Rejection of an innovation: health information management training materials in east Africa

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A shift towards decentralization in many low-income countries has meant more skills are demanded of primary health care managers, including data and information handling at all levels of the health care system. Ministries of Health are changing their central reporting health information systems to health management information systems with emphasis on managers utilizing information at the point of collection.

This paper reports on a research study to investigate the introduction of new information management strategies intended to promote an informational approach to management at the operational health service level in low-income countries. It aims to understand the process taking place when externally developed training materials (PHC MAP), which are intended to strengthen health management information systems, are introduced to potential users in an east African country.

A case study has been undertaken and this research has demonstrated that the dynamic equilibrium approach to organizational change is applicable to the introduction of new information management strategies and management approaches in low-income countries. Although PHC MAP developers envisaged a technical innovation needing implementation, potential users saw the situation as one of organizational change.

Contributions to theory have been made and many implications for introducing new information systems or the informational approach to management are identified. This theoretical framework could also facilitate the introduction of future information management innovations and would allow practitioners to perceive the introduction of information management innovations as one of organizational change that needs to be managed. Consequently, issues that may facilitate or inhibit adoption could be identified in advance.

Key words: health information system development, low-income countries, PHC MAP, decentralization, management, organizational change

Introduction

District Health Management Teams in Africa are not as efficient and effective at delivering primary health care, as they should be. The 'weakness of information support is acknowledged by most member states as a persistent obstacle to vigorous and objective management' (WHO 1994a). Decentralization in many low-income countries has demanded more skills of primary health care (PHC) managers including data and information handling at all levels (AKF 1993). Ministries of Health (MOH) are changing their centralized reporting health information systems to health management information systems (HMIS), with emphasis on decentralized use of information. The new information management strategies are intended to promote an informational approach to management at the district and operational health service level. Organizations which have an interest in training health service managers also recognize the need for more skills, and the Aga Khan Foundation (AKF) initiated the development of a training package for PHC managers known as the Primary Health Care Management Advancement Programme (PHC MAP).

Definitions

The terminology of the information systems field is not standardized: lay terms have specific meanings and different researchers have different terms for the same concept. Recognizing this problem, various terms are defined below.

Information is a key resource in many organizations, and has to be well managed in order to ensure effective and efficient use. This seemingly obvious concept becomes more complicated when it is differentiated from data and in this paper we maintain ‘information to be data plus the meaning ascribed to it’ (Wilson 1984a: 198), implying that data, not information, is neutral. Avison and Fitzgerald (1988: 6) support this idea and indicate that the distinction between data and information is context dependent. That which is information to one person, because it is an interpretation of events, to another is raw input because it has not been analyzed according to their purpose. These definitions recognize information is organization-specific, and role- or individual-specific. Information management strategies include: ways of collecting, storing and processing data; data and information flows; information
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dissemination and use; tools for examining information systems such as information audit and identification of who is involved, where and when.

The information systems conceptual basis lies in the 'systems' idea, developed to deal with complex problem situations. In this paper, an information system involves the data collection, data pathways, storage, processing and dissemination, as well as the information pathways and information use in an organization. It describes human activity, which may not involve the use of computers.

Non-computerized management information systems (MIS) are the focus of this research, and the definition used throughout this paper is:

an MIS is the term that describes the provision of information to support the planning, control and operations of an organization. It aids operations, management, and decision-making by providing past-, present- and future-orientated information about internal operations and external intelligence.

Finally, an information system is part of an organization and supports it. This suggests that: ‘it is impossible to analyse the operations of an information system or design a new one without first having a clear understanding of the activities and the objectives of the business system it serves’ (Lewis 1994: 61). This implies that different approaches to decision-making are necessary, depending upon the management style and information system in the organization. In a centralized decision-making organization with little capacity for junior managers to initiate activities, their decisions are likely to be based on traditional practice or convenience rather than information. With decentralized decision-making a different management approach is needed and consequently a different information system. Data collection, analysis and information use are all likely to take place at a decentralized level where those managers employ an informational approach to decision-making, that is they base their management decisions on information either from their local internal operations or local external intelligence.

