFRO-NETS	African Networks for Health Research & Development
AHILA	Association for Health Information and Libraries in Africa
AIDS	Acquired immune deficiency syndrome
AIHA	American International Health Alliance
AJOL	African Journals Online
BMJ	British Medical Journal
CD-ROM	Compact disc, read-only memory
CEIHA	Committee on Enhancing the Internet for Health Applications
DFID	Department for International Development
FAQ	Frequently asked questions
FTF	Face to face
GCATT	Georgia Center for Advanced Telecommunications Technology
HIF	Health Information Forum
HINARI	Health InterNetwork Access to Research Initiative
HIV	Human immunodeficiency virus
HTML	Hypertext Markup Language
ICT	Information communication technology
IDS	Institute of Development Studies, University of Sussex
IHN	Interactive Health Network
IICD	International Institute for Communication and Development
INASP	International Network for the Availability of Scientific Publications
IT	Information technology
IWSP	Information Waystations and Staging Posts
JAAIDS	Journalists Against AIDS
LDC	Less developed country
NASA	US National Aeronautics and Space Administration
NGO	Non-governmental organisation
NIH	US National Institutes of Health
PA	Per annum (per year)
PC	Personal computer
PDA	Personal data assistant
PDF	Portable Document Format
PERI	Programme for the Enhancement of Research Information
TALC	Teaching-aids At Low Cost
TB	Tuberculosis
UK	United Kingdom
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFPA	United Nations Population Fund
URL	universal resource locator
US	United States
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
WHO	World Health Organization
WWW	World wide web

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1 Introduction

If we cannot ensure that this global revolution creates a worldwide information society in which everyone has a stake and can play a part, then it will not have been a revolution at all. –Nelson Mandela at the Opening of Africa Telecom 98

Ten thousand years ago, the spread of agriculture revolutionised the human way of life by allowing us to settle in one place instead of following our food. In the industrial revolutions of the 18th and 19th centuries, the invention of the internal combustion engine transformed society again; people left their farms and flooded into cities in pursuit of factory jobs.

Now, even as less developed countries (LDCs) scramble to ‘catch up’ to the industrialized countries of the North, we are arguably at the start of a third revolution – that of the information society (Toffler 1981, Browne 1999). While smokestacks crumble and assembly lines rust in Europe and the US, wires are webbed and satellites launched to form the infrastructure for the new ‘knowledge economy’. This time, the revolution is driven by information and communication technologies (ICTs)¹. Beginning with the ‘old’ ICTs – telegraph, telephone, radio, television – the information revolution is now accelerating with the advent of new ICTs – e-mail, the Internet, CD-ROMs, PDAs.

About a decade has passed since Internet access made a popularised entry into offices and homes in industrialized countries. Development NGOs were quick to consider the possible applications in their work and, by the end of the 1990’s, national and multi-lateral donors had also seized on these new ICTs as a potential development tool². One of the ways they have been employed is to support health professionals³ in developing countries. A myriad of projects and programmes currently attempt to harness these technologies to this end.

This study examines some of these projects, with a particular focus on the INASP-Health programme⁴, in an attempt to answer the following questions:

- How are new ICTs being employed to support health professionals in developing countries?
- What can we learn from these experiences about best practice in using new ICTs to support health development professionals in their work?

1.1 Approach and Methods

To frame the study, the next chapter outlines the position of new ICTs in development theories and deconstructs the terms making up the ICT acronym. Chapter 3 discusses

¹ This study uses the term ICT to refer to new ICTs unless otherwise specified. This does not necessarily apply to direct quotations.

² The forthcoming UNESCO World Report, *Building Knowledge Societies*, due out in December 2003, is an example.

³ In this study, the phrase ‘health professionals’ includes health educators and promoters, medical workers (doctors, nurses, clinicians), medical and health librarians, and others working in the field of health in developing countries.

⁴ www.inasp.info/health

applications of ICTs for health professionals and examples of them in practice. Using these examples, the literature and personal experience, I suggest good practices for some of these applications. The fourth chapter hones in on three case studies, and INASP-Health in particular, to further develop and apply the ideas discussed in the first two chapters. The study ends with a summary of issues commonly faced by ICT projects for health professionals, suggestions for overarching best practices in this area, and notes on areas ripe for future research. Many sections begin with a quote from a development ‘thinker’ to frame the text as well as tell a ‘story’ about the quantity and quality of perspectives in this field.

In an attempt to identify the truly new health and development tools available via new ICTs and to facilitate comparisons with the capacity of older tools, this study divides the tools themselves and their potential and current applications into two categories: evolutionary and revolutionary.

I approach the research questions through a critical literature review, structured and unstructured interviews with project managers via telephone and email, and qualitative and quantitative analysis of project web sites and email discussion lists. The following notes detail this methodology:

- *Literature review*—By the nature of this topic, most of the literature reviewed here is available online. Thus, in addition to traditional library searches at the Institute of Education, Association of Commonwealth Universities and Cornell University libraries, I spent many days trawling the web and email forums for related work and have been able to assimilate references published as late as August 2003.
- *Data collection*—Many of the references are primary – publications and text from the programmes analysed here. I followed these up in some cases with email and telephone interviews with programme managers. Prepared questions are listed in Appendix A. All numerical data, such as membership and participation numbers for email forums, time and financial costs, and usage statistics, were provided by programme representatives either through personal communication or in published evaluations.
- *Sampling*—In Chapter 3, each application of ICTs for health professionals is illustrated with several relevant project examples. I selected these examples via online and email forum research, choosing those where details are published (either online or in print) and/or where managers replied to my email queries. In Chapter 4, I attempted to select three case studies that would illustrate the unique aspects of the potential for new ICTs to support health professionals and had not already been extensively reviewed elsewhere. More details are in the introduction to that chapter. Appendix B provides a list of the health development projects and programmes mentioned in this study along with brief notes on each.
- *Limitations*—These, by the limited nature of an MA dissertation, are extensive. In particular, with more time and resources, each case study would and should have included questionnaires and interviews with the end users. As it stands, any user feedback mentioned here was collected via the literature review. This study does not discuss health applications of new ICTs for the general public or the technologies that

make access possible, except in passing. Also, while meant to be a useful guide to and analysis of some key projects using new ICTs to support health professionals, it does not attempt cover existing projects exhaustively.

- *Assumptions*—The single largest and most important assumption in this study is implicit – that supporting health professionals will in turn positively impact public health.

My personal perspective on this topic is framed in part by experience as a health and science educator in a developing country (without access to new ICTs), a manager of a web-based academic networking firm, and an online learning designer for a university.

2 Background and Context

We live in a global knowledge economy – where knowledge, learning communities, and information and communications technologies are the engines for social and economic development. (World Bank 2000: 1)

When the World Bank pronounces ICTs as an engine for development, and has backed it up with many millions of dollars in web-based projects⁵, the development community knows the concept has become mainstream. But how does this engine work, if it works at all? Where does it fit into development theory in general and health promotion theory in particular? How are its components – information, communication and technology – fitted together with one another and with development efforts? Are these technologies driving a revolution or are they just refining existing approaches? The sections below explore these questions.

2.1 Gaps in the Literature

eDevelopment... has arrived. The result has been an explosion of activity and writing, much of it poorly thought out and with little understanding either of history or of development realities (Heeks 2002: 1).

Gaps in the ICTs-and-development literature have three main causes. One, by nature this is a relatively new field of study. Two, frameworks for measuring the impact of communication and information are difficult to build. Three, technology itself, access levels to it, and projects employing ICTs are all moving targets. Thus, in spite of the ‘explosion’ of writing in this area, many issues in this field have not been adequately addressed.

Evaluation and Evidence

There is an alarming lack of empirical evidence, or analyses, of actual experiences of applying ICTs locally and their impact upon poor people's economic and social livelihoods. (Michiels and Crowder 2001)

For all the investment in ICT-related health projects, little has yet been done to evaluate their impact or to determine best practices (e.g., Michiels and Crowder 2001, Chetley 2001, Driscoll 2001, CEIHA 2000). With the rapid development of these technologies, frequent project changes in response to feedback, and the dramatic increase in access to the technologies within developing countries, assessments of how the services are being used (e.g., Sall 2002, Guerny et al. 2001, Deany 1998) goes quickly out of date.

Comparative studies in particular are few and far between. Both this work and studies of a single project over time would help inform best practice, and the latter would also help map where this superhighway (as the Internet is often called) is going.

Frameworks for Evaluation

How can development activities move beyond what is difficult (measuring their own efforts) to what might be impossible (analysing the pervasive spread of information throughout the developing world, and measuring any benefits of this information)? (Zielinski 2001a)

⁵ See www.worldbank.org/ks/vision.html for a list of projects.

The impact of new information and communication technologies are difficult to measure in the quantitative terms recognised by any quantitative scientific method. One researcher notes, “the real essence of the revolution is qualitative” (Browne 1999: 11).

Mansell and Wehn have developed the INEXSK (the INfrastructure, EXperience, Skills, Knowledge) model, which considers how eight variables contribute to knowledge-based economic growth and development (1998: 21). However, they state that measuring the economic impact of ICTs entails “severe problems of statistical classification and data availability.” (1998: 14). The root of this challenge is that “ICTs are used to produce an intermediate good or product, information. The value of information in use varies dramatically depending upon the context” (1998:15). Attempts to assess the process and value of *communicating* information and its more sophisticated cousin, knowledge, elicit even more complex problems.

Other ways of measuring ICT project success include storytelling and anecdotes, user interviews, and usage rates. This is discussed in greater detail in section 5.2.

Tracking Projects

The problem with many information development projects is that they come and go and rarely leave a trace (Zielinski 2001a).

Simply monitoring the existence of, much less evaluating, the spectrum of ICT health projects and services requires ongoing effort. They appear, disappear and change online addresses at an alarming rate. For example, during the course of this study, Popline, a reproductive health reference source discussed in section 3.3, changed its web address and removed some content. Others, like Healthinfo-Ethiopia⁶, are still online but otherwise appear to have been inactive for months or even years.

Locally driven projects in particular are nearly invisible beyond their borders for lack of any published (online or otherwise) documentation (Michiels and Crowder 2001). In spite of seeking such projects to discuss in this study, of the 29 ICT projects in Appendix B, only 8 are based in developing countries.

Perhaps worst of all, the projects that fail tend to drop off the map, often taking any lessons learned with them (Zielinski 2001, Chetley 2001, Heeks 1999).

These three gaps combined make the use of new ICTs to support health professionals a largely unmapped wilderness. Projects discussed here are only beginning to explore it. Currently, the literature lacks any research that discusses and combines the experience of projects in this field. This study attempts to sketch a map of where many of these projects have been, where they are now, and where perhaps they should go.

2.2 ICTs and Development Approaches

There is a general assumption within much writing about ICTs that the poor are merely recipients: of technology, of information, of knowledge. (Heeks 1999: 11)

⁶ www.geocities.com/healthinfo_ethiopia/

It seems almost ridiculous now to say that we once believed that more information was always better, and that more technology, in and of itself, could resolve existing problems. (Casmir 1991: 18)

Development, as a discipline, is roughly the same age as the information revolution. The various theories of development economics, health, communication and education impact the use of ICTs in health development. This section briefly outlines their relationships.

Approaches to development, with their underlying assumptions about the causes of poverty, can be divided into two broad categories: modernisation and dependency. In oversimplified but indicative terms, Table 1 summarises approaches in the development disciplines of health, communication and education that share either modernisation or dependency assumptions.

Table 1: Summary of Two Development Approaches

	<u>Assumptions about Poverty</u>		<u>Related approaches by discipline</u>		
	Causes	Solutions	Health Promotion	Communication	Education
Modernisation	<ul style="list-style-type: none"> - Internal and individual - Individual beliefs and behaviour - Lack of information 	<ul style="list-style-type: none"> - Top down approach - Information dissemination - Belief change 	<p><i>Knowledge, Attitudes Practice and Health Belief Model:</i> Individual knowledge, beliefs and attitudes determine health behaviour. Health promoters should provide information to influence beliefs.</p>	<p><i>Diffusion/Mechanistic:</i> Communication is transmitting information; the sum of discrete and concrete components—sender, message and receiver.</p>	<p><i>Behaviourism:</i> Learners are empty vessels, needing to be filled with information.</p>
Dependency	<ul style="list-style-type: none"> - External and political - Hegemony, richer countries monopolising resources - Lack of mutual understanding 	<ul style="list-style-type: none"> - Grass-roots approach - Negotiation - Empowerment 	<p><i>Preceed-proceed:</i> Health behaviours have social and political influences, and health promoters should create and sustain conditions where it is possible to make healthy choices.</p>	<p><i>Participatory/Organic:</i> Communication is an end in itself; every situation is unique, requiring constantly shifting and responsive two-way communication. Meaning is fluid and open to interpretation.</p>	<p><i>Constructivism:</i> Learners negotiate meanings, contributing what they already know and understand.</p>

Some donor excitement about the potential of new ICTs is likely rooted in modernisation assumptions. If information is the solution, and these new technologies can spread it cheaply and widely, then ICTs are the perfect development solution indeed. This study argues that ICT health projects conceived in this vein are unlikely to succeed.

However, most of the literature cited here holds that poverty has socio-political causes that require participatory, empowering solutions. This study shares these dependency assumptions and attempts to show that new ICTs, well applied, are well suited to meet these requirements⁷.

⁷ For example, the Jakarta Declaration mentions using new information media to support increasing community capacity and empowering the individual (1997).

2.3 ICTs in Health and Development

Information poverty is one of the most serious obstacles facing health professionals in the developing world. –Dr. Ruhakana Rugunda, former Ugandan Health Minister (Pruett and Deane 1998:13).

Our priorities are hygiene, sanitation, safe drinking water... how is having access to the Internet going to change that? –Supatra Koirala, nursing home worker in Kathmandu (Pruett and Deane 1998:16.)

Which is more valuable, food or water? It is a meaningless question. We must have both. –Walter Thorngate, regarding the choice between information and its funding competitors (1995).

Certainly filtering water through a modem will not improve the quality of either. Justifying spending on new information and communication technologies is challenging in the face of pressing basic health needs. Given limited resources, a health professional may have to choose between an annual supply of syringes or a laptop, or whether to bring in the health education theatre troupe from the capital or pay the bill from the Internet service provider.

ICTs cannot support a health system that does not exist. Basic health services should take priority over new technologies (Chetley 2001). However, often the direct and opportunity costs of providing health professionals with access to new ICTs and associated health development services (e.g., email forums, online databases, CD-ROM coursework) are worth the price for one or more of the following reasons:

- *Quality, cost-effectiveness and reach of the project*—Some of the ICTs-for-health programmes discussed here have demonstrably helped health professionals in the field and at very low cost.
- *Progress requires risk-taking*—To find successful new strategies for supporting development health professionals, they must be tried, risking failure.
- *The opportunity cost of ICT projects is often much lower than its direct cost*— This is because the ‘glitz’ of new ICTs attracts new money and different people. Thus, other than for government departments with fixed budgets, it often is not a choice between a laptop and the year’s syringe supply; i.e., the skills and funds devoted to some ICT development projects, were they not spent on these projects, would not have supported other development causes. For example, Geekcorps⁸ sends technical volunteers to developing nations to contribute to local IT projects and to transfer their skills, while their site does not list a single familiar sponsor. Malaria Online, discussed in section 4.2, is another example of a project with little to no opportunity cost⁹ for development.

More generally, from an economic standpoint, investment in telecommunications has shown benefits-to-cost ratios ranging from 5:1 to over 100:1 (Pruett and Deane 1998). This compares to ratios of between 1.7 and 3.7 to 1 for a child health nutrition programme in Bolivia

⁸ www.geekcorps.org

⁹ This ‘calculation’, however, does ignore the potential negative side-effects of ICT-related projects such as job losses, stress, a ‘Big Brother’ effect, and worsened communications that have been demonstrated in some cases (Heeks 1999).

(Behrman et al 2000), or 5.5:1 for a project tackling environmental health problems in sub-Saharan Africa (Doumani 2001: 20). While assignment of quantitative values to the often qualitative 'benefit' sides of these equations is subjective, these comparisons suggest that investments in communication technologies can often pay, and pay well.

Information

For all of human history up until the last century, information could travel no faster than the human messenger. (Mayor 1999: i)

The most urgent task before us is to get medical and health knowledge to those most in need of that knowledge. Of the approximately 50 million people who were dying each year in the late 1980s, fully two thirds could have been saved through the application of that knowledge. (Grant 1994)

Information is necessary but not sufficient for development, its effects are usually indirect and delayed, and it is never useful on its own. (Thorngate 1995)

Information dissemination has always played a key role in development strategies, particularly in health. It is not enough, but it is essential.

New ICTs have not changed the role of information, but they have revolutionised human capacity to disseminate it. They allow exponentially faster, wider, easier, and cheaper information dissemination than ever before. For those with access to these technologies, directly or indirectly, three key impacts of this include:

- *More voices*—Organisations in LDCs can more easily share their information and knowledge with one another and with the North, starting counter-currents to the traditional North-to-South flow of information. Also, average desk-bound individuals can, for the first time, disseminate their work. For example, one person in India has shared his research project – a directory of medical libraries worldwide – with the wired world¹⁰, and two men in Australia have fulfilled thousands of requests for their malaria education CD-ROMs (see Malaria Online in section 4.2) that they had originally created for local use.
- *Greater power in the hands of information seekers*—Putting information online makes it more demand-driven and less supply-determined. Information seekers can much more easily select which information they desire precisely when they need it, versus taking what they are given when it happens to arrive. New ICTs enable health professionals to become active seekers and users of information, instead of passive recipients.
- *Improved information access*—The information poor become instantly richer with an Internet connection and, to a lesser extent, email and CD-ROMs.

