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Developing a District Health Information System in South Africa:

A Social Process or Technical Solution?

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Abstract

South Africa initiated a national District Health Information System rollout strategy in the latter half of 1999. Experience has demonstrated that the implementation of an information system as a vehicle for the delivery of accountability in the management of health services, demands organisational change within a framework of human resource development and technical support. The aim of training, to empower facility and district staff to use locally generated information to improve coverage and quality of primary health care services, can only be realized if training and innovation for change are appropriately marketed and supported.

The appeal of HISP software, a locally developed application system lies in its user acceptance. While computers form a vital tool in providing easily accessible information for decision-making, their use must not be seen as a panacea for all information problems in primary health care services.

Strategies for promoting sustainability of DHIS implementation lie in the social processes of human resource development, changing organisational infrastructure and the use of ongoing evaluation rather than those of technical infrastructure. South Africa has developed a variety of mechanisms to facilitate this process.

Keywords

district health information system, primary health care, computers, software, sustainability, organisational change, human resources, training, evaluation

Introduction

The optimism expressed by international funding organisations on the cost-effectiveness of information systems in primary health care settings, with debate generally exploring policy, political, fiscal and organisational factors, has been tempered by the realisation that the development of technical infrastructure has often taken place at the cost of promoting internal sustainability [1-4].

As early as 1981 the World Health Organisation emphasized the importance of health information systems and related skills training in the implementation of an integrated primary health care approach. While the quality of primary health care services stems from an attitude that fosters service improvement, the measure of improved coverage and client satisfaction lies in the judicious use of information. Key factors that contribute to the success of services are decentralisation of authority for decision making, training and strengthening of managerial support for district-based initiatives [5].

In South Africa the historic first democratic general election held in 1994 set the stage for sweeping reform in political, social and health spheres that would redress imbalances in access to and distribution of resources.

Guiding principles of the national health plan and Reconstruction and Development Plan in promoting equity are those of consultation, transparency and consensus, with the active involvement of community members both a key ingredient and primary outcome [6].

The restructuring of the health sector from a fragmented, centralised service to a primary health care oriented system is characterised by the development of a decentralised, district-based system that is driven by an integrated health and management information system. An outcome of discussions on the concept of a national health information system that would facilitate an equitable distribution of resources and monitoring of progress towards objectives, initiated in the early part of 1994, was a consensus to develop a national policy for health informatics in South Africa [7]. The main policy issue challenges for the development of an information system included the identification of essential information needs at national level, development of standardised routine data collection systems and the promotion of health informatics education and training.

Initiatives to develop a decentralised district-based health system that is driven by an integrated management information system have to date, attempted to identify appropriate models through the development of pilot projects. The Health Information Systems Programme (HISP) is a collaborative project between four universities (Western Cape, Cape Town, Oslo and Eduardo Mondlane), health departments at various levels and non-government organizations. It is a development project that has designed and implemented mechanisms for the collection, processing and analysis of data and use of information for decision-making at facility and district level. On completion of a three-year pilot project in the Western Cape (1996-1998), the programme was accepted as the national model in the latter half of 1999.

The Context

The vision of HISP is to support the development of an excellent and sustainable health information system that enables all health care workers to use their own information to improve the coverage and quality of health care within our communities.

HISP is currently involved in facilitating a national rollout of the District Health Information System (DHIS). The DHIS aims at developing a culture of information use amongst health care workers through the development of knowledge and skills in data handling in order to create locally relevant information for use in the management of district level health programmes.

The unique contribution of HISP was ensured by the collaborative, bottom-up nature of an action-led health and management information system [8]. Project objectives included the design of a health information system model, development of a collaborative process for implementation at district level, development of appropriate computer and manual information tools, establishment of in-service training and support programmes and the establishment of monitoring and evaluation mechanisms.

Achievements were realised by focussing primarily on the processes involved in development of the human and organisational component rather than technical products. Successes included the creation of district-level data based information systems and structures, development of practical training courses that focussed on skills and understanding of information management and, less tangibly, a sense of ownership and a culture of information [9].