Developing and improving health information systems

Research and reports on information management for health unit and district managers in low-income countries have focused on: data collection and processing (Nabarro et al. 1988; Foltz 1993; Mock et al. 1993; Van Harteveld 1993); information use (Smith et al. 1988; Wilson et al. 1988; Bekui 1991; Keller 1991; WHO 1994b); and general organizational and management problems (De-Kadt 1989; Sandiford et al. 1992; Husein et al. 1993; Campbell et al. 1996). Many of these problems indicate a need for information that could inform various aspects of operational managers' policy implementation, monitoring, evaluation and planning role, rather than contribute to profiling morbidity and mortality status for national use, which was often the aim of central reporting health information systems. An underlying concept in many papers is the need for information management strategies to promote an informational approach at health unit and district level. None of the papers mentioned reviews the decentralized operational manager’s role and appropriate information management strategies.

Few papers describe the development of a new or revised HMIS for operational management. Information system developers in Ghana (Campbell et al. 1996) recognized the scarcity of research describing the process of developing HMIS for operational managers. Their case study covers the design process and makes useful suggestions on how to resolve important issues arising. However, it does not follow implementation in detail, or draw upon existing research and theory to interpret findings. VanHarteveld (1993) discusses the need for an information management approach when strengthening this information system in Ghana, and suggests that the ‘introduction of information systems is only successful when implemented as part of an information strategy leading towards information management which support the organizations’ objectives rather than is [sic] an objective in itself’ He is, however, referring to intentions, rather than the actual events.

Foltz (1993) describes technology transfer to improve a national reporting system, but does not measure success in terms of use of information for local operational management. A case study of information system development in Niger (Mock et al. 1993) describes the change from a centralized reporting system to an HMIS, but only MOH central management is facilitated.

The World Health Organization (WHO) states: ‘Efforts to strengthen national information systems have often produced little improvement and have sometimes made the problems worse’ (WHO 1994a: 10). These case studies of information system development make a contribution to the current level of knowledge on this issue in low-income countries. However, there is a lack of research that aims to understand the process of introducing externally developed training materials, intended to strengthen health management information systems to potential users in low-income countries. This paper reports on such a research study, using existing theory and research to interpret the process and deepen our understanding.

Methodology

A particular east African country, unidentified because of confidentiality guarantees, was chosen because AKF were introducing PHC MAP there, and research funding was available. The investigation utilizes a qualitative approach, which is ‘multi-method in focus, involving an interpretative, naturalistic approach to its subject matter. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meaning people bring to them’ (Denzin and Lincoln 1994). Following Morse (1994), the research strategy was not based on conscious, prior consideration of philosophical questions, but on the study purpose, research question, and the skills and resources available: ‘if the
question concerns the nature of the phenomenon, then the answer is best obtained by using ethnography'.

The case study has used participant observation, interviews, official document examination, written field-notes and diaries. The position of the researcher was that of a 'peripheral' observer (Alder and Alder 1994: 380) in which the researcher is not fully committed to member's values and goals or to being a genuine member of the group, but instead observes and interacts closely, without participating in the core activities constituting group membership. In this case study one of the researchers (JG) took on the peripheral observer role during the workshop where the PHC MAP was introduced.

In addition, JG interviewed participants in relation to their experience at the workshop, and other interviews were conducted before and after. Theme development was aided by NUD*IST software. Using Phillips and Pugh's (1994) classification of relationships between theory and empirical evidence, our approach is exploratory as we use theory, not to guide, but to elucidate and to provide further understanding when analyzing empirical data. Although initial data collection and analysis were not guided by existing theory, we were 'theoretically aware' (Glaser and Strauss 1967) prior to fieldwork.

The ultimate aim was to identify a theoretical framework that describes the relationships within the evidence, and use that theory to develop recommendations for practice. It is an approach also utilized by Orlikowski (1993). Subsequent discussion relates the empirical situation to those found elsewhere.