However – in addition to limited physical access to the technology itself – several barriers cloud the sunny picture above, including:

¹⁰ <http://medlib.netfirms.com>, created and managed by Dr. Vinod Scaria

- *Information quantity and quality*–Trying to find information online is often compared to drinking from a firehose. Navigating the vast quantity takes skill and some luck. Quality and accuracy of the information also poses problems, since the web is a giant bulletin board on which anyone can post ‘information’ (Edejer 2000, McLellan 1998). And finally, some of the most valuable information – for example, some data and most journals – is only available for purchase via credit card¹¹, where both the amounts and the means of payment can be obstacles.
- *Relevance*–Much of the health information online is irrelevant to or unusable in developing countries (Driscoll 2001, Groves 1996). Only about 10% of health research funding goes to topics relevant to developing countries (Edejer 2000), and the resulting literature and web content reflect this bias.
- *Skill requirements*–Finding what you need in a bibliographic database, much less on the web at large, requires searching skills. While most people can simply sit down and extract some value from Internet access even without previous experience or training¹², training is required for optimal usage, particularly in the face of slow or expensive Internet connections.
- *Language*–Most information online, on CD and in email discussion forums is available only in English.

The best ICT projects attempt to lower or eliminate some of these barriers, as discussed in the following chapters.

Communication

Too often communication was mistakenly conceived as propaganda or, in the best scenario, as information dissemination, but seldom seen as dialogue. (Dagron 2001: 9)

The term at the centre of the phrase – communication – is still largely unconsidered. (Chetley 2001)

Of the three letters making up the ICT acronym, the middle ‘C’ induces the most controversy and debate.

In modernisation approaches to development, the word ‘communication’ simply means information transfer from sender to receiver. In health communication, strategies such as social marketing and entertainment-education fall into this category. In this sense, the impact of new ICTs is not much broader than the information section above describes. For those with access, email and the Internet make this information transfer faster, easier, and cheaper than was previously possible. This holds particularly for some one-to-many communication (e.g., posting information on a web site or emailing a newsletter as opposed to publishing a binder

¹¹ In most countries with exchange controls, an internationally valid credit card is required, as national ones cannot be used to purchase items from abroad. Obtaining a credit card from a bank abroad is nearly impossible for developing country residents.

¹² See the “Hole in the Wall” experiment, where researchers placed networked computers in kiosks in India, and found that semi-literate poor children can quickly teach themselves the rudiments of using computers and the Internet. (www.niitholeinthewall.com)

or posting paper bulletins through ‘snail mail’) and when that communication is to a selected audience, such as health professionals, rather than to the general public.

Participatory approaches describe communication as interaction – dialogue, debate and discussion – leading to understanding, learning and empowered decision-making. These approaches were first outlined by Friere (1970) and now include Participatory Development Communication and Communication for Social Change (Figueroa *et al* 2002). In this view, shared by this study, communication is a development end in itself, not merely a means (UNFPA 2002).

New ICTs have ‘evolutionised’ one-to-one and one-to-many communication, but have revolutionised participatory communication by allowing, for the first time, many-to-many communication. Email discussion forums, discussed in section 3.6, are the best example of this application.

On the other hand, potential does not mean practice. ICTs are a full box of tools, and some projects may use the hammer rather than the level.

Knowledge

The way forward is to exploit the full interactivity of the Internet, which allows rapid feedback and change to continuously mould information into useful knowledge. (Edejer 2000)

IT also provides a counterbalance to the increasing compartmentalization and specialization in all sectors, because it provides an expedient means of collaborating with counterparts in parallel disciplines (France 1997).

To have knowledge is to have power. –Francis Bacon

In 1994, Michael Gibbons and colleagues published a much-quoted book, *The New Production of Knowledge*. Its thesis is that society is and should be moving from ‘Mode 1’ knowledge production of ‘ivory tower’ research driven by the interests of a cadre of academics to ‘Mode 2’ production through problem-solving by multi-disciplinary teams and partnerships, where society at large identifies which problems to solve. In development, this might be called ‘participatory knowledge generation’. In the world of new ICTs, Mode 2 might be called ‘knowledge networking’.

Sometimes the word ‘knowledge’ is used nearly interchangeably with the word ‘information’. If only it were as easy to transfer knowledge as it is to pass on information.

Knowledge is information that users learn, understand, and – if desired – practice. Communicating knowledge presents more challenges than transferring information for two reasons. One, it requires teaching and learning, and thus benefits from a back and forth exchange, rather than a one-way transfer. Two, much knowledge is tacit rather than explicit; trying to put this knowledge into words, particularly in unidirectional communication such as an online database, risks simply turning the knowledge back into information (van der Velden 2002: 29).

Thus, participatory communication provides the most effective way to transfer knowledge and, in Mode 2, generate new knowledge. The many-to-many communication that new ICTs

support has created entirely new opportunities for this. Participatory communication was possible before only through prohibitively expensive face-to-face meetings. New ICTs extend participatory communication capacity beyond borders of time and space and make it available to anyone with email.

This does not mean that new ICTs support the best means of sharing knowledge; Bellanet¹³, the NGO leading the way in promoting development collaboration, believes that the best knowledge transfer mechanism will remain face-to-face (FTF) contact (Song 2001: 49). However, new ICTs, and email discussion forums in particular, make knowledge networking available to a much larger number of people, across a much wider part of the world, over much greater period of time, at exponentially less cost¹⁴. As discussed in section 5.2, this is particularly effective when part of a larger programme, ideally including a FTF component.

Technology

If the poor are considered overtly at all, the feeling is that they must gain eventually from adopting the technology because the technology is development. (Heeks 1999: 12)

When new technologies are introduced to a different social setting, what is transferred is not only technology itself, but also the social use of it, a set of assumptions and practices that emerged from another context and other needs. (Dagron 2001: 23)

Coordinators of any project in any field should begin by establishing the project goals, then considering the possible means to reaching those goals, and finally choosing the best fit. However, sometimes they are blinded, and perhaps even guided, by what Heeks calls the “sales pitch and glitz of the new technology” (1999: 17). Schech argues that the technology enthusiasts follow a modernisation path, whereas the sceptics take a more post-colonial/dependency approach (2002: 21). This is likely one of the grounds that technology-driven projects, rather than need-driven, are more likely to fail (Chetley 2001, Box and Engelhard 2001).

ICTs have many of the disadvantages of nearly all technologies, i.e., they are expensive and they require infrastructure, regular maintenance, upgrading, and training for users; thus, the digital divide. They also can carry culture with them, as Dagron’s quote above indicates.

However, unlike the vast majority of successful technologies, the Internet (including email) is a public good. No one owns it and use by one person does not preclude the use by somebody else. The language used to link computers over the web is in the public domain, freely available to use however, whenever, and as frequently as desired for health, development or any other ends.

¹³ www.bellanet.org

¹⁴ Global Development Network (GDN) Steering Committee members at the GDN annual meeting in Rio de Janeiro in December 2001 estimated that this four-day meeting of 500 people cost in the range of US\$2million, excluding salaries of the GDN employees organising it (personal communication). All three programmes discussed in Chapter 4 could run for over four years on these funds, each reaching at least 1000 people each year (see Appendix B). The impacts are not directly comparable, but it does mean the ICT programmes are much more affordable and have a wider reach.

Digital Divides

Despite its massive potential, the current global information explosion has had surprisingly little impact on access to relevant, practical information for healthcare providers in developing countries. (Pakenham-Walsh 2002b: 2)

This study considers the relevance of new ICTs for health professionals who do have access to them and explores ways to extend the reach of the benefits of that access. However, at this time, only a very small proportion of health workers in developing countries have access to email, and a smaller number of those to the Internet.

For example, a survey of 57 healthcare personnel in Malawi found that only 3 (5.3%) had access to the Internet, and under half had a telephone in the office (Muula *et al.* 2003: 4). Those in academia tend to fare better; even back in 1998, a survey of Anglophone universities in LDCs found that 66% had at least some level of web access and a majority of the remaining respondents had plans in place to soon provide this access (Lund 1998). A 2001 survey found that about 40% of librarians and health information professionals in Africa had at least email access (Ibrahima 2003). Similarly, a survey of Southern development research institutes in 1999 found that over half of them provided access to e-mail to all staff (Squire 1999).

However, the divide is not only technical. An ICT research centre has identified three components of this divide from the user perspective:

- Access to technologies.
- Access to content and services.
- The value and utility of the content and services – including their relevance and ability to take advantage of them (GCATT 2002).

Thus, it is useful to talk about ‘the digital divide’ in the plural¹⁵. As discussed in the next three chapters, the best health ICT projects address the latter two divides directly and attempt to mitigate the effect of the first¹⁶.

¹⁵ These digital divides are one of the reasons this study does *not* discuss health applications of new ICTs for the general public. While even in 1998 the Internet was available in the capital of every country in Africa (Jensen 1999: 181), only 1 in 130 people in sub-Saharan Africa have access to a computer (Myers 2003). Access to the benefits of new ICTs is feasible for health professionals in developing countries, but affordable access for the majority of poor people is not in sight.

¹⁶ SatelLife (www.healthnet.org) has made great strides in bridging the technological divide with its global communications network, HealthNet. Starting in 1991 with satellites and ground stations (each comprised of an antenna, a computer, email software and a radio), this project now reaches 4000 health workers in LDCs with health information from the web and their ‘in house’ directories (Groves 1996). They also created GetWeb, which allows health professionals with email but not Internet access to retrieve online content in email format.

3 Applications of ICTs for Health Professionals

Because FTF interaction cannot be replicated using technology, ICTs are not and probably will never be the best means to all information and communication ends, for health professionals or anyone else. However, their revolutionary communication capacity and facilitation of information transfer do give them a place in supporting health professionals in developing countries – a place that this and the next chapter explore in detail.

This chapter considers the current and potential applications of new ICTs for supporting health professionals in the field. For those development health professionals who do have access to new ICTs, how can they use them and how do these uses compare to alternative means to reaching these ends? Using examples, each section below discusses a potential application, compares ICT versus traditional options and, in a few instances where evidence and experience make it possible, suggests some good practices¹⁷.

To draw out the detail of some of these applications in current practice, Chapter 4 examines three health ICT projects for health professionals in greater depth.

3.1 Professional Development and Training

ICTs have opened up distance education and training. While possible before via correspondence courses through post, tapes and radio, the Internet and CD-ROMs have widened the possibilities both pedagogically and practically.

Pedagogically, education using new ICTs can provide a more student-centred learning environment than some classrooms, and certainly in comparison to traditional correspondence courses (e.g., Hawkrigde 2000, Lockwood and Gooley 2001, McNulty 2002). Learners can choose when and where to engage with which material. Multimedia presentation – mixing images with text and audio – accommodates learning style differences more readily than the traditional ‘chalk and talk’ lecture. Software – whether on CD or online – can adjust to the choices learners make, including providing instant feedback to assessment questions and varying the question difficulty according to performance. Also, in comparison with old ICT means of distance learning, online learning allows collaboration and networking, and certainly offers greater geographical variety than a classroom experience. For example, in an online ‘ICTs for Developing Countries’ course, many students ranked these aspects of the course as the most valuable (Porter 2002).

Presuming learners have access to them, delivering education and training via new ICTs can reach more students across time and distance boundaries and requires less investment in physical and managerial resources than classroom-based learning. Of the new ICTs, CD-Rom courseware in particular can reach a much broader audience than online education, while being better able to include multimedia offerings because they do not have download time issues. Most of the online training and courseware aimed at health professionals in developing countries are also available on CD-Rom.

¹⁷ The use of the word ‘best’ is avoided here because the evidence and analysis in this section is not sufficient to justify it.

Examples

For example, EngenderHealth¹⁸ offers courses on sexual and reproductive health and on preventing infections. These demonstrate many aspects of best practice in pedagogy and access. The courses are organized in short, easy-to-navigate modules to hold attention. Objectives are clear and learning is reviewed with true/false testing and expanded with case study work. According to the project site, these courses ideally form part of a broader training program run locally, but accommodate stand-alone usage to “serve as an orientation or review for the more factual information.” The courses are technically as accessible as possible while remaining in ICT format; both are available on CD-ROMs (free for users in LDCs), are downloadable online and are available with or without images online. Additionally, the CD version of the infections course takes advantage of its format by being more multi-media and interactive than the online version. The CD includes a virtual tour of a clinic, video clips of a few infection prevention procedures, and interactive games and quizzes. This course is also available in Spanish.

The courses are in demand. EngenderHealth has filled approximately 2000 requests for the infections CD since launch in 1999 and the most popular content module of this course received 1,820 user sessions in three months during Spring 2003. (Landovitz 2003)

Two training projects discussed in the next chapter, the Malaria Online course on identifying malaria cases and the Supercourse library of lectures, are also available on CD. These are available at no cost.

Much of the literature on ICT distance learning lauds the efficiency gains (e.g., Gagne and Shepard 2001; Collis and Moonen 2001). Some short, single-topic courses – particularly those run without instructors – can be relatively inexpensive to create and reproduce. For example, each Malaria Online CD costs about seven pounds sterling to burn, package and post (including handling costs but excluding content development) (Sneddon 2003).

However, ‘converting’ a full course to a new ICT format while retaining engaging and facilitated collaborative content is expensive and time consuming (e.g., Phillip 2001, Smith *et al* 2001). For example, at the online learning subsidiary of a US university¹⁹, where I work as a learning designer, a team of learning designers, proofreaders, quality assurance officers, and media artists and technicians spend an average of 650 hours to produce a 6-hour online course. This excludes the time of the ‘subject matter experts’ (the professors) who provide the content for the courses and help adapt them for online usage, and of the instructors who mentor the ongoing courses. The price of taking one of these courses nears the £700 mark²⁰. Facilitated (i.e., with an instructor) professional and post-graduate courses for health professionals are generally not available for free.

¹⁸ www.engenderhealth.org. For another example of training CDs, visit www.fahamu.org.uk/health/chaos.html for the soon-to-be-released *Engaging with chaos - Managing Health services in conflict*, an interactive guide for humanitarian actors working in political emergencies.

¹⁹ eCornell (www.ecornell.com)

²⁰ The online “ICTs for Developing Countries” course, offered via the USDA Graduate School, is ‘only’ £200. In the year I participated, the instructor negotiated 10 scholarships from the School to allow students from developing countries to participate at no cost (Porter 2001). This course includes a health module. (www.grad.usda.gov)

Good Practices

Keeping the product cost considerations discussed above in mind, the following list describes some guidelines for best practice in designing online and CD-Rom training for health professionals. (It excludes general pedagogical best practice applying to all training and education, which is beyond the scope of this study.)

- *To improve access*—Make available online (ideally downloadable and with a text-only version available), on CD and in more than one language.
- *To reduce learner frustration*—Provide extremely clear instructions, navigation (including course map link from every page), and modular layout. Learner frustration is a key reason for high online course dropout rates (Hara and Kling 1999).
- *To engage learners*—Use pictures and, on CD-ROMs, animation; break up text (e.g., using mouseovers²¹, a series of pages, and links within pages) to reduce or eliminate the need to scroll. Text should be highly concise.
- *To engage learners and reinforce learning*—Illustrate content with case studies taken from a range of contexts that relate to the experience of the target group of learners.
- *To reinforce learning and motivate*—Include short tests providing immediate feedback, ideally related to the case studies presented. Ideally this includes a mix of ‘regurgitation’ questions to build confidence and more open-ended or branching scenario questions to stimulate deeper analysis. These scenarios can make the case studies more interactive, taking a problem-based approach to learning.
- *To promote participation and discussion*—Include at least one collaboration component, e.g., group project, email discussion lists, peer review of assignments. While course developers may not be able to provide the instructors, guidelines for a facilitator running the course locally or regionally could be included. Assignments that ask learners to apply the content to their own work are ideal.

In sum, new ICTs support an evolution in learning and training for health professionals in the field. With the addition of online and CD-Rom courseware, those with computers have a wider selection of courses available to them than previously and access to much greater variety of professional and geographical perspectives among their classmates. Also, these media allow great leaps in potential dissemination and cost reduction.

²¹ A mouseover is text that appears only while the user hovers the computer mouse over a particular word or words.

3.2 Information Dissemination

If all this information comes from the industrialized countries alone, and none of it is local, it could end up being seen as a form of information colonisation. –Chris Zielinski, as he announced making ExtraMED available to developing countries at low or no cost. (2001b)

In place of limited information coming from a few authoritative sources, many messages are now passed between growing numbers of individuals and organisations in increasingly networked societies. (UNFPA 2002:13)

New ICTs have revolutionised information dissemination by making it possible for everyone with a computer and an Internet connection to publish and disseminate their work cheaply and easily.

This has opened up global dissemination to many Southern individuals and organisations that could not afford the only previous option of printing and posting paper. Supporting online South-South and South-to-North dissemination plays a crucial role in making local health knowledge part of the global health knowledge (Pakenham-Walsh and Priestly 2002). It also helps counter the tendency of the Internet becoming merely another means of ‘information colonisation’ (Zielinski 2001b). Projects with a health component that support new ICT publishing and dissemination of journals produced in developing countries include Bioline²², ExtraMED²³ and two INASP programmes: African Journals Online²⁴ and Programme for the Enhancement of Research Information (PERI)²⁵. Other organizations, such as the UK-based NGO, Healthlink Worldwide²⁶, once a distributor of international newsletters for healthcare workers, have recognized the importance of supporting local publishing, and have shifted their focus to support regional and local publishers to produce their own materials.

