South-South Collaboration: Adapting Information Systems Integration Strategies in Namibia

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Abstract: This research tests the feasibility of an information systems integration strategy within the Namibian health care system. Early findings suggest that the transfer of ‘best practices’ may be inappropriate in different country contexts, or that previously considered ‘best practices’ are less than optimal. The adaptation process builds on a South-Africa - Namibia collaboration of sharing practices, experiences and expertise. The role of South-South collaboration in supporting adaptation interventions in offering opportunities to explore both feasibility and appropriateness of potential interventions is addressed. The finding emphasizes the usefulness of extending joint knowledge on how to develop information systems in the health sectors of African and Asian countries.

Keywords: Health information systems, integration, adaptation, standards, user participation

1. Introduction

Health services in Southern Africa are divided into horizontal levels and vertical programmes, like malaria, HIV/AIDS and immunization. In order to provide health information for ministries and health managers at all levels, several countries have embarked on a process of integration of health information systems. Poor integration between health programmes has been observed to create obstacles for development in countries where this process has been studied, including Ethiopia [1], Malawi [2], Mozambique and Tanzania [3], and in South Africa [4].

A strategy for development of the integrated solution has been identified through compiling the results of studies made in countries mentioned above. The strategy for developing an integrated system consists of a sequence of processes for:

1. promoting buy in from all stakeholders for integration of vertical programmes
2. negotiating a common, indicator-based essential data set and adapting paper data collection forms to eliminate duplication of recording effort
3. adapting a technical solution for local application of data entry, reports and data transfer to other computer applications and pulling in data from previous years
4. improving access to information through decentralised feedback processes
5. training of health personnel at all levels on relevance and use of information for action
This research sets out to test the feasibility of this strategy in another Southern Africa country, expecting to confirm that these five processes will bring forth an integrated system with reliable data. Contrary to expectations, step 2 was deliberately delayed, while the technical solution was implemented. The implemented system thus has some particular qualities that will be explored and it raises questions as to what should be regarded as a successful integration across vertical organizational barriers.

2. Objectives

The development process was carried out in collaboration between people from the neighbouring countries, as has been the case for previous implementations. This collaboration has enabled the sharing of experiences and development of the strategy employed. Since similar information systems development efforts are planned in more countries in Africa and Asia, extending the common knowledge base and strengthening collaboration are likely to improve the development processes to come; so this research aims at extending the knowledge upon which such systems are built.

3. Methodology

The case study is a development project. The interpretive approach adopted to describe the development processes are based on the experiences of the primary author who acted as a consultant to the ministry. The author was actively involved in the implementation process and has participated in a number of iterative processes related to modification of the software to suit the local context.

Data were collected from a review of case specific documentation such as internal health reports, policy proposals and programme planning processes as well as a range of formal and informal interviews with stakeholders as part of the consultancy process. Participant observation during training sessions provided insights on user acceptance of the software.

It is relevant to note that, although no formal action research process was adopted, the in-house Health Management Information System (HMIS) committee mandated to coordinate the integration process considered themselves as change agents who were both coordinating the process and participating in the change process. The experiences and findings of one key action have informed both the actions and method of implementation of the next, resulting in a series of iterative action, reflection and change processes. Although the project is ongoing, the case describes the activities of a three year period, 2004 – 2007.

4. Health Information Systems Development

Health Information Systems in developing countries are complex to change; development and implementation are influenced by organizational complexity [5] [6], unrealistic ambitions and problems around sustainability [7]. Fragmentation and lack of coordination between health programmes and their initiatives are identified as key challenges in the integration of routine health information systems [8] [9].

Recent studies have demonstrated that health programme specific software systems continue to be used in addition to the integrated one [2], despite programme managers’ assurance that the integrated system is sufficient for their needs. Familiarity with the programme specific systems and control over their data seem to be important reasons for their continuous use [10].

A lesson learned from experiences of various countries is the need to match current realities with the context, the installed base, prior to the re-design and implementation of information systems [11]. These include consideration of poor infrastructure and technical capability as well as the weak ‘information use culture’ that is often seen in many
developing countries. In addition to scarcity of resources access to components of the infrastructure varies extensively between geographic and administrative areas. The resulting inequities and uneven development of infrastructure impact negatively on expansion of the health information systems interventions. This impact has created obstacles for the implementation of Health Information Systems Programme (HISP) initiatives. HISP has had to explore innovative ways to adapt implementation strategies across various country contexts where it is active. This has been a key factor in the development of the use of flexible standards in the HISP context [12].