This case study showed that the decision to adopt PHC MAP was very complex. Gladwin et al. (2000) have reported elsewhere this complexity by drawing on two theoretical frameworks and the practical implications for introducing new information systems or the informational approach to management.

The theoretical construct of most value has been the idea of an organization as four forces in dynamic equilibrium, first postulated by Leavitt (1965) and elaborated by Leavitt et al. (1973). They believe change in one part of the organization (Task, Structure, People or Technology) leads to changes in other parts, and a relationship exists between all these parts. By Technology Leavitt means the tools which enable people, other parts, and a relationship exists between all these parts.

Background

Until 1993 the health information system in the country studied was mainly a morbidity and mortality reporting system with information flowing one way, from individual health units to district and national level. Since then an HMIS, intended to support management of health units, has been developed and is being implemented.

This was the context into which PHC MAP was introduced, at a 1-day workshop sponsored by AKF and USAID in 1996. The materials were originally developed to strengthen management information systems and the sustainability of PHC and mother and child survival programmes within AKF’s own programmes (USAID 1991). Developers assumed this would be achieved by improving planning and management capabilities of programme management teams, as well as by more appropriate and greater use of information for rational decision-making. They later widened the application to include the government District Health Management Team, without changing the design of the materials.

Post-publication promoters focus on developing management skills, rather than strengthening information management skills. PHC MAP consists of eight modules, each with an accompanying trainers' module, plus computer software and booklets on computers, management tips and problem solving. The first, ‘most important’, module emphasizes information audit. The series could be seen as management tools, as information management tools, as a training package for managers or as enabling the production of information as a management tool.

Results: consideration of the use of PHC MAP

PHC MAP is an external innovation, not requested by the country’s health service providers. However, at the workshop AKF introduced PHC MAP to MOH personnel, international agencies, management trainers and academics. When considering whether to use the package, potential PHC MAP users appeared to be drawing upon ideas of organizational change, developed from experience, conjecture or theoretical knowledge. Figure 1 displays their ideas graphically showing five forces and issues raised. There was some confusion over exactly what PHC MAP was amongst the key informants, and the lack of clarity in the definition led participants to develop their own definitions, depending upon their own roles and responsibilities, and how the package could help them. PHC MAP was variously interpreted as a management-training package; data collection, processing and information use strategies; a rational approach to management; or informational approach to management by different people. Developers and presenters did not emphasize that PHC MAP was promoting an informational approach to management. Key informants queried its relevance for their own practice, as it was not aligned to the organizational forces mentioned below.
Organizational strategy and policy

The key informants questioned the alignment of PHC MAP to the intended strategy and policies of the health services in the country. Their concerns included:

- the primary health care policy in PHC MAP differed from their own approach;
- their emphasis was on consolidating existing services, including hospital services, which were not mentioned in the package;
- the introduction of patient fees to be retained at the health unit level, partly to supplement staff salaries, was not reflected in PHC MAP;
- their own approach to district management training, which did not focus on information management;
- the new HMIS that was being piloted in parts of the country;
- the support–supervision training approach which they used.

Organizational structure

The key informants felt that organizational structure was not considered in PHC MAP. Thus the theoretical approach (in PHC MAP) to health service decentralization differed in practice. No ministry of local government officials or members of the non-governmental organization (NGO) health services coordination body had been invited to the workshop, yet they were important decision-makers regarding health service provision.

Individuals and roles

PHC MAP was considered inappropriate because the district management teams did not have the appropriate skills, roles and other resources, upon which they assumed the package depended, including:

- skills in management and information use;
- adequate financing of health services, training, time and other resources;
- ability to utilize existing information for management;
- ability of District Medical Officers to prioritize.

Management style and procedures

Key informants believed their existing management style and procedures were at odds with those portrayed in PHC MAP, including a need for logistics, supplies and financial data at district and health unit level, which they believed PHC MAP did not have. Hence the programme was not aligned to their own management tools.

Degree of change

Some key informants focused on the degree of concomitant change needed when introducing PHC MAP. One MOH official desired minimum disruption.