Identified threats to sustainability at district level and large scale application are influenced by the failure of top and middle management to support strengthening of a district based information system by allocation of human and financial resources and the slow pace of creation of decentralised district health systems with delegated authority to act on available information [9]. While the scarcity of staff trained in data analysis and interpretation has limited the effectiveness of health information systems, unless attention is focussed on constraints within the system, and they are "designed to support the decisions and actions of health personnel", the prioritisation of health information systems reform by policy makers and health managers can have limited impact [4].

The development of a DHIS in South Africa has taken place within the framework of an evolving technical infrastructure. Experience has demonstrated that while technical change occurs rapidly with ever increasing sophistication, the social processes within organisational structures, central to ensuring sustainability, occur slowly, with internal and external changes only apparent after many years.

The DHIS at the primary level looks at routine aggregated anonymised patient data, which is generally collected manually. The implementation of the DHIS was kick-started by development of an open-source, user-definable, scalable and flexible computer software application system based on MS Office Professional that uses Access as a relational database for data input and Pivot Tables in Excel for viewing, manipulating and graphing data. The software, initially developed for monthly primary health care data, has been expanded to include quarterly TB data, emergency medical services, environmental health and the hospital minimum data set. This HISP software has been accepted as the national standard for district-level anonymised information systems. Development of new modules, improvement to existing modules and interfacing with existing applications is ongoing.

The high profile given the HISP software application with its associated training and support, has given rise to a situation where computers are commonly (albeit misguidedly) regarded as the central component of information management. Most managers do not appreciate that computer software is merely a tool to facilitate data processing and access to information for management decision-making. Consequently, inadequate attention is given to the process issues that facilitate sustainability.

While the importance of information technology is undisputed, the use of computers at facility level as an essential tool for processing data and interpreting information is debated. Scarce resources, lack of information technology infrastructure and skill in developing countries form significant constraints to utilisation of computers as part of data handling and processing of information [10-12].

There has been discussion on the importance of developing a culture of information use. If front-line health workers are to use health information systems as a management tool for programme monitoring at local level, health managers & policy makers must develop a culture of information whereby information is actively used for resource allocation, planning and policy development at higher levels.

The optimistic suggestion that implementation of an action-led district information system will itself support district development and promote primary health care awareness by establishing a culture of local analysis and use of

information in order to identify and follow progress towards local targets within a primary health care approach has had limited success. Reality has indicated that managers seldom seek information (data yes) and once given it, are at a loss as to how to deal with it. Thus training also needs to include supporting the managers who need to use the information.

Strategies for sustainability

Strategies have been adopted to enhance the internal sustainability of the DHIS implementation process in 2001. Experience from South Africa shows clearly that a high degree of flexibility is an absolute pre-requisite for successful rollout in the current restructuring and transformation of the public sector. These strategies involve the so-called 'soft issues' that will facilitate realisation of the long-term assimilation of a DHIS implementation strategy, through focussing on issues of human resources development and support within a framework of organisational change and ongoing evaluation.

Human resource development

Programme directors, health managers, researchers and academics have identified training as a cornerstone in the successful implementation of health information systems. While training in health information systems is an essential ingredient, it in itself does not ensure successful implementation and needs to be linked to appropriate organisational development.

An evaluation of HISP training initiatives, conducted in 1999, demonstrated that while courses were well received, training did not result in a change in practice. The main barriers to application of skills acquired, were poor organisational infrastructure, lack of management support and a poorly established culture of information use at district level [13].

The way forward required both a return to the drawing board and organized action at various levels of the system. HISP training initiatives were revised with a clearly formulated strategy for action that was marketed to top and middle management structures to promote buy-in as part of the overall DHIS implementation strategy. Trainees need to return to a supportive work environment in which they have time and resources to practice new skills. The development of strategies to develop appropriate job descriptions that reflect the new skills and their use is ongoing.

Training involves careful selection of target groups from all levels and categories of health workers. Training courses contextualise health information systems within a broader health and social development perspective through incorporation of both generic and skills training components. Front-line data handlers are skilled in aspects of data handling, while service and programme managers are oriented to the rationale for health information systems as the tool needed to handle relevant data through strategies that focus on the analysis, interpretation and use of information. Ongoing training and support of staff are crucial if their role is to be developed into its full potential.