South-South collaboration offers opportunities to explore both feasibility and appropriateness of potential interventions. Sharing of lessons through the creation of networks of action may contribute to identifying best practices and understanding the challenges of adaptation to country contexts.

4.1. Information systems development

Information systems are usually built according to the principle of avoiding data duplication, since this creates inconsistencies. Data duplication is avoided through designing a sound data model prior to implementation in a database management system.

Another desirable quality is that users accept the systems, so that resistance is avoided. This can be achieved by designing the systems to be as similar to the old systems as possible. When converting form an older computer application to a new one, users will normally require that the new application performs exactly as the old one, plus that it has a range of new functionality. When the old system is paper based, this principle means that old paper forms are imitated on the screen, that no structural changes are made; the “paper+” strategy. The downside of this is that the possibilities of the computer are not exploited.

5. The Namibian Context

Taking ownership is a complex and time consuming process; on achieving independence from South Africa in 1990 Namibia set about building a unified democratic country. An aspect of this was re-building its health system. The technical and financial support provided by international donor agencies and development partners provided a platform for a programmatic approach to improve health care and reverse the burden of disease. Newly appointed programme managers were tasked with assuming responsibility for the planning and delivery of health services; reporting on activities and progress made was formalised. Data needs were addressed by incorporating a ‘wish list’ under the umbrella of a ministry based HMIS unit. The HMIS unit collated all existing data routinely collected into a series of 20 plus programme specific datasets. Although a uniform set of data collection tools were designed to facilitate reporting of data from health facilities, a range of vertical information systems were developed to handle the data needs of special programmes such as malaria, HIV/AIDS and TB.

The Namibian Ministry of Health and Social Services (MOHSS), recognising the importance of relevant, timely and reliable information for effective management, embarked on an ambitious project to develop an integrated Health Management Information System (HMIS) to facilitate the management of services provided by the ministry in 2004.

It was perhaps natural that Namibia looked to South Africa, with whom they had close ties, a long history and a similar health system. Building on South-South collaboration through the dissemination of best practices, the experiences gained in South Africa have informed the Namibian approach to health information systems integration. The paper will
explore the important lessons learned in adapting collaborative South-South integration strategies within the Namibian context.

The two countries faced similar challenges; exploring mechanisms to redress the legacies of apartheid – a health system characterized by inequity and fragmentation. The main restructuring strategies in both countries involved the adoption of a Primary Health Care Approach to health service delivery and decentralization of authority through creation of a District Health System. In South Africa, a key mechanism to facilitate this process was the development of an integrated Health Information System [4] [12].

Development partners, international donor agencies and national interest groups were increasingly demanding evidence of health performance. Namibian health ministry officials found that despite large volumes of data collected, providing integrated health status reports that compared service delivery across programmes and levels of care was a complex and labour intensive activity; relevant health information was neither readily accessible nor available. In responding to the demand for improved health care planning and decision making, the need to integrate both service delivery and its tools as a key strategy to strengthen health service management was identified.

In 2004 the Namibian Health Ministry established an in-house committee to coordinate the process of developing an integrated HMIS. Before deciding on solutions, an in-depth assessment of the status of health information systems in the country was done. Looking to its neighbour South Africa a team was contracted to do an assessment of the status of the health information system. These findings were used to guide future development of an integrated HMIS for the ministry.

The assessment revealed an information system that was ‘data-rich, but information-poor’ [13]. Key aspects of this assessment are described. The data handling system is highly fragmented with several parallel information sub-systems in use. The information system, paper based at health facility level, is computerised at district or central ministry level. The majority of routine data are captured electronically at district level, while that for special programmes are computerised at ministry level. A focus on priority diseases such as HIV/AIDS, generally with dedicated donor funding, has resulted in a situation of disproportionate, uncoordinated systems development. This was reinforced by the range of software applications used to handle routine data and IT support staff employed by donor programmes to handle their reporting requirements.