Ease of dissemination also makes ‘desk chair’ development work possible, since people can easily contribute their efforts without leaving their homes or offices, even if they are not associated with development organisations. The Malaria Online project, discussed in detail in the next chapter, is one such example, and the medical library directory mentioned in section 3.2 is another. SA HealthInfo²⁷, a site specialising in health information relevant to southern Africa, capitalises on this by inviting specialists to manage online modules in their areas of expertise, from wherever they happen to be located.

Of course, information dissemination via old ICTs and print is still effective. However, because of logistics and cost, these avenues are not an option for many small organisations and for most individuals.

One crucial impact of this information dissemination revolution is multiplication of the voices in the health and development discussion, with much-needed amplification of input from the South. Another is improved access to information.

²² www.bioline.org.br

²³ www.iwsp.org/extraMED.htm

²⁴ www.inasp.info/ajol

²⁵ www.inasp.info/peri

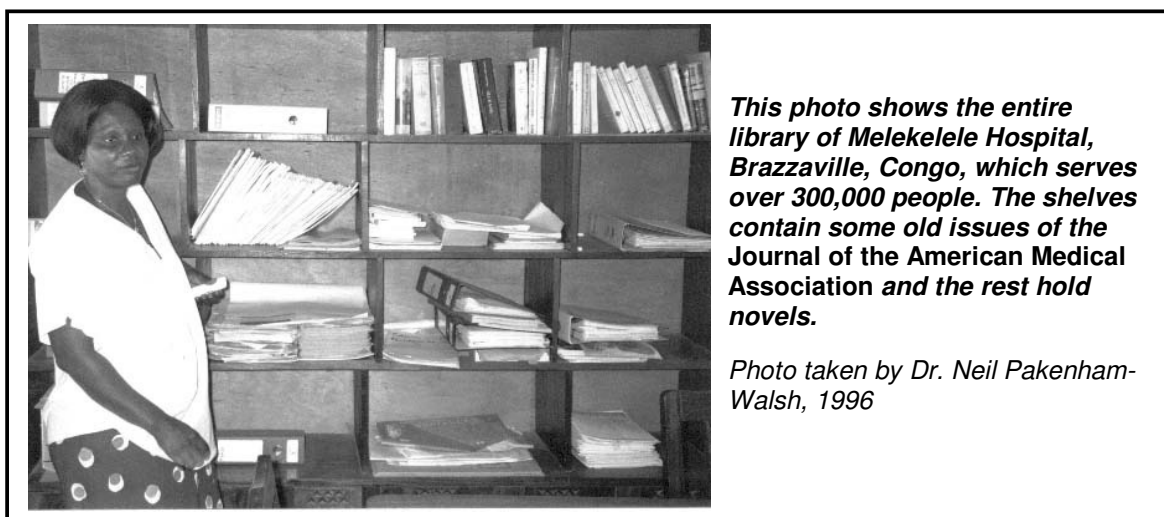
²⁶ www.healthlink.org.uk

²⁷ www.sahealthinfo.org

3.3 Data, Information and Resource Access

The web and CD-ROMs have already made publications, resources and data much more accessible and affordable for health professionals in developing countries because the marginal cost of providing these services has dropped dramatically.

As discussed in the previous section, disseminating printed paper is the traditional alternative for such access. However, the high cost of producing and distributing paper resources creates a health information divide perhaps as great as the digital one. For example, while a US medical library subscribes to about 5000 journals, when the founder of SatelLife visited the Nairobi University Medical School Library, he was told that they subscribe to just 20, down from 300 a decade earlier. One of his colleagues asked to see the library of a large district hospital in Brazzaville, Congo, and was shown a single bookshelf, much of which was taken up by novels. (Pruett and Deane 1998: 13; see photo below)



Online information access has several interactivity, space, cost, portability and share-ability advantages over print, including:

- *Free access to some subscription journals*—Because information is cheaper to produce and disseminate online, many subscription health journals are free online (see examples below).
- *Publishing speed*—ICTs have accelerated the submission, review and publishing process by making communication and document transfer cheaper and faster and allowing release online before a print version is even typeset, much less delivered through the post.
- *More background information*—Because e-formats don't have the space restrictions of print, many publications provide more details and data than is possible in print versions.

- *Discussion with other readers*—Some journals, such as the British Medical Journal (BMJ)²⁸, support instant feedback messages to individual articles, so discussion groups spring up around them.
- *Access to online-only information*—Grey literature, newsletters, NGO publications, and other resources are available online well before they are in print, and sometimes are available *only* online. Though books are still mostly available exclusively in print, ebooks are becoming increasingly available, particularly key medical references²⁹.
- *Links to related information*—Links between documents (e.g., to a web site mentioned or the full text of reference) are even more useful for extending the utility of online information.
- *Alerts to newly published information*—Some services offer email alerts of everything from an individual journal's table of contents to any and all new publications of relevance to one's field. This 'push' technology makes it much easier for professionals to stay up to date.
- *Ease of navigation*—Electronic copies are more usable than print in that they can be searched for keywords, copied and pasted, and both saved and shared with others at no monetary or space costs. Links within documents make them easier to navigate (e.g., jumping with a click to another section) than paper documents.
- *Portability and share-ability*—E-resource portability in PDAs means health professionals can have key references to hand in the field (see section 3.4 for an example in practice). E-formats are also easier to share with colleagues; many online publications even have an 'email this to a colleague' feature to facilitate this.
- *Living documents*—Some information goes out of date even before the journal containing it has been printed and posted. The web supports continuous updating and publishing to keep a publication relevant. The Cochrane Collaboration,³⁰ which maintains constantly updated reviews of health care interventions, is an excellent example of this. INASP-Health hopes to secure the funding and authors for something similar in the area of information access for development health professionals.

Examples

Several ICT initiatives make journals and other publications available to health professionals in developing countries. HINARI³¹ is the most extensive; public institutions in over 100 developing countries subscribe to 2,100 journals for around the price of a normal library subscription to *Nature*, which is one of the 2,100. The AJOL, PERI and ExtraMED resources mentioned in the previous section also are available at no cost to developing countries. For example, via PERI, eMedicine.com provides free access to its online clinical library for users in poor countries.

²⁸ www.bmj.com

²⁹ For example, see the PDA tab on www.emedicine.com or Amedeo's www.freebooks4doctors.com.

³⁰ www.cochrane.org

³¹ HINARI is the Health InterNetwork Access to Research Initiative, a WHO and publisher-sponsored project that provides low-cost and, for the poorest countries, free access to health and other social science journals for developing countries. (www.healthinternetnetwork.org)

POPLINE³² provides perhaps the most accessible model of all. This project maintains the world's largest database of reproductive health resources, providing it online and on CD-ROM, along with a customised e-mail alert service of new items added each month and full text PDF or paper document delivery free of charge for developing countries. On the CD, users can search using English, Spanish or French interfaces.

Results of their 1997 evaluation confirm their relevance: 100% of their LDC-based users said they would use it again and 95% of all users said they had recommended it to a colleague (POPLINE 1998: 8). The stories users tell about the impact it has had on their work are also informative. Several say they had access to almost no information before POPLINE, others mention how resources influenced policy changes, aided funding applications or saved their organisations significant amounts of time and money. For example, one lecturer says, "POPLINE was my first regular contact with the foreign literature and it still has the most important source" (POPLINE 1998:12). This year, 2003, POPLINE is running on an approximately £872,000 budget funded by USAID (Compton 2003).

Health reports and publications by or commissioned by NGOs, think tanks, and national and multi-lateral donors are also normally available online and sometimes can be ordered as paper copies at no cost. Some journals are also currently available for free online to the general public. These arrangements can change, however, as online publications becomes more standard and some users give up their paid paper subscriptions. For example, the BMJ, while currently free, has just announced that they will charge for full text access starting in 2005; though importantly, low and middle income countries will still have free access (Delamothe and Smith 2003).

Reusable health promotion resources are also available online via services such as the Health Communication Partnership³³ and Tools For Life³⁴.

To help health professionals navigate this wealth of information, many ICT projects provide directories or link lists about these resources. For example, Amedeo³⁵ hosts lists of free journals in over 6 languages, medical ebooks, and also provides a free alerting service. The Source³⁶ maintains development-focused directories on disability, primary health care, and TB. The best and most complete examples I found in my work are hosted by INASP-Health and are discussed in detail in section 4.1.

Good practices

Guidelines for providing accessible publication, resource and directory sites are the same as for education – available online, on CD, and ideally in more than one language. Paper document delivery, such as what POPLINE provides, is also ideal, though well beyond most project budgets.

To make usage easier and more intuitive, page design and navigation guidelines include:

³² <http://db.jhuccp.org/popinform/basic.html>

³³ www.hcpartnership.org

³⁴ www.jhuccp.org/africa/tools

³⁵ www.amedeo.com; this project is part of Flying Publisher (<http://flyingpublisher.com>)

³⁶ www.asksources.info

- Using consistent navigation on every page, including a link to home.
- Providing a simple search option for any databases, with a link to a more advanced interface for experienced users.
- Categorising every entry.
- Making directories and databases browseable by topic. This helps users unfamiliar with searching and means they do not have to guess at terms or spellings (US or Commonwealth) used in the content. Indexing³⁷ each entry also solves the latter issue.
- Including an abstract or other description of every item in a results list. This helps users avoid wasting time and money following irrelevant links.
- Posting last update dates.

One of the biggest challenges health information seekers face is finding quality, relevant information (Driscoll 2001, Edejer 2000, Groves 1996). Directories are one of the best ways to solve that problem. (Authoring and adapting existing content to increase its relevance is another, as discussed in section 5.2).

Directories

The quantity of online information is a barrier as well as blessing. Finding high-quality, relevant information is a challenge even with a high-speed web connection and sophisticated searching skills. For people with slow, expensive connections and/or limited searching experience, it is nearly impossible unless they are provided with direct links to the resources they seek.

As the project co-ordinator for the Kenya-based AfriAfya³⁸ project says, “Web resources can improve the quality of content and presentation for local health information production. Sites that can summarize reliable accurate information become of particular interest as searching the vast www on bad slow connections can be an absolute nightmare.” (Nyamai 2002)

Maintained, indexed and edited directories of high quality resources relevant to health professionals in developing countries solve this problem. This is relatively straightforward, but resource-intensive.

Directory maintenance poses two challenges: link rot of existing listings and timely inclusion of new relevant entries. For any web site with external links, link-rot (changing web links) can quickly degrade its content. For example, at the time of this writing, of 112 web sites recommended to African health communication professionals in a recent book (Alali and Jinadu 2002: 327), only half pulled up the intended page. Of the failed links, eight triggered a cascade of image-intensive pop-up ads in a series of browser windows. Given that a key reason for providing such directories is saving users expensive navigation and download time (this was explicitly the reason for the link list in the book), maintaining accurate links is

³⁷ Indexing means labelling entries with terms from a controlled vocabulary, or list of words, that describe the entry's content. For example, the US National Library of Medicine's MeSH terms are used to index MEDLINE citations.

³⁸ www.afriafya.org. See section 5.2 and Appendix B for more project details.

important. Fortunately, a small investment in link checking software³⁹ can at least let site managers know when a link has died, though time-consuming manual testing is then required to check and correct these.

Keeping directories current with new resources is even more labour intensive, requiring regular, active maintenance. For example, Lenny Rhine, who maintains INASP-Health Links (discussed in greater detail in section 4.1), estimates that he spends 5-8 hours a week keeping this directory updated. In the year he founded the list he spent three times that (Rhine 2003). Combined with the INASP manager's time spent on this project (Pakenham-Walsh 2003f), this service requires over 10 full time weeks of work each year.

Editing decisions also pose challenges. What is the scope of the directory, how should it be organised, and how is 'quality' and 'relevance' to be judged? Ideally, an advisory group representing the target users would support the directory editor in developing parameters and policies, reviewing the directory, and providing feedback on unclear cases. (This holds for publication databases as well.)

Once sites are accepted inclusion, the editor(s) must draft descriptions and index or categorise them before posting them. If the directories are available on CD and/or paper, editors must decide how often to revise, republish and redistribute these.

Not only do good directories provide health professionals with direct access to quality, relevant information, they also help avoid costly duplication and support evaluation efforts by mapping ongoing efforts. They are an excellent investment and should be funded accordingly. However, while a good directory requires ongoing investment, and other online information and resource projects can find funding, creating and maintaining the directories that map them is still normally done by volunteers in their 'spare' time. For example, Dr. Rhine's work on INASP-Health Links as well as on the gateway links directory for the AIDS portal of the SA HealthInfo project mentioned earlier in this chapter is unremunerated (Rhine 2003). This lack of funding is short-changing a crucial tool for maximising the benefit of health and development ICT projects.

In sum, new ICTs have not significantly changed why or how information is used. However, by revolutionising dissemination, they have radically increased how much information is available to those with access to these technologies.

3.4 Information and Knowledge Management

By facilitating data collection and analysis, information distribution, and communication, new ICTs have helped health organisations maximise their effectiveness and efficiency. The case studies below have already demonstrated evolutionary but impressive impacts because the paper and post alternatives are much more time consuming and, therefore, expensive.

PDAs can play a prominent role in data collection from and information distribution to the field. SateLife has played a key role in demonstrating their effectiveness. For example, in

³⁹ See www.softwareqatest.com/qatweb1.html#LINK for a list of such software. Link checking cost around £15-100/year, depending on the number of links and frequency of checks.

2001 they distributed PDAs to thirty Ghanaian Red Cross volunteers about to embark on a measles immunisation campaign. After two days of training, the volunteers completed over 2,400 surveys in just 3 days. This compares to the 200 normally yielded by the previous paper and pen method. Data was turned in, analysed, and reported to the health ministry by the end of day four. “The speed and ease of gathering this epidemiological data was unprecedented” (SatelLife 2002).

Phase two of this project took advantage of other capabilities of the technology, demonstrating PDA usefulness not just for collecting data but also disseminating information to support health professionals in the field. This information included drug databases, disease treatment guidelines, medical textbooks and a medical calculator. The evaluation reports “all of the students who had specifically relevant content on their PDA reported that it was useful during [patient care] rotations and it helped them improve patient care” (Bridges.org 2003: 20).

Another great success story is the use of ICTs to control river blindness. Health professionals in the field beamed local data via satellite to central laboratories, and spraying was scheduled accordingly, eliminating this disease in seven countries over 20 years (World Bank 1999: 60).

AfriAfya has also had success with applying new ICTs to information and knowledge management. The project co-ordinator writes:

In the Kwale district where we have been working with the district medical officer’s office, using ICTs has enabled him process the monthly returns coming in from the 57 facilities in the district and give feedback to the facilities. This whole process has increased reporting rates and the timeliness of reporting. It has further allowed him to target interventions based on information on what the key problems in a particular locality are. Immunization coverage has gone up from being one of the lowest in the province to now being one of the highest in that province. (Nyamai 2002)

Two other ways new ICTs aid information and knowledge management are providing greater access to resources on managing health care and easing ongoing feedback collection and impact assessments. The Manager’s Electronic Resource Center⁴⁰, the Health Systems Resource Guide⁴¹, and a recent report from an NGO on improving healthcare using ICTs (AIHA 2003) are examples of the former. Examples of the latter include WHO using the HIF-net at WHO discussion list to distribute surveys on the usage of their services and INASP-Health employing this list to inform the other services they offer (e.g., replying to questions posed to the liaison service, identifying new links for INASP Links, suggesting topics for the next HIF meeting, etc.) (Pakenham-Walsh 2003c).

3.5 Telemedicine

Formal telemedicine – providing clinical diagnosis, treatment, or advice at a distance – remains in experimental stages (Mansell and Wehn 1998: 86). However, consultations with peers via email are already common (AIHA 2003). Consider, for example, the story below:

⁴⁰ <http://erc.msh.org>

⁴¹ www.healthsystemsrc.org

On 23 September 1996 Professor Praveen Aggarwal in New Delhi appealed to doctors and researchers around the world for help. "We are facing a near epidemic of dengue haemorrhagic fever in Delhi, India," he said. "Despite managing these patients on the lines stated in textbooks, many of our patients are dying. I wonder whether we are erring somewhere in diagnosis and management of these patients. Therefore, I request you kindly email me some of the recent information on pathogenesis, diagnosis, and management of these patients." Professor Aggarwal had sent his plea by electronic mail through a global computer network called HealthNet. Prompted by this appeal, a team from the World Health Organisation's regional office for South East Asia visited Dr Aggarwal's hospital the next day, bringing advice on staff training and two brand new reports on managing dengue haemorrhagic fever. Over the next 10 days Dr Aggarwal was offered help by a doctor with 10 years' experience of treating the disease in Rio de Janeiro and put in touch with another doctor in Bangkok who worked at the centre of a major dengue epidemic last year. (Groves 1996)

Telemedicine offers great potential in making the most of scarce specialists and providing better care in rural areas. However, issues of patient privacy and, more immediately, reliability of the technology (the electricity going out in the middle of a remotely guided operation could have deadly consequences) have prevented widespread adoption beyond email, telephone and videoconferencing consultations.