Discussion

An adaptation of Leavitt’s (1965) model of an organization existing in dynamic equilibrium was used to interpret the perceptions of key informants. Assuming ‘Technology’ is PHC MAP, we have found it useful to change ‘Task’ to ‘Strategy’, add ‘Management Style and Procedures’, and change ‘People’ to ‘Individuals and Roles’. Thus, although PHC MAP developers envisage a technical innovation needing implementation, potential users saw the situation as one of organizational change. Avgerou (1993) also criticizes national development planning information-system developers for not seeing organizational change as part of the systems development process in low-income countries.

The issue of the alignment of PHC MAP with existing management style and procedures can be explored with
reference to Leavitt’s (1965) concept of dynamic equilibrium of organizations, which has been elaborated by several authors in a series of writings edited by Scott Morton (1991). These examined the impact of information technology (IT) on organizations, and suggest that an organization should be thought of as consisting of five forces, not four, with the extra force being management processes, which includes the planning and control processes within the organization. They also change ‘Task’ to ‘Strategy’, meaning the business and IT strategy in the organization, and rename ‘People’ as ‘Individuals and Roles’. Additionally, they make the boundaries of the organization explicit, and indicate there is, outside the organization, a technological and socioeconomic environment within which the organization exists. They elaborate on the concept, particularly as it is related to IT and the organization that operates it.

‘Alignment refers to the idea that the requirements of the particular IT system – for certain levels of motivation, types and amounts of knowledge and skill, and communication and co-ordination – are matched by the capabilities of the organization. Conversely, alignment also means that the requirements of the organization – for example, decentralized decision making, continuous learning, challenging jobs, or attractive career paths – are accommodated by the design of the IT system.’

There are several routes to alignment which include: some of the enabling organizational conditions already existing or being developed in anticipation of the IT change; the organization helping to pull the technology into place by both the organization and the technology being developed simultaneously; and the management focusing primarily on implementing the technology, but allowing the organization to be pushed by the change. They suggest this latter route, which presents obstacles to alignment, is the most common.

Potential PHC MAP adopters appeared to be considering the extent of the change required. This is not a new idea, and several authors make the distinction between radical and incremental change when trying to understand their evidence; for example, Onstrud and Pinto (1991), Greer (1981), Kaluzny et al. (1977) and Orlikowski (1993).

Finally, developers and presenters appeared not to recognize that PHC MAP was promoting an informational approach to management. Likewise, in Niger (Mock et al. 1993), information system developers believed they were introducing statistical techniques, and only later realized they were introducing a new management approach with wider organizational consequences.

**Conclusion**

Potential users of PHC MAP suggested the PHC MAP developers had inappropriately assessed the needs in their country and it was unlikely to be of much use to them. Moreover, they perceived the situation as one of organizational change, which the PHC MAP developers did not.

Other situations may benefit from the idea of organizational forces in equilibrium, as it can help predict what needs to change within the organization when an innovation is introduced. The utility of Scott Morton’s refinement of Leavitt’s original idea of organizational forces existing in dynamic equilibrium has been demonstrated in our study, which has also yielded many implications for practice. Some of these reinforce existing guidelines, although this does not negate their usefulness, and others may be new to this area. If some of these implications appear ‘common sense’ to some practitioners this is no reason to omit stating them, as evidence from this case study suggests that putting common-sense or guidelines into action can be difficult. A detailed list is given in the appendix.

The idea of distinguishing types of change is useful because it could help promoters when introducing innovation, implying the need for prior in-depth understanding. PHC MAP tools as reference materials for the Masters degree in health management or for District Health Team management training could be seen as an incremental change innovation. Bringing the informational approach to management is a radical innovation.

Considering the organization as several forces seeking equilibrium, and the innovation as one of those forces, implies that to facilitate alignment these should be considered when adopting an innovation. Walsham (1993) suggests an implementation strategy should be informed by a thorough diagnosis of the organizational setting in which the information system will be used. Acknowledging that implementing new information management strategies is not only an issue of technological change, but also one of organizational change, implies that needs assessments, monitoring and evaluation of the changes should be very broad, adding to expense and use of time at all stages.