Data collection is uniform across health facilities in terms of datasets and data collection tools; however, in excess of 20 datasets are used to record monthly routine data, each with its own set of data elements and data collection tools. Duplication of recording effort with variation in data values across data sets is a common feature. Although there is a high degree of institutionalised acceptance for data collection, the perceived usefulness of data generated is very low. This is reinforced in the poor quality of data, with few mechanisms in place to address data completeness, correctness and consistency. There are no formal data feedback systems in place and health workers, the generators of data, do not regard the processing and use of information as their domain; they are collecting data for higher levels.

Accessibility of information is poor. A variety of monthly, quarterly and annual reports are extracted from the 600 plus data elements; these tend to be generated as part of an annual reporting process. Although data capturers at district level can access the data they have captured and can produce reports, this is not often done as there are no standardised reports useful for management at local level. Integrated reports are scarce and can only be produced with extensive manual efforts; generally only at ministry level. Most reports were found to have limited operational value as they were generally late and data was historic. An additional factor limiting the use and usefulness of reports was the lack of confidence in the accuracy of the data.
In summary, the assessment found a poorly co-ordinated, bloated information system that was unable to produce timely information that is relevant, reliable or in a format useful for the management of health services.

Integration of information systems was identified as the central strategy to improve coordination of data handling processes, support decentralised authority for management decision making and cooperation between user groups. The recommendations to integration involved the standardisation of health data, data collection tools and data bases, the creation of an integrated indicator based essential dataset and a training strategy to support changing organisational work practices.

While the aim of an information system is to facilitate the use of information for action, access to information is a pre-requisite for its use in decision making. It was thus essential that the design of an integrated HMIS included relevant data that would be useful to managers, tools to facilitate easy retrieval of data, mechanisms to improve the reliability of data and reproducible data handling systems that could be embedded in work practices. HMIS has been identified as one of the processes to improve efficiency. However, the HMIS change process has to fit into and feed back into the organisational change process. In fact, it could be argued that it should be one of the drivers of change management.

5.1. Adapting the solution to suit the Namibian context

A change strategy based on the South African approach was developed. The first task was to identify an appropriate technical solution to ensure easy retrieval of data. An in-principle decision was made to use a single software application to serve as a repository for all routine health data. This was seen as a first step in making data available, a pre-requisite for the use of information.

Following a review of ICT systems used across developing countries, a decision was made to use the HISP DHIS software application developed in South Africa as part of a North-South collaborative strategy. The software application is increasingly being used in developing country contexts in Africa and India. This application is free, open-source software (FOSS) with code that allows local customisation using design features that are user definable, flexible and scalable. A range of tools enable local control of monitoring and dealing with data submission rates, data validation and maintenance of database integrity. The database handles both raw and indicator based data, allowing manipulation of the organisation of data in pivot tables. A range of both standardised and customised report templates enable generation of reports for feedback. Benefits for the Namibian Ministry of Health include a functional data repository; a database that offers user-flexibility for local customisation.

Despite addressing similar challenges in making relevant information available for management decision making, the approach adopted in each country was different. In South Africa the HMIS integration process was facilitated by the cultivation of standardisation and institutionalisation processes. A bottom up grassroots approach to building local ownership involved standardisation of health data through creation of a hierarchy of standards that allowed local flexibility and changing work practices. Implicit in many of its design strategies were prescriptions for local adaptation and use; indeed, the open-source HISP software application was based on a design of user-definability and flexibility [12].

In contrast, Namibia has adopted a top down approach to integration. Standardisation is being created by using the computer system (DHIS software application) as a data repository for all health data. Envisaged benefits of using the DHIS software include the generation of integrated reports across programmes and service levels, an integral tool in
strengthening feedback processes. These reports will provide a vehicle for ongoing integration strategies.

Anecdotal evidence has shown that supply creates demand; supply of information creates demand for information. It is suggested that cultivating an awareness of the value of relevant, timely and reliable information amongst health service and programme managers could successfully be applied in changing organisational work practices in the Namibian health system context [4] [12].

5.2. Implementation of the solution

The integration of the Namibian HMIS is in the early stages of design, development and implementation. The implementation activities of the technical solution are described. In the latter half of 2006, a South African consultant team was contracted to develop a customised Namibian DHIS database and import all available health data. This was done by creating an interface between the DHIS and existing databases. Ten years of routine PHC data was imported into the DHIS database. The process was far more complex and time consuming than initially expected. In the words of a key informant . . . “and don't even ask me how much time it took to go through all of that data manually and clean up duplicates and corrupted data!”.