Telemedicine is an evolutionary application of new ICTs; it won't change medical care itself, but will make it more widely available.

However, using email forums and other communication technologies to discuss and develop medical knowledge and understanding is revolutionary, as discussed below.

3.6 Networking and Collaborating

New ICTs have revolutionised networking and collaboration by allowing two-way, many-to-many, demand-driven communication for the first time. The applications discussed here can and sometimes do make development communication more participatory, collaborative, multi-directional and, unlike the only alternative – FTF meetings, they do it affordably.

Email one-to-one and one-to-many

One-to-one email – i.e., email between individuals – has made asynchronous communication easier, more efficient and, often, less expensive. This holds particularly for international communication.

For example, a Ugandan study of professionals found that they used e-mail mainly to communicate outside Africa or within Africa but outside the country, with reported benefits in descending order of importance as: saving time, improving professional productivity, improving quality of work and less dependency on others for information (Asaba and Bamuhiga 1998).

Similarly, a doctor of Bugando Hospital, Tanzania, says that before SatelLife had provided access to email:

Our eight hundred bed Catholic Teaching Hospital, serving seven million people, relied on telephone calls and faxes for securing donations of materials and funds. Even short-term medical volunteers were secured by that expensive mode, totalling over five thousand dollars a year phone/fax charges! Since HealthNet appeared in the sky, we have increased our ability to raise funds, recruit personnel and acquire materials.⁴²

One-to-many email – e.g., sending out a newsletter to a user group – is less communication in the participatory sense than information dissemination, but it still can play a role in establishing and reinforcing networks by keeping members up-to-date and in touch with the central programme office. For example, while I found nothing in the development literature about newsletter impact, when a web-based firm⁴³ I work with began sending weekly newsletters signed by the university services director to a university management user group, the director immediately began receiving more regular email and telephone contact from the users and she feels they now receive her more warmly when meeting face-to-face (Robey 2002).

Email used in these ways is a cheaper and faster alternative to telephone, postal mail and face-to-face meetings. However, it is less personal than verbal communication and, for newsletter distribution, excludes a large swath of people without email access, so the speed and cost advantages of email must be balanced against these less tangible costs on a case-by-case basis.

Online conferences

New ICTs have two conference applications – one is to broadcast live FTF conferences, and the other is to support ICT ‘meetings’ either synchronously or asynchronously via email or online.

For webcast FTF conferences, receiving audio over a slow Internet connection is difficult, and video is impossible. For those paying by the byte, it is also expensive. Logistics can also be a problem. For example, my experience trying to listen to a broadcast INASP-Health Health Information Forum (HIF) session⁴⁴ was unfulfilling (even with a high-speed connection) for two logistical reasons. One, the session began about a half hour late, but an online notice announcing this did not appear for the first 15 minutes or so, and I spent this time trying to understand what I was doing wrong. Two, while speakers could be heard clearly, the many comments from the floor were inaudible.

This session was also broadcast on WorldSpace Radio⁴⁵, which uses satellite to broadcast digital audio radio and even multi-media content across Europe and most of the developing world. So while the logistical problems would be the same, anyone with a receiver could listen in as easily as I did. In fact, participants at a hospital in Kenya, who were also meant to participate by phone (that communication technology failed totally in this instance), reported a similar experience using WorldSpace. They also pointed out that the time (late evening in Kenya) made it impossible for many staff to take advantage of the service (Dahlman 2002).

⁴² Dr. Peter LeJacq, quote previously on the SatelLife/HealthNet website: www.healthnet.org

⁴³ www.cos.com

⁴⁴ This was broadcast on September 18th from the 2002 eHealth conference.

⁴⁵ www.worldspace.com

The publicity for the event specified that this was an experimental learning experience to see what works and what doesn't. Lessons learned are being put into practice for future HIF meetings. These included that "we probably over-did it on the experimentation (we were testing several new approaches at once), and we should have paid more attention to getting the technical side running well in advance" (Pakenham-Walsh 2003a).

A more recent example is the 'Global Forum on Health and Development: Summit of the African Union', a videoconference forum held on 10 July 2003 between African heads of state and global partners, meant to achieve a joint commitment on scaling up action against HIV in Africa. This was videocast live online and broadcast on WorldSpace. It is still available on archive⁴⁶, along with transcripts. However, for those listening in, much of the speaking was impossible to understand, as indicated by the over 580 instances of the word 'unintelligible' in the official transcript (Kaisernetwork.org 2003).

Appointing a broadcast host who can narrate for the listeners, and providing microphones for participants commenting from the floor can overcome the logistical problems. However, remote participation, via whatever technology, will always pale in comparison to being there, since the FTF networking function is lost.

Participatory online conferencing, however, has more potential. It cannot replace FTF meetings, but can supplement them by laying the groundwork for them in advance, including agenda setting, and by continuing discussion and debate after the meeting has closed. This has several potential benefits including:

- Increased participation from network members in shaping the conference.
- Improved efficiency and focus at the FTF meeting since the groundwork for debate has been laid and attendees come better prepared to address the issues on the agenda.
- More value extracted from the meeting as the knowledge sharing and generating as well as work projects decided upon can continue long after everyone has gone home.

Online conferences have also been used to run along side of FTF meetings or stand-alone. For example, the World Bank ran a 25-day online conference⁴⁷ around a one-day FTF meeting on anti-retroviral treatment for HIV infection in developing countries.

In practice, asynchronous online conferences normally work as focussed and temporary email discussion forums⁴⁸ with the moderator playing a particularly prominent role in guiding and facilitating the discussion. Often the discussions are by invitation only. The relevance and best practices for email forums are discussed in detail below.

To date, little to no research has been done to determine best practice in this area. Analysis of archives of past online conferences and interviews with participants would be helpful, but are beyond the scope of this paper. However, online-only conferencing clearly has the capacity to

⁴⁶ See www.healthcomms.org/news/vidconf-au.html or search www.kaisernetwork.org/health_cast

⁴⁷ www.worldbank.org/aids-econ/arv/index.htm

⁴⁸ In fact, one of the most successful health forums, 'African Networks for Health Research & Development' (AFRO-NETS), refers to itself as an electronic conference. See www.afronets.org.

potential to bring health professionals together in debate and discussion for a price and convenience that only new ICTs allow.

Expertise networks

As in most disciplines, professionals in health have relied on personal networks built via publications and conferences for building collaborative partnerships, and this will probably always be the case. However, new ICTs have created a third means of building and maintaining collaborative relationships. In particular, this third way supports multi-disciplinary collaboration while helping to reduce the professional, financial and geographical barriers that traditional networking means have posed, thus improving networking both South-South and South-North.

New ICTs can support expertise networks through discussion forums and online conferencing, as discussed in other sections, and also with expertise databases – extended curricula vitae catalogues of people and organisations.

These can be internal, as part of an information and knowledge management strategy. For example, INASP maintains an internal database of thousands of organisations, about 800 of which are specific to health information development. INASP uses this catalogue to generate an online and printed directory and to inform their advisory services (see section 4.1 for more details).

Or they can be external, as a public or network-member resource to help those with web access can find the health expertise they need whether as collaborators, consultants, or peer reviewers. General development examples include SHARED⁴⁹ and WIDE⁵⁰, which profile both people and organisations. In health, The Source maintains a contacts directory⁵¹ of disability specialist organisations, hosted by the Institute of Development Studies (IDS)⁵² in England, and INASP-Health provides a directory of organisations working to improve health information access. MedicineOnEarth.com is an example of a selective database of medical professionals ‘dedicated to medicine’⁵³.

Also, an Aspen report suggests that expertise ‘talent banks’ of expatriates ready to advise their nations can help ameliorate brain drain effects (Dyke 2000: 56). The South African research council, National Research Foundation, has already put this into practice with SANSA⁵⁴ – South African Network of Skills Abroad, though impact has yet to be assessed.

Catalogues of expertise did, of course, pre-date the Internet. Paper directories were compiled by a number of organisations, the longest standing example being the Association of Commonwealth Universities (ACU) *Yearbook*⁵⁵, which lists the professors at nearly every

⁴⁹ <http://shared-global.collexis.net/main.asp>

⁵⁰ www.wide.org.br

⁵¹ www.ids.ac.uk/data/source/source_cont.htm

⁵² IDS has extensive experience in creating and maintaining development information directories for and with partners. Their health-specific collaborations are the Gender and Health Equity Network and the Health Systems Resource Guide. See Appendix B or www.ids.ac.uk/ids/info/index.html for more details.

⁵³ www.medicineonearth.com; this project is part of Flying Publisher (<http://flyingpublisher.com>)

⁵⁴ <http://sansa.nrf.ac.za>

⁵⁵ www.acu.ac.uk

Anglophone university outside the US. However, the relative ease and lower cost of collecting and disseminating this information online has made them easier to create and publish. The sheer volume of information alone, if providing more than name and position, makes them unsuitable for paper dissemination.

The capacity of the web to support ongoing updates from any location, nearly unlimited text and searchability make creating and maintaining in-depth expertise databases of people and organisations possible. Their content is also easily reusable by creating different database views of the data; many of the database directory projects IDS hosts are sourced from a single, giant database.

However, particularly for databases of people, maintaining quality and updated content is even more challenging than for directories of information resources discussed earlier. Few systems have methods for keeping them maintained and, including attempts of organisations to catalogue their own expertise, many more attempts have failed than succeeded (Porter 2001). Expertise database networks require ongoing investment of time and funds to be sustainable, focused goals, as well as detailed strategies for keeping them updated.

Email forums

Email discussion forums are the single most exciting and revolutionary application of new ICTs because they allow, for the first time, many-to-many communication. When well moderated, they provide an ideal medium for participatory development communication. The moderator of one active forum said about the relevance of email forums to developing countries:

Development policies and strategy need to be responsive to – indeed they need to be driven by – the needs and priorities of the individual countries concerned. For this to be realized, all stakeholders in a community of interest need to be able to share experience, ideas, and perspectives (Pakenham-Walsh 2003c).

In terms of the digital divide, email forums have the added advantages of being low bandwidth and inexpensive (in direct costs, excluding moderator time) to run⁵⁶ while requiring almost no technical knowledge to participate.

Examples

Discussion forums for specific diseases, professions, and/or regions abound. But of the dozens (or more) of health and development email discussion forums currently available, in practice most function simply as information dissemination tools that send out details of new publications, conferences, and the like. Dissemination is important, but this does not take advantage of the communication capacity of this medium.

A few forums truly host debate, discussion and discourse between health development professionals. The examples below take advantage of the revolutionary potential of this tool.

⁵⁶ Find a list of some email discussion group management software at www.summitcollaborative.com/mailtools.html. For example, the option at www.jiscmail.ac.uk/maillinglists/feepaying.htm supports lists at a cost about £1 per year per member.

- *African Networks for Health Research & Development* (AFRO-NETS) facilitates collaboration between African public health networks and professionals in areas including capacity building, planning, and research (www.afronets.org).
- *AHILA-net*, the discussion forum of the Association for Health Information and Libraries in Africa, focuses on information provision, professional development and knowledge sharing among African health librarians (www.ahila.org).
- *SEA-AIDS*⁵⁷ facilitates e-networking and discussions on HIV and AIDS in South East Asia and the Pacific.
- *Nigeria-AIDS eforum* discusses current issues and information about HIV/AIDS in Nigeria. It was founded by Journalists Against AIDS (JAAIDS) Nigeria as a means of encouraging active and accurate coverage of related issues in the media (www.nigeria-aids.org/eForum.cfm).
- *HIF-net at WHO* is a global, multi-sector discussion dedicated to issues of health information access in resource-poor settings. This forum is discussed in detail in the next chapter as an example of best practice.

These forums have a participatory communication reach that only email makes possible. For example, SEA-AIDS has grown from 700 members in 1997 to over 2800 today (Deany 1998 and website). ‘Stories’ about its usage include it being an ‘essential’ tool for planning the Manila 1997 AIDS Congress (Deany 1998) and a UNAIDS staff member in Vietnam receiving help from SEA-AIDS colleagues with estimating the approximate number of condoms needed to prevent the spread of STDs in the commercial sex industry (France 1997). Half of their members say that they have continued forum discussions one-on-one ‘offline’ as well, extending its networking benefits beyond the forum itself (Deany 1998).

Nigeria-AIDS has also grown considerably, from 320 subscribers to over 1000 today, with an average of five messages a day. According to their site, many members say that it is their main source of information on HIV/AIDS and the site is increasingly quoted as a source in the regional media.

⁵⁷ See <http://archives.healthdev.net/sea-aids/> for current archives and www.hivnet.ch:8000/asia/sea-aids for archives previous to October 2001.

⁵⁷ For example, in 1999 a European research administration discussion forum I used shut down for weeks to allow a flare-up about NATO bombing in Serbia to subside, but only after the forum had haemorrhaged members.

Good practices

Discussions initiated are merely between members of Northern countries..., which does not provide useful solutions/debates/discourses from within the African context. –Comment from a forum user (Driscoll 2001: 22)

As more networks are established, it is inevitable that the job of moderator will become, like that of a journal editor, more and more vital to successful communications strategies, more common and more in demand (France 1997).

Characteristics of a successful discussion forum include membership that is representative of the forum target groups, active and representative participation, contributions that are topical and clear, and easily navigable message threads both as they arrive and as they are archived. This requires some technical tools for hosting, but mainly wise and proactive moderation.

Some good practices to achieve a successful list include:

- *Vet messages before posting*–The moderator(s) vetting submitted messages before they go out to the forum keeps the forum on-topic while preventing inappropriate⁵⁸ or unclear messages as well as spam.
- *Set clear scope and policies*–Setting clear parameters for topic, membership, and acceptable message type (e.g., will notice of commercial products, requests for funds, or job hunting be permitted?) from the start helps keep the forum focused and eases the moderators' decision making and decision defending.
- *Establish a user committee*–An advisory group, ideally composed of representatives of the target membership, can help set appropriate policies, advise the moderator on questionable submissions, and perhaps even share occasional moderating duties.
- *Moderate strictly and actively*–If the moderator checks messages for clarity, relevance, and working URLs, this increases the usability and sustainability of the forum. Users will unsubscribe if they feel the messages are not useful to them.
- *Solicit contributions*–If moderators encourage contributions offline from underrepresented groups, organisations they know to have experience in a current thread, or people who are not participating proportionately, the forum will be more participatory and informed.
- *Give personal attention*–While offline contact with 1000 members isn't feasible on an ongoing basis, a personal welcome from the moderator to new members can help them feel part of a community and establish approachability. Personal goodbyes for unsubscribers also provide an opportunity for ongoing evaluation.
- *Attach member profiles to messages*–HIF-net at WHO works with members to create short personal profiles that are attached to their submissions. This helps build a community and aids interpretation of contributions.

- *Provide summaries of discussions*–For a discussion with a number of contributions in the thread, an edited summary helps members assimilate and draw conclusions from the debate.
- *Integrate the forum with other services*–When a forum is just one part of a wider programme, the components can complement one another and serve members more effectively. This can both make each piece more cost effective and improve impact. This is discussed in greater detail in the INASP-Health case study below.

Forums with small membership numbers, a specific discipline and region focus, clear rules, and permission-only registration can with a passive moderator (i.e., submitted messages go to the members automatically)⁵⁹. But as forums grow, the number of irrelevant or unclear messages can quickly add so much ‘noise’ to the conversation that they can no longer function effectively for group communication. (Driscoll 2001, Pakenham-Walsh 2003c)

3.7 Summary

This chapter discussed six main applications of new ICTs for supporting development professionals:

- Professional development
- Information dissemination
- Data, information, and resource access
- Information and knowledge management
- Telemedicine
- Networking and collaboration

All of them need more research to determine their impact and develop best practices. All of them can be and are being used by health professionals in developing countries to aid their work. Most of them supplement more traditional means of reaching these ends. Two of them - dissemination and networking – have been revolutionised by new ICTs, creating new information dissemination and communication opportunities and supporting a truly global conversation between health professionals.

⁵⁹ In these cases, the ‘reply-to’ should be set to go to the contributor, not to the whole list, to prevent accidentally sending personal notes to the list and filling the forum with auto reply notices.

4 Networked for Health?

This chapter examines three projects, particularly the INASP-Health programme, to:

- Illustrate some of the applications discussed in the last chapter in greater detail as they are used in practice.
- Extract best practices from successful projects and learn from any less successful strategies.

I selected these three projects to represent some of the most promising and/or innovative applications of new ICTs being used to support health professionals in developing countries, while excluding projects that have been extensively reviewed elsewhere, are too extensive to fit the limited scope of this study, or where project information was not readily available from project managers, online or in the literature⁶⁰.

In particular, this study focuses on INASP-Health because it demonstrates best practices in several areas, including the successful use of an email forum to support the many-to-many communication between health professionals around the world that new ICTs have made possible.

The Malaria Online project exemplifies the revolutionary information dissemination possibilities new ICTs have created and employs them to provide professional training in diagnosing and treating malaria.

Supercourse, which blends several applications in one project, points to new ways of using new ICTs to support health professionals. Still in its experimental stages, it demonstrates how much wilderness is left to explore about how these new tools can and should be employed.

The following three sections describe each project – including services offered, usage, and costs – with notes on their strategies for overcoming access barriers and other successful practices that can inform similar efforts to use new ICTs to support health professionals in developing countries.

