EVALUATION OF AN IN-HOUSE TRAINING COURSE FOR DISTRICT LEVEL HEALTH WORKERS IN THE CAPE METROPOLE REGION

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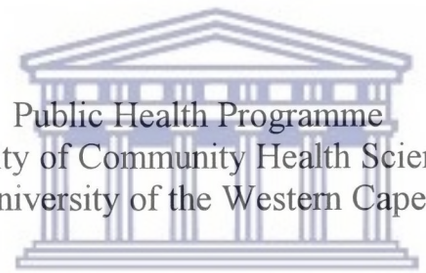

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Health information Systems; Evaluation; District Health System; Training; Course design; Conceptual framework; Learning experience; Method and Style of presentation; Participant perceptions; Evaluation methodologies

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ABBREVIATIONS

DHIS	District Health Information Service
CMC	Cape Metropolitan Council
HIS	Health Information System(s)
HMIS	Health Management Information System
HISPP	Health Information System Pilot Project
HISP	Health Information System Programme
RMR	Routine Monthly Report
PHC	Primary Health Care
PHP	Public Health Programme
UCT	University of Cape Town
UWC	University of the Western Cape
WHO	World Health Organisation

ABSTRACT

The stated aim of training in courses run by the Health Information Systems Programme (HISP) is to empower facility and district level staff to use locally enerated information to improve coverage and quality of primary health care services. As the level of effectiveness of training was not known, it was essential that, prior to a national expansion of training, an evaluation be done.

The aim of the study was to evaluate the quality of a current, in-house training course, Certificate in Information Management, in order to determine whether the goals of training are being met and to identify areas for improvement. An evaluation was made of the course design process, course implementation and participant perceptions of the learning experience.

A cross-sectional descriptive study design using both qualitative and quantitative techniques was used. Data collection included an audit of documentation, direct observation and interviews. The study population comprised key informants, trainers and participants. Purposive sampling was used to select key informants and trainers, convenience sampling was used to select participants from the training courses selected for the study.

The results showed that although the course was 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. Weaknesses in the course design highlighted inappropriate selection, poor contextualisation of content, and a failure to provide effective post training support, as areas requiring improvement.

Recommendations relate to changes required in the course design process, establishment of an administrative infrastructure and the need for a structured evaluation methodology.

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INTRODUCTION

1.1 Context of the Study

Anecdotal experience has shown that nurses working in community settings have always been responsible for the collection of statistical information. The administration of health information was and still is for many, an irritation interfering with their clinical function. While nurses collected statistics, few were trained or required to use the information. Nurses have traditionally been the providers, not managers or planners of health care delivery. Access to relevant health information and the authority to adapt health programmes based on statistical data has been and is generally regarded as the business of 'management', and within the traditionally rigid hierarchical structures, management is not for ordinary nurses.

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. The Cape Metropole region is comprised of 11 health districts where services are rendered by both local and provincial authorities in a variety of nurse-driven clinics and doctor-driven community health centres.

The integration of health services within a unitary primary health care delivery system and the shift to a nurse-based district health care service at the primary level has required the development of appropriate clinical and management skills among all cadres of personnel working in community settings. An integral part of this transformation is the move from a data reporting system to a health management information system.

Participation in decision-making to make the delivery of health care responsive to local needs is an integral part of the primary health care approach. The call for service accountability and transparency within a world of shrinking resources and rapidly evolving technological sophistication is realized in the need for training in the management of health information systems. Responsible decision-making in an ever-widening field of health care delivery should be based on access to and use of relevant information.

The Health Information Systems Programme (HISP) is a development project that has designed and implemented mechanisms for the 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 three districts in the Western Cape (1996-1998), the programme was implemented throughout the Eastern Cape in 1998, and accepted as the National model in the latter half of 1999. Site facilitators were appointed to implement a rollout programme in identified health districts in the Cape Metropole region. Their main function is the training of health workers in the collection and use of data at district and sub-district level and to provide support in the development and implementation of the health information systems programme at district level.

The majority of training for this new role takes place on-the-job or through attendance of in-house training courses. While certification of attendance is the norm, there is limited assessment of whether the acquired knowledge and skills gained on the course are applied on the job.

Lack of authority, lack of time and poor organisational infrastructure are commonly cited as reasons for the failure to use health information systems. The mismatch between health districts & designated magisterial districts in the Western Cape has impeded the creation of a district-based organisational infrastructure to support information system initiatives. The devolution of authority & responsibility is still under negotiation between provincial and local authorities.

The role of the nurse working at the primary level has seen dramatic changes in the past decade. The shift from specialization to generalization and from clinical care to management has demanded the acquisition of a broad range of new knowledge and skills. Advanced professional training programmes, traditionally only available in formal academic settings do not meet current service demands. Strategies have been developed over the past few years to improve the quality of, access to and use of health information systems. Nurses and other health workers at the primary level from both management and clinical areas have completed a variety of in-house training courses aimed at increasing awareness of, access to and use of health information.

The infrastructure of technical and service implementation needed to develop an effective health information system is ongoing. Training and support of service providers should increase awareness of, access to and utilisation of health information systems.

1.2 Definition of terms

A **Health Information System** refers to a system of determining information needs and the subsequent data handling processes of collection, collation, analysis, interpretation, reporting, feedback and use of this information.