This research indicates that Change Agents should make themselves aware of the situation into which they introduce an innovation. They need to assess whether the organizational change they propose fits with organizational forces in operation and, if not, identify strategies and areas for change. An understanding of the decision-making process, and of the important actors in that process, helps identify those people to whom they should direct their efforts.

If the intention was to produce a set of training materials to improve information management amongst health managers, it could have been improved by:

- a conceptual module relating information management tools to management tools;
- another model linking information management and management generally;
- reflecting the training approach, policy, and the organizational, management and presentational style utilized in this particular country;
- identifying common problems and solutions;
- including case studies.

The second of these could be the input-process-output systems conceptual framework, which would help managers...
to understand their activities, as this would point to where information was needed at each stage. However, if managers utilized a different, more relevant conceptual framework for understanding the factors affecting health status, and for planning and monitoring health services, this framework could be incorporated instead. Recommendations for changing information management strategies should acknowledge that these are part of the information system, not isolated islands that need to be seen in the wider information-system and organizational context. The overall rationale should be presented in the materials, as well as by presenters.

If the innovation were a completely new management style, such as the informational approach to decision-making, this would also need major changes in organizational structure to make it compatible with Strategy, Structure, Management procedures and tools, and Individuals and Roles. Materials aimed to strengthen HMsIs should make explicit that the information management strategies are intended to support a particular management style, the informational approach.

Finally, although this research study has demonstrated that the dynamic equilibrium approach to organizational change is applicable to the introduction of new information management strategies and management approaches in low-income countries, this is more than an academic exercise. This framework can be of practical value in understanding existing problems and facilitating the introduction of such innovations by allowing practitioners to identify the required organizational change in advance.  

Endnotes
1 This particular country stressed the comprehensive PHC policy which emphasizes that all the community should be involved, not just voluntary health workers (the apparent approach of AFK) and emphasizes equity which is not a feature of the PHC MAP series.
2 Ideally any new management system would be introduced because the organizational structure and strategies dictate it, however, in practice this is not always the case.

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Appendix: Implications for practice

This case study has led us to suggest many implications for practice. These are itemized below, and are written as if introducing a new information system. However, most of these can be reworked to provide a checklist to examine alignment in an existing organizational situation.

1. Aid agencies developing and presenting tools for strengthening information systems should clarify their aims and objectives within the written material and consistently present them. This would have been useful if presenters had specified that the expected improvements in the HMIS and use of information, after using PHC MAP, had the potential to improve management, rather than simply saying the series would improve management and was about data management.

2. Change agents and others involved in introducing innovations need to understand whether an innovation implies a radical change or natural extension to an existing system.

3. To ensure alignment of new information system technology it is necessary to view the introduction of an information management innovation as an issue of organizational change and facilitate alignment of all forces within the organization, including: organizational policy; management tools and processes; individuals and roles; and the actual power, responsibilities and activities of managers. If that alignment does not exist, adjustments will need to be made.

4. Management training needs to be advocated, and conducted at the same time as or prior to the implementation of a HMIS.

5. A very broad needs assessment should be conducted prior to introducing information management innovations. This should not simply focus upon data collection, processing and information use, but needs to cover the skill levels and roles performed, actual organizational structure, organizational strategies, management tools and management processes in operation.

6. Strategies should be developed to encourage use of management tools and information.

7. HMIS developers should draw upon existing experience and research in the information system area when developing such systems in low-income countries.

8. Aid agencies presenting tools for strengthening information systems should be aware of the context of implementation.

9. Materials for strengthening information management should clarify the links between information, management tools and management.

10. HMIS improvement should focus upon utilizing information as well as data collection and processing.

11. Materials aimed to strengthen HMIS should make explicit that information management strategies are intended to support a particular management style, that is the informational management approach, and put strategies in place to support this.
(12) Efforts to improve health information systems should prioritize the conceptual frameworks which describe health workers’ understanding of the factors affecting health status, and which are utilized in planning and monitoring health services.

(13) Recommendations for changing health information management should take into consideration that these are part of the information system, not isolated issues, and need to be seen in the wider information system and organizational context.