4.1 INASP-Health

Providing access to reliable health information for health workers in developing countries is potentially the single most cost-effective and achievable strategy for sustainable improvement in health care. (Pakenham-Walsh et al, 1997)

INASP-Health⁶¹ is a cooperative network of more than 1000 organizations and individuals worldwide, working to improve access to relevant, reliable information for health professionals in developing and emerging countries. It does not itself provide health

⁶⁰ This chapter should have included an ICT project based in a developing country, however, per the notes on gaps in the literature in Chapter 2, information availability on these projects is limited. In particular, I had hoped to include more notes on AfriAfya, but was unable to access the website until the late stages of this study. This project is discussed briefly in section 5.2 on best practices; lessons learned from this project are quoted throughout the paper.

⁶¹ www.inasp.info/health

information, but works to improve access to it by facilitating communication and sharing of experience among organizations and individuals who share an interest in meeting the information needs of health workers in developing countries.

In addition to demonstrating best practice in several areas of using new ICTs to support health development professionals, INASP-Health provides a particularly illustrative example of the revolutionary communication networking potential of new ICTs in practice.

Launched in 1996 and based in Oxford, United Kingdom, it is a part of the broader INASP (International Network for the Availability of Scientific Publications) programme. INASP-Health currently has only one staff member, Dr. Neil Pakenham-Walsh, who serves as senior programme manager.

In 2002, he ran the programme on a small annual budget of £95,000, including his own salary (Pakenham-Walsh 2003e). This sum includes overheads, costs for all the services below (Table 2), and costs of preparing and organizing a range of projects, publications and workshops in developing countries around priority issues in health information access (especially local creation and adaptation of health information; and continuing medical education) as well as workshops in health information development in the UK.

This is all made possible partly through volunteer labour (detailed in Table 2), some technical services from WHO, and support for HIF meetings from the BMJ.

Table 2: Services Offered by INASP-Health

Services	Notes and Comments
<p><i>Health Information Forum (HIF)</i>—A series of UK-based meetings of users and providers of health information.</p>	<p>Started in 1998, the Forum provides the only 'face-to-face' opportunity in the programme. The British Medical Association and Exchange fund meetings, so they are free for participants. Participation from those based in LDCs via email, audio casting, and videoconferencing and, occasionally, through funded FTF 'study visits'. Proceedings and notes from each meeting are posted online and distributed over HIF-net. The volunteer organizing group (primarily based in the UK) plans topics, informed in part by HIF-net.</p> <p>Face-to-face meetings provide a rich environment for the emergence of new ideas and approaches. For example, HIF-net at WHO was first conceived in a Forum workshop, as was the Waystations concept, described in section 5.2 of this study. The idea to form INASP-Health itself emerged in response to demand for such a programme expressed at an international conference held at the British Medical Institute in 1994.</p>
<p><i>INASP-Health Directory</i>—Lists over 240 international organizations that provide health information or support library development.</p>	<p>The <i>Directory</i> is available online, in print and, soon, on CD-ROM (via the eTalc⁶² service). Contractors and the manager compile and maintain it. Each listing has a multi-paragraph description and contact details. Users can search or browse the entries. The <i>Directory</i> and <i>Links</i> together cost circa £7000pa to produce and distribute on paper, CD and online, not including time from the webmaster or ongoing editing by the manager.</p> <p>The <i>Directory</i> follows most of best practice for such services (see notes on the Links service below).</p>

⁶² www.e-talc.org

<p><i>INASP-Health Links</i>– Lists over 500 Internet links relevant to health professionals in LDCs.</p>	<p><i>Links</i> is available online, on CD and in print. Sites are vetted for quality, accessibility (e.g., languages, download times, reliability, design), relevance to developing countries, and absence of copyright. Web address accuracy is checked every 6-8 weeks. Brief descriptions explain what each link offers. It is compiled by a US-based volunteer, Lenny Rhine, in collaboration with Neil Pakenham-Walsh and is monitored by a volunteer advisory group based in Africa and, soon, in several other LDCs.</p> <p>This service demonstrates best practice in assembling online directories (see section 3.3). It is vetted by both the author and a user group, regularly verified, relatively easy to navigate, includes descriptions of each link, and is available in several formats. The site is accredited by the Health on the Net Foundation⁶³.</p>
<p><i>INASP-Health Advisory and Liaison Service</i>–A networking service facilitating collaboration and experience sharing in response to requests.</p>	<p>The manager calls this the “initial building block” of the programme. Referring to an internal database 700 organisations and forwarding queries to HIF-net as needed, he helps link development partners, individuals and organisations. Over 500 substantive requests relating to health information development were handled in 2002, of which half were directly from colleagues in developing countries.</p> <p>This personal service extracts additional value from the various INASP-Health components and INASP’s broader network and takes advantage of the manager’s implicit knowledge, making the whole add up to more than the sum of its parts and knitting the components together.</p>
<p><i>Local HIF</i>–A capacity-building programme facilitating local workshops and the centre of efforts to support creation of regional and national communities of interest or local HIF networks.</p>	<p>The capacity-building programme is the newest component of the INASP-Health programme. Like all other components, it is being introduced in response to demand, and is synergistic with all other components of the programme. The emphasis is on strengthening national and local capacities for multistakeholder networking.</p> <p>Supporting in-country cooperation among key health information players is currently INASP-Health’s priority because strong communication among stakeholders within countries is essential if they are to set and own their development agendas.</p>
<p><i>Health Library Partnerships Database</i>– A directory of partnerships between libraries in ‘developed’ countries and developing countries.</p>	<p>This database is available online and maintained by volunteer labour (from Lenny Rhine of the University of Florida and Jean Shaw of Partnerships in Health Information⁶⁴) and input from the HIF network.</p>
<p><i>Examples of Impact</i>– Anecdotes, stories and research about the impact of information on healthcare in developing countries.</p>	<p>This new service was launched at a recent Health Information Forum in an effort to demonstrate the importance of information access. The examples are posted online and both collected and circulated on HIF-net at WHO.</p> <p>This service helps to share knowledge and experience while validating ‘storytelling’ as meaningful evidence. Many of the INASP-Health publications⁶⁵ also use this approach.</p>
<p><i>HIF-net at WHO</i>–A moderated email discussion list about health information issues.</p>	<p>This email forum now includes well over 1000 participants, representing health libraries, NGOs, publishers, clinicians, health educators, donors and other health professionals from North and South. It costs £10,000 pa, excluding physical hosting costs.</p> <p>As a successful service illustrating and in fact discovering much best practice in this area, taking full advantage of the revolutionary many-to-many communication capabilities of new ICTs, this service is discussed in more detail below.</p>

Sources: Pakenham-Walsh 2003c and 2003f, INASP-Health site

⁶³ www.hon.ch

⁶⁴ <http://omni.ac.uk/hosted/phi>

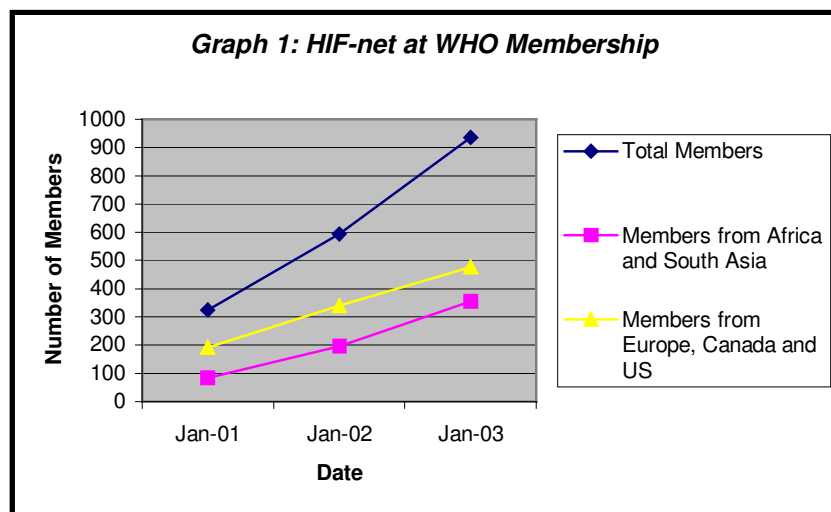
⁶⁵ www.inasp.info/health/index.html#7

HIF-net at WHO

New ICTs in general offer the potential to revolutionise communication, including with and among health professionals in developing countries. HIF-net at WHO may be the best example of a new ICT project that puts this into practice.

The HIF-net at WHO email discussion list, started in July 2000 with 12 British subscribers, now has over 1000 members from around the world (see Graph 1). Its continued success at this size is particularly remarkable given the breadth of the topic (information access for health professionals) and member backgrounds (professionals with interest in this topic, from local NGOs to international publishers). In pursuit of its goal of improving health professionals' access to health information, this forum takes full advantage of the revolutionary many-to-many communication capacity of email to:

- *Network all types of 'players' in health information*—Professionals within a discipline commonly communicate through conferences and publications, but communication across discipline and sector boundaries is rarer. This forum has achieved this.
- *Amplify the 'voice' of health professionals in the South*—Both representation of and participation by health professionals in developing countries is increasing (Pakenham-Walsh 2002a, 2003f). While a common problem of such forums is domination by Northern voices (Driscoll 2001), participation rates by geographic area did not radically differ from membership rates in 2001 (see Table 3).
- *Facilitate knowledge networking and communication*—In 2001, while a slight majority of the forum messages conveyed information, over 40% were discussion, debate and networking messages (using data from Pakenham-Walsh 2002a and 2003f). Before the advent of new ICTs, this information transfer was technically possible, but the communication – the group conversation between this professionally and geographically diverse set of people – was not.



Sources: Compiled using data from Pakenham-Walsh 2002a, 2003f

Table 3: Contributions to the HIF-net Discussion List by Region in 2001

Region	Member composition % (av of start and end of year)	Contributions % of 336 messages ⁶⁶	Skew in Contribution Rate contributions minus composition
UK	28.00%	43.45%	15.45%
Africa	20.50%	15.77%	-4.73%
US/Canada	15.50%	15.18%	-0.32%
Continental Europe	14.50%	8.33%	-6.17%
South Asia	9.00%	9.82%	0.82%
Other	11.50%	7.44%	-4.06%

Sources: Compiled using data from Pakenham-Walsh 2002a and 2003f

Many development discussion forums attempt to achieve goals similar to those above, but few have been as successful as HIF-net. The moderator, Dr. Pakenham-Walsh, and the WHO advisory team have created a forum that demonstrates and, in the case of profiles, invented best practice in an email discussion list in several areas:

- *Active, pre-emptive moderation*—ensuring only clear, relevant messages with indicative subjects and working URLs.
- *Off-line solicitation of messages*—increasing diversity of contributions and representative participation from LDCs.
- *Member profile attached to every message*—identifying the physical and professional locations of the contributor and aiding community building.
- *Personal communication from the moderator*—creating a warmer and more welcoming atmosphere through personal welcomes, goodbyes and off-forum email conversations.
- *Email translation from French and Spanish submissions*—allowing those who can read English but do not feel comfortable expressing themselves in it to contribute to the discussion.

The moderator calls this a ‘reader-centred approach’ (Pakenham-Walsh 2003d). Such an approach takes time and, by association, some money. The moderator spends circa 7 hours a week on this service – 2 on editing and vetting messages, 3 on offline communication, and 1 each on administration and welcoming new members (including finalising profile content).

HIF-net at WHO has been financially supported by WHO, the International Institute for Communication and Development (IICD), and the Wellcome Trust with a total annual budget of about £10,000, excluding WHO hosting costs. That is £10 per annum per member. This small investment not only serves the 1000 HIF-net members directly, but also saves funds and increases quality elsewhere in the INASP-Health programme. As the manager says,

HIF-net is amazingly useful for us to deliver a better service, because now when we get a query [through the Advisory and Liaison Service], we can encourage the enquirer to put the issue to their colleagues worldwide on HIF-net. We might previously have spent an hour, an hour and half trying to answer such queries, but with HIF-net both the question and the

⁶⁶ This number of messages excludes the 42 that were forwarded from other forums or were from the moderator.

answer become public. It is much more dynamic, and as an organisation, we now need to spend only 10 minutes on the enquiry, rather than an hour. (Pakenham-Walsh 2003c)

The list also surfaces new links and organisations to be included in the two INASP-Health online directories and informs discussions at the FTF HIF meetings.

According to Dr. Pakenham-Walsh, the main remaining missing pieces are a web archive (WHO hosts the discussion list at the moment but does not offer a web archive) and a collation of the key discussions and debates taking place, not only on HIF-net but also at Health Information Forum meetings, and in the formal and informal literature. INASP-Health would be keen to collaborate with other organizations on this, and contract experts to maintain these as “living documents”, updated regularly and supplemented with references to literature, anecdotes and opinions from other sources (2003c). With more funding, these are readily achievable and would extract yet more value from the current INASP-Health menu of services while contributing new ones.

Summary

There was consensus that HIF's [HIF and HIF-net at WHO] greatest achievement has been to build a multidisciplinary community of people working in health information... There has been a general shift away from the initial emphasis to promote the delivery of health information to developing countries to the local creation and sharing of health information among many partners (INASP-Health 2003).

The combination and implementation of INASP-Health services puts the potential of new ICTs to support health professionals in developing countries into practice in several areas.

Most importantly, as the quote above from a recent HIF meeting that discussed a 5-year review of these services indicates, this programme takes full advantage of the revolutionary networking and collaboration capacity of new ICTs both for information access advocacy and for knowledge networking and generation within the health and development community.

It also demonstrates best practice in several other overarching areas, including:

- *Internal diversity and integration*—The programme blends new ICT and other services to provide an integrated whole which adds up to more than the sum of its parts. As Dr. Pakenham-Walsh says, they “look for opportunities in every communication: opportunities for links with others and to feed into, and draw from, the various parts of the INASP-Health programme, for the benefit of others” (2003d).
- *External networking*—INASP-Health has links with virtually all leading organisations in this area (Pakenham-Walsh 2003c). Again, this ‘synergy’ extracts greater total value from the networked services. For example, HIF-net has served as a ‘sounding-board’ for two information development initiatives⁶⁷, which helped not only their development but also gave the HIF community a sense of ownership of them. HIF-net, AHILA and AFRO-NETS forums also share relevant postings, thus extending their

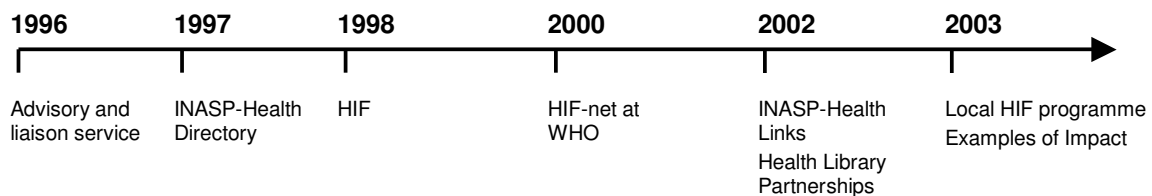
⁶⁷ Information Waystations and Staging Posts (www.iwsp.org; discussed in section 5.2 on Best Practices) and Interactive Health Network (www.ihn.info).

networks. Close ties with Exchange⁶⁸ have linked INASP-Health “into the broader world of ‘health communications’, from which there is much to learn that could be applied to ‘health information development’” (Pakenham-Walsh 2003d).

- *Evaluation*–INASP-Health is strong on evaluation, with detailed data on hours spent providing each service, monetary costs, and HIF-net usage; a full scale evaluation, using interviews with and surveys of users, is currently underway. Its practices and experience are made available online.

INASP-Health’s success in integration and networking is partly the product of their step-by-step approach to creating their suite of services in response to user demand (Pakenham-Walsh 2003b). As the timeline below illustrates, services were added gradually as the need and demand for each arose.

Timeline of INASP-Health Service Launches



The only readily identifiable gaps are technical. First, the programme is missing a cheap and easy usage measurement tool – collection of web statistics about origin and duration of visits, identification of referring URLs, number of total and of unique visitors, and total hits on each service. These statistics would reveal which services are most popular with which users, and would show how users are finding the services. Second, the email forum does not yet have a web archive. An archive would make the wealth of information and knowledge in the forum available to a larger audience and provide a reference tool for members. Third, the site’s search function is clunky, requiring users to search and then use ‘find on the page’. Fourth, in terms of design, using the large, general INASP header as the stable top navigation bar is perhaps not optimal use of space and could be confusing for users who are interested exclusively in INASP-Health.

In addition to maintaining the quality of the current services, INASP-Health’s priority this year is increasing support for local and regional health information and communication projects. Dr. Pakenham-Walsh says, “developing countries should be driving their own development, rather than being driven by international agencies,” and that INASP-Health support for in-country networking can aid this process through partnership with organisations like AHILA (Pakenham-Walsh 2003c).

In sum, on a modest budget, INASP-Health has created an international health and development community while evolving best practice in several areas of using new ICTs to support this community.

⁶⁸ www.healthcomms.org

4.2 Malaria Online

All 3 of us are many thousands of dollars lighter, many hundred of hours of sleep lighter BUT it is something that we can do. –Graham Icke, project manager and co-author of Malaria Online. (Icke 2002a)

The Malaria Online⁶⁹ project seeks to make malaria education freely available to all healthcare professionals via an online and CD-ROM malaria training course on the history, diagnosis, prevention and treatment of the disease.

This project provides an excellent example of the revolutionary information dissemination potential of new ICTs put into practice.