Training programmes have been designed to be sensitive to service related issues, participant and content specific, yet be flexible and adapted to the local context. A localised, grassroots approach to training that is actively marketed to promote interest and involvement of health workers and their managers in health information systems, should facilitate the development of a culture of information use.

Organisational change

Organisational change in job function and responsibility are needed in order to institutionalise streamlining of the systems and processes created to implement, maintain and sustain a DHIS. The shifting of resources that include the appointment of appropriate levels of staff responsible for all aspects of health information issues is a first step, leading to organisational changes regarding post structures and adjustments to job descriptions. The infrastructure to support this function/ person needs to be put into place. This includes appropriate computer hard and software, accessories (printers etc), email and ongoing technical support.

Buy-in by top management is essential for the sustainable development of the DHIS. Where the DHIS has, to date, not been seen as a strategic priority, the lack of full commitment by management at many levels has been a major obstacle to effective implementation. It is proposed that a concerted effort to convince national, provincial and district management teams of the usefulness of information for management in general and the DHIS in particular be initiated [14].

At each level of the system, there is a need for "DHIS champions" – people who are committed to action-oriented information systems and are able to be drivers of the system. Initially this will usually be project-funded facilitators but through a meritocratic process of selection of local trainers and managers, this has to be handed over to local service staff. Unless the DHIS is seen to be owned by local role models, information will always be seen as a chore performed for "other people" and not as an integral part of district development. It is this development of a locally driven information culture that is the key to sustainable development.

Monitoring and Evaluation

Monitoring and evaluation in health information systems is a limited, but much needed aspect of a successful and sustainable DHIS implementation. A review of the literature has demonstrated that effective, ongoing training is central to successful implementation and sustainability of a decentralised health information system. The development of evaluation methodologies that monitor training effectiveness should be a part of the process [3-5, 13-14]. Improvements in overall performance of information systems have been linked to a combination of

factors such as the participatory nature of implementation, increased involvement in management functions and a strengthened support function rather than training per se.

The effectiveness of any programme can only be measured through a systematic monitoring and evaluation of all phases and stages of implementation. While a series of process evaluations conducted by HISP have identified areas for improvement in the programme, the development of a coordinated national strategy is ongoing. The process of DHIS implementation will be evaluated using the HISP 6 steps model [9]. The progress of implementation will be monitored through an assessment of a district in terms of three levels of information system establishment and use.

Level 1 Data collected, captured, validated and reported

The HISP software is installed and staff have developed skills to capture, validate and report data (distribute data vertically and horizontally). Standards, tools and structures for collecting, capturing, and disseminating data are complete. Timely and accurate data are developed and used. This level includes development of Minimum Data Sets, data collection tools, data validation rules and feedback routines.

This level is considered achieved when data is submitted to higher levels within accepted time periods.

Level 2 Data interpreted and presented to managers/facilities

Data is converted locally into useful information (indicators, district profiles, trends) and displayed graphically in reports. Supervisors provide feedback to facilities based on analysed information. Information is quickly and regularly available to managers, decision-makers and other users in the form of specific and tailored monthly reports.

This level is considered achieved when managers and data providers get analysed information in a specific written report, and this information is discussed at relevant meetings.

Level 3 Information for decision-making

Information is used for planning and daily management of health services, often referred to as the existence of a local 'information culture'. This level entails developing mechanisms for quality control, responding to local management issues, monitoring service level agreements or giving incentives for good performance and other activities.

This level is considered achieved when managers at all levels are monitoring business plans using health service indicators, and these are used to ensure accountability to local political structures.

Conclusion

If we are serious in our commitment to adopting a district based primary health care approach to service delivery, we must give service providers the tools and resources to run decentralised health programmes. An action-oriented health information system is such a tool that enables health workers at all levels to plan, implement and evaluate locally appropriate programmes. Organisational structures and training initiatives that enable the use of locally generated information as a management tool to improve coverage and quality of primary health care services, is integral to the process of health service transformation.

Thus balancing the push to promote the development of technical infrastructure against the difficulties experienced by a lack of an organisational information culture has set the scene for ongoing debate between technocrats, bureaucrats, administrators, health managers and users – should the development of a district-based health information system be a social process or technical solution?.

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