The initial adaptation involved the creation of a single dataset to handle all data; the data repository. The plan was to delay further customization until standardisation of datasets and creation of an indicator based essential dataset was completed, which was scheduled to run parallel with the initial rollout of the software in 2007. However, during user training on the software, a high degree of resistance to use was encountered. One of the reasons identified was that the list of 400 plus data elements for data capture was too large; “we will get lost and not be able to capture all the data from the various forms because they don’t match the report forms”.

To redress this, the database was immediately adapted. Data elements were grouped into datasets that matched the monthly reports. The sequencing and naming convention of data elements was replicated to match those used in the data collection tools. The benefit was immediate. What users liked was that the data capturing form was familiar; they could understand how to use the form. Although the technical solution and adaptation process was simple; the benefit was immediate in reducing resistance. The technical management of this adaptation was done in consultation with users and served to demonstrate the ease of adaptability as well as transfer knowledge and skills. Local staff were empowered and users could now assume local control of the software.

Implementing use of the DHIS software across the country was planned for the latter half of 2007. In preparation for this a user manual was customised for the Namibian context; a valuable mechanism to demonstrate local adaptability of the system. A series of training courses was planned; all data capturers across the country were targeted. The foundation course included training on data capturing, data validation and generation of standardised reports. General aspects on database maintenance were introduced; training on advanced functionality was planned for subsequent training initiatives. A key aspect of the approach to training was the development of a post training support strategy, which was deemed critical to early identification and resolution of user problems. This is currently ongoing.

A number of technical challenges remain. A solution to handle the mix of inpatient service and clinical data is required. This has delayed full rollout of the software as dual database systems are still maintained. Despite this, there are further requests for integration with other databases, such as HIV/AIDS: “We want to stop entering the PMTCT data on the old EPI 6 systems. This data must also be imported . . . Lastly we must do this thing
soonest. Right now there are too many systems for different data sets, i.e. EPI 6 for the PMTCT, DHIS for HIS data and Dbase for inpatient data. The sooner we consolidate this the better our rollout will be”.

5.3. Early findings

Technical skilling in database maintenance is increasing at both ministry and district levels. User knowledge and skill in generating integrated reports for a range of programme and service managers at all service levels is providing a vehicle for consensus building.

Lessons learned from South Africa include the value of openness and flexibility in the implementation of health information systems. The lesson learned is that products and strategies can be used in different settings, although they must be adapted to suit local needs. The time frame, within which adaptation takes place, during the design, development or implementation phase, may impact on its successful adoption. South-South collaboration may help in improving reform activities across country contexts.

6. Conclusions

The Namibian adaptation process is still underway. The detour from the accepted sequencing of development steps appears counter-intuitive; in the sense that step 2, negotiating a common data set and data collection tools were delayed in favour of immediate implementation of the software solution. The case has demonstrated that the processes do not have to follow the same sequence as in other countries. The final result has not yet been seen in Namibia, but there is no indication that this development should be more problematic than those experienced elsewhere. The idea that there is a best way of carrying out such endeavours might be false; rather that flexibility in approach is desirable in negotiating within a local context.

The technical solution currently implemented is an integrated system in the sense that the data for the majority of vertical health programmes is stored in the same database, a data repository. Contrary to the principle of a sound database, data duplication, overlap and inconsistencies still remain.

The paper+ solution is what is currently implemented, and this seems to do its job in reducing resistance amongst vertical programme managers. Having all their data in the software system, they are getting familiar with using it, hence we predict that they will prefer to continue using this software. The resistance found amongst programme managers in other countries seems to have been overcome through the strategy followed in Namibia.

Redefinition of the data set is scheduled to take place, and a series of incremental refining can be expected. As long as this will happen over a longer period of time, we expect that the users will stick to using the system and not develop programme specific databases, except for exporting data from the integrated system to software required by programme donors. Future research should test the validity of these expectations.

This approach to integration may be seen as part of a series of incremental steps that are informed by local contextual factors. The implication is that use of a technological solution may facilitate buy-in and overcome resistance to integration.

This finding emphasizes the usefulness of extending the joint knowledge on how to develop information systems in the health sectors of African and Asian countries. The sharing takes places both through exchange of personnel and through publications and reports on experiences, often carried out by research students.

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