When project co-authors Richard Davis and Graham Icke moved from the UK to Perth, Australia they were ‘perturbed’ by the poor malaria diagnostic skills of laboratory staff. They began a malaria workshops series to increase the awareness and skills of local clinical staff. A director at Royal Perth Hospital asked if they would put their course material online and, thus, the web site was born in 1998. A few years later, a medical supplies company sponsoring a tropical medicine conference asked the authors to put the content on CD-ROM, and then paid to produce it for all the conference attendees. Davis and Icke then offered the leftover CD-ROMs over a malaria discussion forum. They were inundated with hundreds of requests, and quickly ran out of CDs while spending thousands of Australian dollars out of personal pocket in postage costs.

In hopes of making the CD-ROM service sustainable, they approached another international medical equipment company, Abbott Diagnostics⁷⁰, which agreed to fund the web site at the Hospital (at circa £2500 per annum to ‘buy’ four hours a week from the webmaster) and to promote, produce and post the CD-ROMs.

So, new ICTs and a little funding made it possible to move the materials from a local workshop series to the world via a CD-ROM sent to over 2000 organisations (many of which copy and disseminate it further) and a website that has received well over 300,000 visits (Icke 2002a).

Highlights of this project include:

- *Accessibility*–the course is available on free CD-ROM and online, in English, French and Spanish (translations and proofreading was done by volunteers).
- *Low cost*–This project runs on the £2,100pa that Abbott Diagnostics provides for direct support for the webmaster’s time, plus about £9,600 for the company’s expenditure on producing, packaging and posting circa 1000 CDs each year (Sneddon 2003). This service is mainly so cheap to sustain because of the huge donation of time. The two authors spend a total of 2-3 hours each day collating requests to send to Abbott, updating the content, and responding to project-related emails.

⁶⁹ www.rph.wa.gov.au/labs/haem/malaria/index.html

⁷⁰ www.abbott.com

- *Personal service*—Part of the reason the project takes so much of the authors' time is the personal service they offer, individually answering every email of the thousands they receive each year.
- *Pedagogy*—Site navigation is intuitive and consistent and, crucially, the course ends with a 'test and teach' module, where clinicians can practice identifying malaria infections on photos of blood cultures, receiving immediate feedback on their selections. (In fact, the CD-ROM has been made part of an accredited course in Colorado.)

While the site would benefit from some layout and design improvements⁷¹, Malaria Online is a very well produced service with a wide reach and is run at little cost, and with perhaps no opportunity cost to health and development.

Between the first and second versions of the CD (they are now disseminating version five), the project team sent out a questionnaire to ask about areas needing improvement. They achieved an exceptionally high 63% reply rate, the main result of which was requests for languages other than English. This is when they had the site and CD translated into Spanish and French (Icke 2002a). At least 95% of respondents ranked content, usefulness and presentation as good to excellent, and the results also included many requests for similar projects on anaemia, TB, HIV/AIDS and other topics (Icke 2002c: slide 27 and 28).

Malaria Online is loosely networked with its community of interest via email discussion forums (I found out about it myself through HIF-net at WHO) and link directories⁷², but it is a stand-alone service, and likely always will be because it is run by volunteers on a shoestring budget.

The survey responses, however, point to areas where a project like this could link with existing efforts on courseware about other diseases and where there are gaps in filling the needs of the medical community.

4.3 Supercourse/Global Health Network

Supercourse: Epidemiology, the Internet and Global Health⁷³, also known as the Global Health Network, is an Internet-based library of lectures on disease prevention and public health. The project collects PowerPoint-format lectures donated by academics and clinicians from around the world and disseminates them online and on CD to students and lecturers (and the general public). Originally funded by NASA, Supercourse now runs on a budget of about £160,000 per annum provided by NIH "plus a lot of free labour world wide" (LaPorte 2003b).

⁷¹ Specifically, the red and black text on a reddish background is difficult to read, the home page could give more context to indicate what the site offers and/or an 'about' link, and the long HTML pages on history, prophylaxis and treatment could be broken up to make them easier to navigate and more engaging. Also, while the intended audience is medical, less sophisticated and technical use of English might help broaden the potential user group.

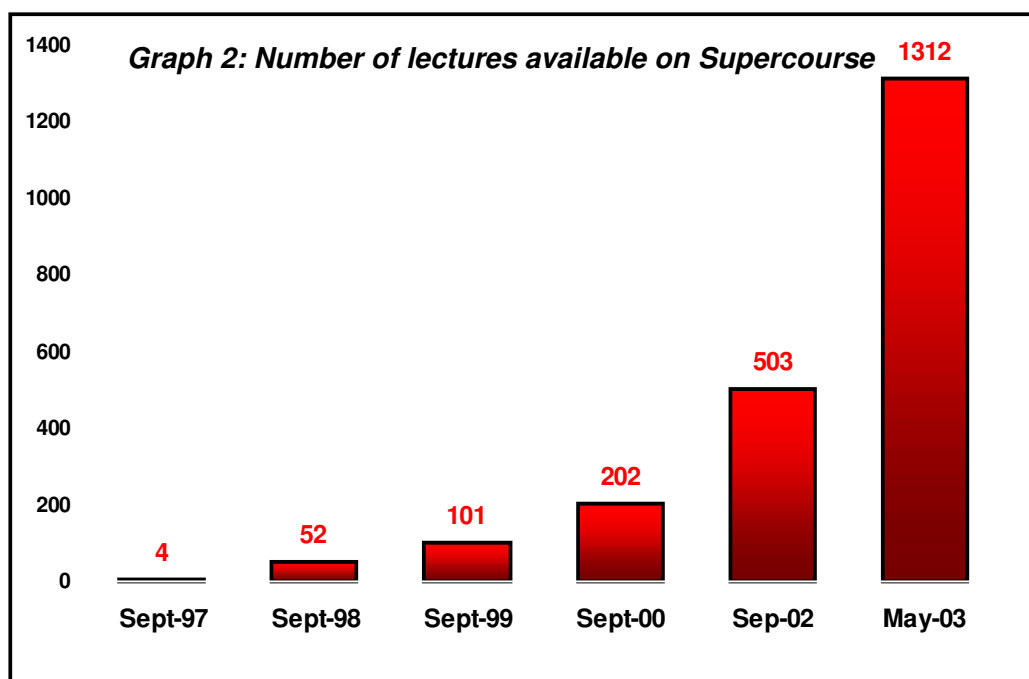
⁷² It is listed on Healthlinks (www.healthlinks.net) and the Medical Resource Reviews Database (<http://hpdrc.cs.fiu.edu/med.resource>), both of which maintain edited directories of sites on health and medical topics.

⁷³ www.pitt.edu/~super1

With over 1300 lectures from over 575 authors available to date, this project blends the professional development, dissemination and resource access applications of new ICTs in a single format but on a large scale. Supercourse manager Ronald LaPorte estimates that each lecture costs about £2,500 to prepare for the site (2003f: 9).

Two exemplary features of this project are the extent of contributions from health professionals around the world, many of whom are based in LDCs, and the professional network that is emerging behind the scenes among contributors and users, particularly around the Islamic Health Network portion of the site (LaPorte 2003b).

The project also provides a good model of technical accessibility, including use of Adobe PDF files to reduce the memory size of each PowerPoint slide, availability on free CD-ROMs, provision of shows in over 6 languages, and mirrored sites across the world (thus reducing Internet access charges and increasing download speed). In addition, an Egyptian partner is creating paper 'comic books' out of the lectures to make them available to those without access to computers. (LaPorte 2003a)



Source: Supercourse 2003: 25

As Graph 2 shows, the number of contributed lectures has exploded over the past two years. Usage has grown with it. According to their site, the project has sent out over 7500 CDs and usage statistics indicate about 2500 site users each year. They hope the service works as a teaching-support system, where lecturers can pick and choose from the online slide shows to create their own lectures, as well as learning from the original slide shows.

A detailed and complex form of lecture evaluation and ranking is planned, applying 'statistical quality control' (LaPorte 2003a), but this is not yet in place.

Until this filtering and ranking begins, to some extent the project is a victim of its own success. Since anyone can contribute a lecture and there is currently no filtering or ranking, the quality of the PowerPoints vary greatly from show to show. Guidelines for presentations are posted on the site, but are not as yet enforced. Problems in some slide shows include font sizes too small to read online, unclear content, lack of objectives, and lack of continuity. In particular, they would benefit from vetting from a pedagogical perspective, with fulfilment of at least basic content and design guidelines being required for posting.

The wide selection of lectures available on some topics is a boon for lecturers wishing to harvest from them to create their own and also provide a choice for learners. At the same time, reviews or rankings (as are planned) would make the choice between options – for example, between the three different epidemiology courses by three authors, each composed of over a dozen slide shows – much easier and less time consuming to make.

For learners using the site directly, a broader issue is that pedagogically, stand-alone PowerPoints have a very limited teaching capacity because they can function only in a ‘chalk and talk’ format (or, to be more precise, only in ‘chalk’ since they do not support recorded audio). To achieve its broader goal of becoming a ‘Global Health Network University,’ Supercourse would need to support collaborative and learning application activities to go along with the lectures. This of course has huge funding implications.

Overall, this is a quickly evolving and unique project. Its success in soliciting contributions from around the world is astounding, and the project’s exploration of creating learning communities around religion and of new media for distribution on and off line are promising. Once quality controls are activated, evaluations of usage could generate new knowledge of best practice in assembling and disseminating teaching resources using new ICTs.

5 Problems and Promising Practices

Pulling from the literature and the experience of projects discussed in Chapters 3 and 4, this chapter discusses the common problems health and development ICT projects for professionals face and strategies for preventing or overcoming these.

5.1 Common Problems

Failure has been downplayed. Yet estimates suggest that the majority of ICT-based initiatives end in total failure of a system that never works; partial failure in which major goals are unattained or in which there are significant undesirable outcomes; sustainability failure that succeeds initially but then fails after a year or so; or replication failure of a pilot scheme that cannot be reproduced. (Heeks 1999: 13)

How much better would it be if established international co-operation best practices and policies were applied to all new information, knowledge and ICT projects, and did not need to be re-discovered? (Ballantyne 2001: 27)

The main ‘problems’ in ICT health development projects have much in common with many development programmes, for example, being donor-driven, non-participatory, technology-driven, insufficiently evaluated, and/or insufficiently sustainable. This section focuses on the overarching issues related to using new ICTs in developing countries. These problems include:

- Extremely limited affordable access to the technologies.
- Ethics of investing in new ICTs when basic medical, food and water needs are unmet.
- Risk of ‘information colonisation’ (Zielinski 2001b). “The potential erosion and loss of local knowledge as a consequence of the development of a ‘knowledge economy’ dominated by Western knowledge is featuring in critical ICT debates” (Skuse 2000: 11).
- Prevalence of false or incomplete information in the ‘wild west’ of the web.
- Dearth of information and resources relevant to developing countries.
- Lack of information and resources in languages other than English.
- Service design that inhibits usability.
- Lack of skills in using the services, particularly searching.

Some of these issues stem from project design flaws such as:

- Absence of means to disseminate the benefits to those who do have access to the technologies.
- Wasting money on projects that are not sustainable or that duplicate other projects.

- Technology-driven rather than user-driven projects that invest in new ICTs when other approaches would have better served the target group's needs and/or do not provide services optimally usable and appropriate to local needs.
- Lack of user testing.
- Insufficient training and support for participants.
- Limited project evaluation, so neither that project nor any other can learn from its mistakes.

ICT projects that repeat documented errors made elsewhere waste precious resources and dampen enthusiasm of participants (or 'subjects', in the worst of non-participatory, top-down projects) to engage in any future attempts to harness these technologies to better ends.

However, uncovering new ways to support health professionals in the field, using new ICTs or any other method, requires trial and error. Errors are not failures if the error is new, documented, analysed and addressed; they are valuable and essential learning experiences that contribute to our knowledge of best practice.

5.2 Promising and Best Practices

We seem to be dealing with a domain that is uniquely well suited to effectively practice what the development community preaches. (Ballantyne 2001: 27)

So little research has been done in the area of using new ICTs to support health professionals in developing countries that few suggestions for 'best practice' here would meet a stringent definition of that phrase. For example, AdvanceAfrica⁷⁴ states:

A best practice is a specific action or set of actions exhibiting quantitative and qualitative evidence of success together with the ability to be replicated and the potential to be adapted and transferred. Best practices represent the 'Gold Standard' of activities and tools that can be implemented to support program objectives.

Most of the 'good' and 'best' practices mentioned here would fall into their other category of practice, a 'promising' practice:

A promising practice is a specific action or set of actions exhibiting inconclusive evidence of success or evidence of partial success. It may or may not be possible to replicate a promising practice in more than one setting.

Drawing from the literature and Chapters 3 and 4 of this study, this section proposes some overarching promising and best practices for using new ICTs to support health professionals. These practices are not just about solving the common problems discussed above, but also about exploiting the full, interactive communication potential of new ICTs to this end.

This study emphasises the practices that are unique or of particular relevance to ICT project planning. General best practises for project planning, implementation and evaluation in

⁷⁴ www.advanceafrica.org; see their FAQ section for these and other term definitions.

developing countries or anywhere of course also apply, but are beyond the scope of this paper.

Strategic Participatory Planning

General best practice for participatory project planning (e.g., Lefevre et al 2000; LO/FTF et al 2000) is no different for initiatives involving new ICTs than for any other project. However, a few elements deserve special emphasis when considering these technologies:

- *Perform proactive due diligence*—Because little is published in the way of evaluations and experience in this field, in addition to traditional surveys of current related projects, planners should make personal contact with their managers to share experience and prevent duplication and error replication. This also helps to build networks.
- *Compare tools*—Are new ICTs really the best way to achieve part or all of the project objectives? Planners should not fall into the ‘technology fetish’ trap. Projects should be user-driven, not technology driven.
- *Focus on communication*—The most powerful application of new ICTs is for supporting participatory communication. Project plans using new ICTs should advantage of this.
- *Maintain focus*—Because new ICTs lower the costs of collecting and disseminating information, with no space or size limits, they can lure planners into trying to make their project the A to Z of a general subject area⁷⁵. However, as one ICT planning specialist notes, “‘grand’ projects seldom work” (Wilks 2001: 22). Creating and sticking to clear objectives increases chances of success.
- *Use new ICTs as a tool*—Even if the project does not employ new ICTs in achieving its objectives, planners can still use tools such as email discussion forums to help elicit input into the planning process.

The other recommendations below may also inform the project planning process.

Accessibility

Project designs including new ICTs should consider the accessibility issues below.

Design for usability

On the web and CD-ROM, following design guidelines⁷⁶ makes the experience more engaging and less frustrating for users, allowing them to extract more value from the services.

With slow and expensive Internet connections being the norm in developing countries, use of images should be limited and strategic, and ease of page navigation becomes particularly important. Sites intended for audiences in LDCs should also provide text-only versions as

⁷⁵ For example, the World Bank’s Development Gateway (www.developmentgateway.org) intends to be “the most comprehensive information available on a topic, presented clearly, logically and conveniently” (World Bank 2001: 2).

⁷⁶ For example, see www.useit.com, <http://usability.gov/guidelines> and www.w3.org/WAI/eval. Also, www.hon.ch/HONcode/Conduct.html of the Health on the Net Foundation provides a quality checklist.

well as download options for resources, with clear warnings about file sizes and descriptions of off-site links. (Suggestions for making directories and email forums more usable are in sections 3.3 and 3.6, respectively.)

Use appropriate language(s)

Ideally all resources would be available in all languages, but until on-the-fly translation software improves, this is not reasonably possible for budget reasons. However, projects planners should explicitly address this issue and make decisions according to their budgets and target audiences.

Many of the projects discussed in this study have used volunteers to provide French and Spanish translations of English resources, greatly reducing costs while dramatically multiplying accessibility.

If resources are provided in more than one language, a separate dissemination strategy needs planning and implementation to reach out to each language group.

Resources in English should be carefully crafted to be accessible to those who speak English as a foreign language including avoiding idioms, difficult vocabulary and complex sentence structure, particularly if they are only available in English. Also, or two-way communication resources, finding volunteer translators for users who can read English but who are more comfortable contributing in their native tongue may encourage a broader input base; e.g., HIF-net at WHO provides this service for French and Spanish speakers.

Plan for offline access

Providing access to resources in various media, ranging from Internet to CD to print to e-mail, increases users' physical access to the materials. While formats other than online greatly multiply production and dissemination costs, these options should be carefully considered during planning stages. At a minimum, materials provided via new ICTs should include a print-friendly format so that they can be printed and disseminated locally.

Also, strategies for disseminating the benefits of the services beyond those who have direct access to ICTs multiply the project's impact. The Integration, Agents and Dissemination practices below discuss this.

Integration and Networking

"ICTs should complement other communication work and be integrated into broader programmes" says Andrew Chetley, director of Exchange, a programme tasked specifically with facilitating the exchange of relevant knowledge, information and experience in health communications for development (2001).

Making new ICT initiatives part of a broader programme of related services and networking with other projects offering complimentary services increases sustainability, multiplies their impacts, and makes them more responsive to user demand. Ideally, one of these components would provide opportunities for FTF meetings, since this promotes knowledge transfer, networking and brainstorming in ways that cannot be replicated but can be built upon online.

For example, lessons learned from the AfriAfya project, which was founded by seven Kenyan NGOs and networked seven existing field centres, include that:

Cooperation with external partners and international organizations has contributed to the success of the project. Building on existing structures is quicker than starting from scratch – makes it easier to sustain than a stand-alone ICT project would be (Nyamai 2002).

The INASP-Health programme discussed in section 4.1 provides another great example of the benefits of integration and networking; “INASP-Health is an integrated program of communication tools all of which work together and feed into each other” (Pakenham-Walsh 2003c). The email forum informs topics for HIF meetings, points out links for Health Links and the Directory, and helps INASP provide their advisory service. The Links and Directory support the advisory services and help answer queries coming into the forum. Examples of impact are both collected and disseminated in the email and FTF forums.

Externally, the impact of networking is just as powerful. For example, HIF provided a 'sounding board' for two information development initiatives - Information Waystations and Staging Posts (discussed in the section on Agents below) and the Interactive Health Network (IHN). Also, the directors of IHN and Exchange met at a HIF meeting, and now collaborate closely; for example, both were heavily involved in the recently broadcasted Global Forum on Health and Development mentioned in section 3.6.

Step-by-Step

As the experience of INASP-Health shows, introducing services individually, each in response to demand, helps ensure the programme incorporates user input while linking the pieces more tightly with one another and with related external programmes (Pakenham-Walsh 2003b).

Personal Contact with Users

The most powerful applications of new ICTs are for communication, and communication requires building trust and establishing open, two-way channels. This requires personal contact between those implementing a programme and its users and participants. As the AfriAfya project discovered:

Establishing two-way communication processes takes time, and needs to be continuously refined and improved along the way... Do not expect that sharing and communication will happen automatically. It needs facilitation and encouragement. (Nyamai 2002)

Similarly, the moderator of the successful HIF-net forum says: “Hopefully I’m more approachable, having sent out such a [welcome] message, they get the feeling they are talking to a person, rather than to a machine... it is important to build that relationship, even if it is just a few words.” (Pakenham-Walsh 2003c)

Likewise, when I asked the Malaria Online manager why he doesn’t apply for funding to hire an administrator, he replied that “over the years we have built up quite a good rapport with colleagues at many centres around the world and we are keen to continue to provide this ‘personal service’ (akin to a corner shop as opposed to a supermarket!) and we would prefer to continue with the hands-on approach.” (Icke 2002b)

Establishing personal contact may also help encourage feedback, create a greater sense of ownership among users, and facilitate network formation.

Champions

Staffing makes or breaks a project, in this or any other field. People who invest the time and energy to network with users and with other projects, driving project success, are commonly called project 'champions'. Experience shows that such a champion stimulates "interaction within communities of practice through discussion groups" or provides "leadership, vision, motivation, support and guidance" (Pakenham-Walsh 2002b). Every successful project discussed here has a champion. This is the 'secret ingredient' required to make a good project great.

Actually, it is not the ingredient itself that is secret, but how to recruit this ingredient for a project. This is perhaps one of the great advantages of the information dissemination capacity of new ICTs that can make everyone a publisher; people who found, run and expand their own projects are committed champions by definition.

Training and Support

Unless participants know how to use services provided and have access to support as questions arise, a project is destined for failure regardless of the quality of the rest of the implementation (Chetley 2001, Michiels and Crowder 2001).

This includes technical training for computer use. As the AfriAfya project found, "people with limited background education can acquire basic computer skills, even rural women living in a rural Kenyan environment" (Nyamai 2002). The PDA survey project discussed in section 3.4 found that even those with no previous computer experience learned to use the tools effectively in two days of training (Satellife 2002).

The technical aspects are the easy part of training. As ICT critic Richard Heeks says, "the poor need knowledge to access, assess and apply existing information and need resources for action more than they need access to new information" (1999: 18). The softer skills needed to identify and apply the appropriate resources available via new ICTs take longer to transfer. For health professionals working as agents to adapt and author content for local use (see below), writing and editing skills are also required.

Adoption of electronic rather than more traditional means of information and communication also necessitates a working culture shift (Kale 1994, World Bank 1999: 56).

Thus, while a few days of technical training may be enough to launch a project, participants need ongoing support in all of these areas for the project to be sustained.

Agents

Providing all health professionals in developing countries with direct access to new ICTs and the associated services is not the most cost effective nor culturally appropriate means to maximise their benefits. Using particular health professionals and centres as 'agents' for these services reduces technology, training and support costs and limits the 'cultural hegemony' of western technologies in the community while increasing the appropriateness of the information and communication and multiplying its dissemination.

This agent strategy appears frequently in the literature under various names, including intermediary institutions, hubs, staging posts, information waystations, intelligent intermediaries, ICT intermediaries, proxies, knowledge nodes and focal points. (Colle and Ostman 2000, Heeks 1999, Nyamai 2002, SHARED⁷⁷, Zielinski 1999)

Whatever this strategy is called, it appears to be an excellent way to bridge the digital divides between those who have access to new ICTs and those who don't but who still need access to the resources they can deliver.

Information Waystations and Staging Posts

The Information Waystations and Staging Posts (IWSP) initiative aims to put this strategy into practice by establishing a global network of health information resource centres that will provide locally appropriate content on health issues. The project began by compiling a directory of 1000 of these centres (IWSP 2001) and surveying their current information activities. The next phase, which is still awaiting funding, is involved in networking the centres to help identify their needs and collate and disseminate their experiences. In the third phase, some centres will become Information Waystations to develop their technological capacity and to link them into a larger network.

Information Waystations are local points of access to health information received electronically. They have a PC, CD-ROM & databases, printer, modem, reliable satellite or land telephone, and prepaid broadband Internet access. They are linked to the network of other IWs, and share information with other IWs in a two-way flow. (www.iwsp.org/iw.htm)

In the final phase, some Information Waystations will become Staging Posts, which will adapt and disseminate locally appropriate health information. Chris Zielinski, the project director, estimates that for the 1000 centres, the project would cost circa £6 million a year for each of five years (2003).

AfriAfya

AfriAfya, the African Network for Health Knowledge Management and Communication established in April 2000 by Kenya-based health development agencies, acts as a pilot Staging Post in rural Kenya. It harnesses ICTs – new and old – for community health. For example, the programme compiles and adapts health information and distributes it to its seven field centres and, using WorldSpace, to Africa and the Middle East. They are disseminating their experience and learning from that of others in part by using forums such as HIF-net at WHO and AFRO-NETS. Also, the project coordinator, Dr. Caroline Nyamai-Kisia, has published details of their experience in the pilot project, including lessons learned towards best practice (2002).

The 18-month pilot phase of this project cost £130,000, including equipping each of the seven field sites with a computer, WorldSpace receiver and solar panels where needed and training three to four staff from each of these sites in using the equipment (Nyamai 2002).

⁷⁷ <http://shared-global.collexis.net/linkpageopen.asp?pageID=40000>

Adaptation

The dearth of health content, or content in any discipline for that matter, that is relevant in local contexts in developing countries is noted throughout the literature. For example, as the AfriAfya manager notes, “despite the plethora of health information on the Internet, very little is directly suitable for dissemination to poor communities as it is. It needs to be repackaged to ensure local suitability and relevance” (Nyamai 2002). Heeks agrees: “the poor need access to new locally-contextualised information more than access to existing information from an alien context” (1999: 18).

The solution is local adaptation, authoring and repackaging of content, such as by Agents as discussed above; “Local ‘health information providers’ (publishers, libraries, NGOs, ministries of health) are best placed to provide content for local ‘end users’” (Pakenham-Walsh 2002b: 2). This practice also helps counteract the ‘information colonisation’ problem:

Developing countries are being ‘invaded’ by foreign ideas and values that may undermine or overwhelm local cultural heritage and economic livelihoods. If we are serious about the use of ICTs as an empowerment tool – so poor people can shape decisions that affect their lives, so they can grasp economic and social opportunities, and so they can deal with misfortunes and disasters, then this foreign content must be matched by the expression and communication of local knowledge that is relevant to local situations. To a large extent, this means that ICTs need to be conveyors of locally relevant messages and information. They need to provide opportunities for local people to interact and communicate with each other, expressing their own ideas, knowledge and culture in their own languages. (Ballantyne 2002: 1)

Together, adaptation and dissemination services are powerful strategies in the hands of Agents to multiply the positive impacts of new ICTs for health in developing countries.

Dissemination

The best service in the world is useless if no one knows it is there. New ICTs have made it easier than ever to make information and communication resources available, and email forums provide an easy means of advertising. The existence of and inclusion in relevant service directories is essential, as is publishing and distributing evaluation findings.

Spreading the word about available resources – e.g., CD-ROMs or free print publications – to health professionals who are not online or on email, however, is more challenging. Agents may be the most effective way of doing this, along with creating and maintaining personal contacts and networks with ministries, libraries and NGOs that have local offline dissemination capability. These networks in turn can aid in needs assessments and feedback collection.

For resources available in more than one language, plans and networks for dissemination must be established for each language.

Marketing, branding and customer service: lessons from the private sector

To make their services appealing and accessible, many projects could learn from the commercial sector in three areas.

One, dissemination is a kind of marketing. It is not enough for users to know a service exists – they must want it, find it, and use it. Dissemination efforts shouldn't just tell, they should sell. This kind of commercial language disturbs some people in the not-for-profit sector, but it doesn't mean cold calls and lies. It means segmenting user groups and crafting engaging and informative short messages customised for each group and then delivering the messages via media these groups use and trust. For example, if announcing a new links directory about HIV/AIDS, emphasising the resources meant for use with the general public might appeal to SEA-AIDS forum members, but mentioning the links to relevant journal articles might better entice AHILA forum members to the site.

Two, branding matters. For example, British Petroleum spent £4.6 million devising their new logo and 'beyond petroleum' branding that was launched in 2000. This level of outlay falls well out of bounds for projects discussed here; however, it indicates that corporate research shows investment in branding reaps returns.

Branding matters because it helps users come to know and trust a service provider, and because having a recognisable brand multiplies the impact of marketing (dissemination) and fundraising efforts. For example, if SatelLife is soliciting donations and a potential donor has not heard of 'SatelLife', but only about the great work of HealthNet (SatelLife's communication network), will she pull out her wallet?

Any changes in service names, location (URL), and page layouts should be very carefully considered and strongly justified, because they can confuse the customers (the health professionals). Also, service names that are unique and constant, ideally with matching URLs, make it easier for customers to find and remember them.

For example, there is little to help users remember that www.healthcomms.org will take them to Exchange, or that the 'Global Health Network' might also be called 'Supercourse', or that 'Malaria Online' is a medical training module, not a list of malaria resources. AfriAfya, on the other hand, is unlikely to be confused with another project (though perhaps is occasionally misspelled). INASP has also been careful to manage and make the most of their trusted brand by using this acronym in all of their core programme names.

Accompanying a brand name with a logo and possibly a 'strap line' – a short description – also aids recognition and marketing if used consistently. For example, the Exchange logo at right incorporates all of these elements, while being flexible enough to use each of the three pieces (name, cyclical image and strapline) separately as well.



Three, health professionals are the customers. If they don't use a service sufficiently, then that service should adapt or go out of business. In development, it is normally not the customer but the sponsors who pay, which weakens the link between customer satisfaction and the bottom line. This requires project managers to be all the more conscientious about thinking of their

user groups as their customers, taking to heart the old saying that ‘the customer is always right.’

Evaluation

In many ways, new ICTs have made testing and evaluation much easier than ever before because disseminating questions and collecting feedback can be done so quickly and cheaply via email or online surveys.

User surveys and interviews provide one means of quantitative and qualitative evaluation (though effective methods for using these tools with professionals and about ICTs also need research). Also, usage rates over time – numbers of CD-ROMs ordered and by whom; web usage statistics such as page views, number of unique users, user location, referring links and visit duration; membership rates on email forums including the number, type and origin of messages – provide valuable data on service usage and success. Monitoring investments of funds and time also aid evaluation and comparisons between services.

On the other hand, demonstrating the impact of information or, even more challenging, communication, is extremely difficult:

Demonstration of impact is notoriously difficult with health communications for development. Even where a cause-effect relation can be demonstrated (as in the case of behaviour change in 'social marketing' activities), the implications are unclear. Many observers are now saying that the focus should be more on 'improving' the processes and sharing of lessons learned. 'Process indicators' may prove to be at least as useful as 'outcome indicators'. The quality of 'process' in any programme is likely to be closely related to the programme's ability to engage local input, dialogue and ownership (Pakenham-Walsh 2002b: 12).

One powerful way to share experience and understand the impact of a project is storytelling. Telling stories and recounting anecdotes keeps the information in context, retaining its ‘face’ and ‘voice’ (van der Velden 2002: 29). Also, as the head of the World Bank’s knowledge management explains in his theory about using storytelling as a catalyst for change, “Stories help us understand complexity. Stories can enhance or change perceptions. Stories are easy to remember. Stories are inherently non-adversarial and non-hierarchical” (Denning 2001: 1). The INASP-Health Examples of Impact mentioned in Table 2 earlier applies this strategy.

Additionally, as discussed in section 2.3, participatory communication is an end in itself. A project that facilitates multi-way communication has demonstrated some level of success, even if no further benefits are proven.

Summary

These suggested promising and best practices – participatory planning, making services accessible, integrating and networking with existing programmes, establishing personal contact with users, providing ongoing training and support, using local agents to adapt and disseminate locally relevant content, and evaluating the services – are relevant to many ICT health and development projects.

However, two final, important lessons from the literature to keep in mind are:

1. Not all successful projects or strategies are replicable. “There is no single solution: working in a diverse group of settings has been a big strength because it has demonstrated different ways of using the different technologies effectively” (Nyamai 2002).
2. When planning local projects, prioritise; address basic needs first. ICTs can only support existing health systems, not create them; “Strong health systems and other basic services are essential for effective use of ICTs.” (Chetley 2001)

6 Conclusions and Implications

[Using ICTs] is not about plugging and playing, chatting and surfing, getting info abroad, converging to one language, one culture and one market. It's more about empowering persons and communities, collaborating and social networking, producing local content, facilitating diversity of languages, cultures and opinions. –Funredes, a Latin American NGO (Chetley 2001)

This study discusses projects that employ new ICTs to support health professionals in the areas of professional development, publishing and dissemination, information access, knowledge management, telemedicine, and networking and collaboration.

Drawing lessons of good and best practices from these is challenging because the technologies are new, access to them in LDCs is even newer and still extremely limited, project evaluations are few and far between, and comparative studies are nonexistent.

However, new ICTs do have great potential to support health development professionals and this potential has already been put into practice in some of the projects discussed here. Their general promising and best practices are summarised in the previous pages.

In particular, some of the projects discussed here demonstrate that these technologies have begun to support revolutions in two areas: information dissemination and many-to-many communication.

By radically lowering the barriers to publishing and disseminating information, new ICTs have enabled health professionals everywhere to contribute their work to the global health and development knowledge base. This has two key impacts. One, the Internet, email and CD-ROM can broadcast the voices of professionals in LDCs to the world affordably and quickly; this is beginning to create counter currents to the North-to-South information flow. Two, information access has become more widespread and less expensive; this is beginning to bridge the information divide between health professionals in the North and South. This in turn means that health professionals in the South who have access to new ICTs are increasingly becoming active information consumers rather than passive receivers – able to select what they need rather than take what they are given.

Even more importantly, the revolution in communication capacity makes it possible for the first time to create and network local, regional and global communities of health development professionals in participatory knowledge sharing and generation. Because this application is supported by one of the cheapest, most widespread and easiest to use technologies – email – the digital divides are narrower than other applications.

The technological digital divide, however, still yawns widely. Locally relevant content and services, in relevant languages, is also a gaping need. In particular, services supporting regional and local communication are needed, because internal communication among stakeholders is a prerequisite for participation in and ownership of development agendas (Pakenham-Walsh 2003b). If the part of the international development community that espouses participatory development were to put its money where its mouth is, these areas are where much of it would go.

Overall, core areas in applying new ICTs for development health professionals that require attention include:

- Investing in supporting local and regional resources, resource directories and, most of all, communication networks.
- Creating standards for data and information that should be collected by ICT projects to facilitate internal and comparative evaluations.
- Evaluating individual projects that have ICT components and disseminating findings. In particular, extensive qualitative interviews with professionals using more than one set of services would help highlight effective practices and areas for improvement.
- Comparing projects with one another and tracking progress within a project using year-on-year comparisons.
- Improving collaboration between health and other disciplines to share experience towards a best practice for using new ICTs to support development professionals. Most lessons apply to using ICTs in supporting development professionals generally, rather than being specific to health.
- Developing best practices guidelines for each kind of new ICT application, drawing from interviews with project managers, feedback from users, and other evaluation material and experience.
- Taking advantage of the revolutionary participatory communication and information dissemination capabilities of new ICTs in projects that involve these technologies.
- Funding the promising and proven strategies for making the benefits of new ICTs more accessible, such as maintaining resource directories, using email forums, supporting ‘agents’, and facilitating dissemination of information and knowledge generated in the South.

Chapter 2 begins with a quote from a World Bank marketing brochure that calls knowledge, learning communities and ICTs the engines for social and economic development. This study agrees that new ICTs are indeed a potential development engine. However, the engine power depends on the fuel.

Filled with information and ‘knowledge’ from the West alone, fuelled only with English, these technologies won’t take us very far, and possibly in the wrong direction. Used as a tool in the modernisation tradition to plaster over poverty with one-way information flows, they cannot take us anywhere we haven’t been before.

In contrast, employing the revolutionary capacities of new ICTs to support information dissemination from any location and to create communities for knowledge sharing and generation drives us towards new development destinations. The passengers can choose which and take turns at the wheel.

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Unless otherwise noted, all URLs cited in this section were working as of 18 August 2003.

Appendix A: Interview Questions

Initial question format sent via email to several of the projects discussed in this paper (those who responded received follow-up questions specific to their projects):

As a (part-time) student at the Institute of Education, University of London, I'm working on my MA dissertation examining what roles new ICTs do, could and should play in supporting health professionals in developing countries.

I'm cataloguing related projects and programmes as part of this, including [project's] services. If you are able to spare a moment to answer 2 questions, I'd be grateful.

1. What was your total annual expenditure for 2002?
2. Have you done any formal or information evaluation of your services? If so, would you be able to share this with me?

Thank you very much for your time. If you have any questions at all, please do not hesitate to contact me. If you would like a copy of my final paper (in September), let me know.

Interview questions to Dr. Neil Pakenham-Walsh, Senior Programme Manager of INASP-Health, during a telephone interview on 11 July 2003:

1. How many hours a week do you spend, on average, moderating the HIF-net at WHO list? How do you spend that time?
2. Is there any technology that would make that job less time consuming? If so, what?
3. What proportion of the submitted messages do you return to authors for clarification/revision?
4. What have been your biggest challenges in founding and maintaining a successful list? If and how have you overcome them?
5. What, if anything, about your moderation experience is specific to running a list for health professionals?
6. What, if anything, about your moderation experience is specific to running a list meant to include participants from developing countries?
7. What 2-3 pieces of advice would you give to someone else wishing to found and moderate a list that would include professionals in developing countries?
8. How does HIF-net at WHO fit into the overall mission and other services of INASP Health? e.g., the Health Information Forum meetings
9. To confirm, the INASP-Health Directory is contracted out (will there be a CD-ROM? Can you tell me how much this costs?) and INASP Health Links is maintained by a volunteer?
10. Do you track hit rates and which countries this hits originate from to your site? If so, can you share these?
11. Could you tell me more about the INASP-Health Advisory and Liaison Service? The site says that "INASP-Health maintains an extensive database of the activities of network participants. Dozens of communications and enquiries are handled daily, facilitating collaboration, liaison, and sharing of

experience and expertise.” Who are the network participants? How is the database maintained? Who does this serve and how?

12. What other pieces, if any, would you add to the INASP Health offerings, and why?

13. Would you talk a bit about the role of information vs. knowledge, and the relationship between information and communication in reaching the goals of INASP Health? You wrote “The INASP-Health programme starts from the premise of 'Access to relevant, reliable health I(nformation)'. Our role is very largely to support the international, regional and (increasingly the main priority) national level of interdisciplinary Communication that is need to achieve this.” Do you see, then, C as the route to access to I?

14. Would you please elaborate on the priority shift from international to national communication? Which disciplines do you mean – donors (e.g., WHO) and practitioners?

15. What initiatives, (if any), does INASP Health have to serve professionals without access to email or the web or who do not speak English?

16. How have links worked between INASP Health and other health professional projects and programmes (e.g., AHILA-net, Afro-nets, Exchange, Waystations and Staging Posts)?

Appendix B: Selected Health and Development ICT Projects

The table below briefly summarises the new ICT aspects of health and development projects discussed in this study. Their applications of new ICTs are noted as follows:

I = provides or disseminates information and resources

Ed = supplies education or training materials

C = facilitates two-way communication

Q = sets content quality standards or rates quality

T = provides technology and/or training in technology

These 'labels' only apply to use of new ICTs for these functions – many of these projects provide these services using old technologies or FTF contact, but this is not addressed here. Information is from the project websites unless otherwise indicated.

Project Summary	Project Notes on Use of ICTs
<p>AfriAfya: African Network for Health Knowledge Management and Communication www.afriafya.org <i>strapline:</i> Harnessing ICTs for community health <i>applications:</i> I, C, T, Ed <i>location:</i> Kenya</p>	<p>The hub or 'staging post' of a network of seven field health centres. Provided email equipment and training to the field centres. Collects, adapts and disseminates health information for community use in response to community needs, in part through ICTs. Founded in 2000 by a consortium of seven of the large health NGOs in Kenya and the Ministry of Health. Pilot stage had a total budget of £130,000 (Nyamai 2002).</p>
<p>AHILA: Association for Health Information and Libraries in Africa www.ahila.org <i>applications:</i> I, C <i>location:</i> Africa</p>	<p>Professional association of health information professionals in Africa. Promotes resource sharing, health information access, database standardisation and professional development. Networked with the active AHILA-net email forum, founded in 1995, moderated by a WHO employee in Geneva.</p>
<p>Bioline International www.bioline.org.br <i>applications:</i> I <i>location:</i> Canada and Brazil</p>	<p>Electronic publishing service. Provides free electronic publishing and distribution services for peer reviewed biomedical journals from various developing countries. Founded in 1993. Managed in Canada with software development and hosting in Brazil.</p>
<p>Cochrane Collaboration www.cochrane.org <i>strapline:</i> Preparing, maintaining and promoting the accessibility of systematic reviews of the effects of health care interventions <i>applications:</i> I <i>location:</i> United Kingdom</p>	<p>Maintains 'living reviews' (i.e., updated quarterly) of clinical evidence about the effects of health care interventions. Abstracts available online at no cost. Full Cochrane Library available via subscription on CD or online, including in Spanish. Founded in the early 1990's. Also publish the journal <i>WHO Reproductive Health Library</i>, available at no cost to users in LDCs.</p>

<p>eMedicine.com www.emedicine.com <i>strapline:</i> Instant access to the minds of medicine <i>applications:</i> I, Ed <i>location:</i> United States</p>	<p>Compiles publication abstracts, ebooks, news and other resources to create 'the largest and most current Clinical Knowledge Base available to physicians and health professionals.' Email alerts available for new postings. Since 2001, provides free access to these services for professionals in developing countries through INASP's PERI. Education services available via subscription.</p>
<p>EngenderHealth www.engenderhealth.org <i>strapline:</i> Improving women's health worldwide <i>applications:</i> I, Ed <i>location:</i> United States</p>	<p>Courses in reproductive health and infection prevention available online and on CD, the latter in Spanish as well as English. Available at no cost to LCDs through Gates Foundation funding. Infection course launched in 1999; CD has been sent to about 2000 organisations and receives about 1000-2000 hits to each module each quarter (Landovitz 2003). Fact sheets on reproductive health and email newsletter also available from their site. Also produce online 'Guide to Multimedia Resources on Reproductive Health', mainly CD-ROMs, some of which are free.</p>
<p>Equinet www.equinetafrica.org <i>strapline:</i> Network on equity in health in Southern Africa <i>applications:</i> I <i>location:</i> Zimbabwe</p>	<p>Original research and policy reports on health equity in Southern Africa available online at no cost.</p>
<p>e-TALC <i>Electronic Teaching-aids At Low Cost</i> www.e-talc.org <i>applications:</i> I <i>location:</i> United Kingdom</p>	<p>Produces CDs with health and training information contributed from health professionals and health organisations internationally. Any organisation can contribute materials; e.g., INASP distributes INASP-Health Links this way. Available at no cost through funding from DFID. First CD produced in 2001.</p>
<p>Exchange www.healthcomms.org <i>strapline:</i> A networking and learning programme on health communications for development <i>applications:</i> I, sponsors C and I <i>location:</i> United Kingdom</p>	<p>Funds, researches, networks and otherwise supports health communication work. E.g., is the core sponsor for INASP-Health. Original research findings available online at no cost. Works on an annual budget of £500,000, provided by DFID.</p>
<p>Fantsuam Foundation www.fantsuam.com <i>applications:</i> T <i>location:</i> Nigeria</p>	<p>Runs IT training programme for rural community health workers.</p>

<p>Flying Publisher http://flyingpublisher.com <i>strapline:</i> Free Medical Information <i>applications:</i> I <i>location:</i> Unknown</p>	<p>Provides access to free journals, books and information online. Includes Amedeo (free journals and ebooks), HIV Medicine and SARS services. Amedeo provides email alerts available by topic. Lists titles by over 5 languages. Funded by the founder, Bernd Sebastian Kamps. Also hosts MedicineOnEarth.com, a vetted expertise <i>curricula vitae</i> database of 'women and men dedicated to medicine' who subscribe to the Amedeo email alerts.</p>
<p>Gender and Health Equity Network www.ids.ac.uk/ghen <i>applications:</i> I <i>location:</i> United Kingdom</p>	<p>Provides online access to working papers and some other research from an international network of institutions concerned with gender health equity.</p>
<p>HCMN: Health Communication Materials Network www.hcmn.org <i>applications:</i> I, C <i>location:</i> United States</p>	<p>Collects health promotion resources from members internationally and distributes them online for free. Currently offers over 40,000 sample materials. Has circa 700 contributing and using members, gains 10-20 new members each month, the majority from developing countries. Also runs an email forum that functions mainly as a news distribution channel. Estimated budget circa £10,000pa, funded by USAID (D'Adamo 2003).</p>
<p>HINARI: Health InterNetwork Access to Research Initiative www.healthinternetwork.org <i>applications:</i> I <i>location:</i> Switzerland</p>	<p>Provides free or nearly free online access to the major journals in biomedical and related social sciences to public institutions in developing countries. Supported by the WHO and BMJ in particular and also a large number of other publishers. Available in English, French and Spanish. Launched in January 2002. Has plans to expand into Internet connectivity and capacity building work.</p>
<p>HON: Health On the Net Foundation www.hon.ch <i>applications:</i> I, Q <i>location:</i> Switzerland</p>	<p>Sets ethical standards for health web site developers and accredits sites that meet the standards with the HONcode logo. Publishes research on use of online health information, available at no cost at their site. Available in French and English. Conceived in a conference and launched in 1996. Runs on funds from a local Swiss government authority.</p>
<p>Health Systems Resource Guide www.eldis.org/healthsystems <i>applications:</i> I <i>location:</i> United Kingdom</p>	<p>'Provides access to technical assistance, knowledge and information in support of pro-poor health policies, financing and services' for DFID and its partners. Consists of directories and databases of existing health resources, including email forums, journals, databases and newsletters as well as access to publications by the network partners. Launched in June 2002 by an international consortium of seven organisations.</p>

<p>Healthlink Worldwide www.healthlink.org.uk <i>applications:</i> I, supports C in partner organisations <i>location:</i> United Kingdom</p>	<p>Works with organisations in developing countries to strengthen provision, use and impact of health information. Runs on £2m per annum, about half of which is from the UK government. Hosts Exchange.</p>
<p>INASP AJOL: African Journals Online www.inasp.info/ajol <i>strapline:</i> Online access to African journals <i>applications:</i> I <i>location:</i> United Kingdom</p>	<p>Publishes over 50 African journals online and provides support for e-publishing for African journals. Launched in May 1998. Has been funded by various national and multi-lateral donors.</p>
<p>INASP PERI: Programme for the Enhancement of Research Information www.inasp.info/peri <i>strapline:</i> A programme to support capacity building in the research sector in developing and transitional countries by strengthening the production, access and dissemination of information and knowledge <i>applications:</i> I, T, Ed <i>location:</i> United Kingdom</p>	<p>Provides access to scientific and scholarly information through electronic means. Includes over 10,700 full-text online journals and bibliographic databases. Provides in-country workshops to build expertise in using and managing online resources and in publishing. Launched in November 2000, full programme began January 2002.</p>
<p>INASP-Health www.inasp.info/health <i>strapline:</i> Working together to improve access to reliable information for health professionals in developing countries <i>applications:</i> I, C <i>location:</i> United Kingdom</p>	<p>Hosts an active email discussion forum of over 1000 members interested in health information access in developing countries, HIF-net at WHO. Provides directories and link list to key resources and organizations in this area online, in print and on CD at no cost. These components run on an annual budget of £17,000. Overall programme launched in 1996; forum began in 2000.</p>
<p>IWSP: Information Waystations and Staging Posts www.iwsp.org <i>applications:</i> I, proposed for C and T <i>location:</i> United Kingdom/Switzerland</p>	<p>Phase one mapped health information resource centres in developing countries in an online directory; later phases, if funded with circa £30m, would employ the 'Agent' strategy, supporting some of these centres to become waystations and staging posts. Also created ExtraMED, a CD of scanned-in journals from developing countries.</p>
<p>IHN: Interactive Health Network www.ihn.info <i>strapline:</i> The international community for health equity <i>applications:</i> I, C, Ed <i>location:</i> The Netherlands</p>	<p>'Dedicated to using online technologies to combat health inequities.' Hosts information such as news and directories. Helps audio and videocast conferences online. Created the Health Channel, an 'interactive community for healthcare workers in developing countries' using WorldSpace. Is attempting to host online discussion forums. Recently experimented with online learning using a WorldSpace and online audio broadcast of a clinical review of a malaria case, supported by a PowerPoint slide show that users viewed as they listened; evaluation forthcoming.</p>

<p>JAIDS: Journalists Against AIDS www.nigeria-aids.org <i>applications:</i> I, C, T <i>location:</i> Nigeria</p>	<p>Hosts an active email discussion forum about AIDS in Nigeria, publishes locally relevant HIV/AIDS information online, provides training in using ICTs.</p>
<p>Malaria: An On-line Resource www.rph.wa.gov.au/labs/haem/malaria/index.html <i>applications:</i> I, Ed <i>location:</i> Australia</p>	<p>Provides information and training about preventing, identifying and treating malaria for medical workers. Available on CD and online at no cost in Spanish, French and English.</p> <p>Launched online in 1998. Funded by a medical supplies firm at circa £11,700pa, excluding the work of the authors. CD has been sent to over 2000 organisations, site has received over 300,000 total hits.</p>
<p>Managers Electronic Resource Center http://erc.msh.org <i>applications:</i> I, C, Ed <i>location:</i> United States</p>	<p>Provides online resources, training and message boards about health management at no cost. Registration required. Funded by USAID.</p>
<p>Medical Resource Reviews Database http://hpdrc.cs.fiu.edu/med.resource <i>applications:</i> I, Q <i>location:</i> United States</p>	<p>Database contains directories, summaries and reviews of electronic medical information resources. Entries rated for quality by medical professionals. Access is free.</p>
<p>medlib http://medlib.netfirms.com <i>strapline:</i> The medical library gateway <i>applications:</i> I <i>location:</i> India</p>	<p>Provides a directory of over 750 medical library websites, available at no cost. Created as a post-graduate project and maintained on volunteer time.</p> <p>Also experimenting with provision of a discussion forum, a directory of health library publications, and production of <i>Health Library Online</i>, an online journal publishing and republishing papers relating to online health libraries.</p>
<p>PHI: Partnerships in Health Information http://omni.ac.uk/hosted/phi/index.html <i>applications:</i> I <i>location:</i> United Kingdom</p>	<p>Facilitates partnerships between libraries in the health sciences in the UK and low resource countries. Helps maintain the Health Library Partnerships Database on INASP-Health.</p>
<p>POPLINE: POPulation information onLINE http://db.jhuccp.org/popinform/basic.html <i>strapline:</i> Your connection to the world's reproductive health literature <i>applications:</i> I <i>location:</i> United States</p>	<p>Maintains database of reproductive health information online, lists over 300,000 citations. Free CD available to users in LDCs in English, French or Spanish. Delivers full text to users in developing countries in PDF format, or on paper if required.</p>

<p>SAHealthInfo www.sahealthinfo.org <i>strapline:</i> South African health knowledge network <i>applications:</i> I <i>location:</i> South Africa</p>	<p>Health information portal for southern Africa with modules on over a dozen health topics, each maintained by volunteers (some of whom may secure funding for their portions). Launched in 1999.</p>
<p>SatelLife www.healthnet.org <i>strapline:</i> The global health information network <i>applications:</i> I, C, T <i>location:</i> United States</p>	<p>Conducts research on the use of PDAs for health professionals in LDCs. Hosts several active health email forums, including AFRO-NET. Created HealthNet, a satellite system providing email to remote areas in developing countries, uses it to deliver health information. Links over 4,000 health professionals with this network. Launched in the mid-1990's.</p>
<p>SHARED: Scientists for Health and Research for Development http://shared-global.collexis.net/main.asp <i>applications:</i> I <i>location:</i> Switzerland</p>	<p>Hosts databases of people, projects and organisations in science and health development. Launched in 1996.</p>
<p>Source: international information support centre www.asksource.info <i>strapline:</i> Supporting health and disability activities worldwide <i>applications:</i> I <i>location:</i> United Kingdom</p>	<p>Provides bibliographic and other directories related to health and to disability in particular, with a focus on developing countries.</p>
<p>Supercourse: epidemiology, the Internet and global health www.pitt.edu/~super1 <i>applications:</i> I, Ed <i>location:</i> United States</p>	<p>Collects PowerPoint lecture slide shows from lecturers internationally and disseminates them online and on CD at no cost to users. Has collected over 1300 lectures. Launched in 1997. Runs on a £160,000 annual budget, funded by NIH.</p>
<p>Tools for Life www.jhuccp.org/africa/tools <i>applications:</i> I, Ed <i>location:</i> United States</p>	<p>As an 'electronic experiment', created 28 health activity cards and over 40 information cards that are 'an integrated set of health communication materials for community health workers'. Includes guide for health managers to use in training staff in using the cards. Downloadable online at no cost in English or French. Funded by USAID. Also hosts audio and video shows of health interventions in various LDCs.</p>