A **data reporting system** refers to the flow of data from facility level to higher management levels. This does not necessarily include or imply feedback, analysis or use of data.

A **health management information system** incorporates the data handling processes of collection, collation, analysis, interpretation and feedback for the purpose of using information as a decision-making tool in the planning and delivery of health services.

Evaluation is concerned with the measurement of the performance of learners, the effectiveness of teachers and the quality of the programme – a systematic review of a programme to assess its performance, effect, efficiency, sustainability or relevance – a more in-depth and comprehensive approach to assessment of a programme than monitoring.

Training refers to the transmission of knowledge and skills to others, often with the intention of bringing a person(s) to a desired standard of efficiency by way of instruction and practice.

LITERATURE REVIEW

Whereas power used to be in money in the hands of a few, power now lies in information and this is in the hands of many (Hilary Southall)

The review is comprised of four parts:

2.1 The role of health information systems in primary health care

2.2 The need for training in health information systems: policy and practice

2.3 The principles of adult professional continuing education

2.4 The principles and practice of evaluating vocational training programmes

2.1 The Role of Health Information Systems in Primary Health Care

An International Perspective

There is extensive literature on the use of information systems in primary health care settings, with debate generally exploring policy, political, fiscal and organisational factors that may impact on successful and sustainable implementation (Braa & Heywood, 1995; Heeks et al., 1999; Opit, 1987; Sandiford et al., 1992).

The Primary Health Care (PHC) approach as a model of health care delivery was adopted in response to the failure of the medical model in meeting the basic health needs of people. Mechanisms for improving coverage and quality of PHC services are informed by policy development and use of available scarce resources and appropriate technologies (WHO, 1978). As early as 1981 the World Health Organisation emphasized the importance of health information systems (HIS) and related skills training in the implementation of an integrated PHC approach.

Campbell (1997) suggested that a critical factor contributing to the gap between health policy and implementation is the "availability of accurate, timely and relevant information to support more rational and effective decision making". Heywood & Campbell (1997) found that "a health information system (HIS) can produce better information and increase the proportion of informed decisions . . . even if information is available, there is no guarantee that it will be effectively used."

Southall (1993) found that data is not used because "it is not in the right place at the right time to be used by the right person." If, despite the wealth of available health related data, poor data quality is a consequence, not a cause of under-utilization, an action-led rather than a data-led information system where "information needs are related to intervention" can enhance commitment to and utilization of information in decision-making.

According to Sandiford et al. (1992), the "scarcity of staff trained in data analysis and interpretation" has limited the effectiveness of HIS. However, unless information systems are "designed to support the decisions and actions of health personnel", the prioritization of HIS reform by policy makers and health managers can have limited impact.

Opit (1987) in emphasising the importance of an action-led "bottom-up" approach, found that while national policy and fiscal guidelines must influence the design and implementation of information systems, the willingness to "devolve power and resources to the grass roots" can enhance information utilisation as a decision-making tool.

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 successful quality assurance programmes are decentralisation of authority for decision making, training and strengthening of managerial support for district based initiatives Omaswa et al. (1997).

Lessons learned during development of a PHC information system in Ghana included the realisation that although involvement of staff at all levels in the design and implementation of a health and management information system (HMIS) may lead to "a sense of ownership, understanding, decentralised use and analysis of data", a balance must be sought between "maximum participation at all levels and maintaining momentum of the initiative"(Campbell, 1997).

The role of computers has received widespread comment. While the importance of information technology is undisputed, the use of computers at district and facility level as an essential tool for processing data and interpreting information is debated. Scarce resources, lack of information technology infra structure and skill in developing countries form significant constraints to utilisation of computers as part of data handling and processing of information (Heywood & Campbell, 1997; Sabbatini, 1987; Southall, 1993).

A South African Perspective

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 (ANC, 1994).

The restructuring of the health sector from a fragmented, centralised service to a PHC oriented system is characterised by the development of a decentralised, district-based system that is driven by an integrated health and management information system (HMIS).

An outcome of discussions on the concept of a national health information system that would facilitate 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 (Power, 1994). 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 the most appropriate model, through the development of pilot projects in a variety of sites throughout the country. The unique contribution of the Health Information Systems Pilot Project (HISPP) of the Western Cape (1996-1998) was ensured by the collaborative, bottom-up nature of an action-led health and management information system (Heywood et. al., 1998). Project objectives included the design of a HIS model, a six-step process for implementation at district level (identification of pilot sites, creation of an information team, conducting a situation analysis and information audit, training and evaluation), development of appropriate computer and manual information tools, establishment of training programmes and the establishment of monitoring and evaluation mechanisms.

Achievements were realised by focussing primarily on the processes involved in development of the human component rather than technical products. Successes included the creation of district level data based information systems and structures, development of training courses that focussed on skills and understanding of information management and less tangibly, a sense of ownership and a culture of information (Braa et al. (1997). Identified threats to sustainability of the project at district level and large scale application are influenced by the failure of top 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 (Braa et al., 1997).

Heywood et al. (1998) suggested that implementation of an action-led district information system will itself support district development and promote PHC awareness by "establishing a culture of local analysis and use of information in order to identify and pursue local targets, a pro-active preventative PHC approach".

2.2 The Need for Training in Health Information Systems: Policy and Practice

Policy statements on training in HIS generally identify training as one of the requirements for the development of HIS. Programme directors, health managers, researchers and academics have variously identified training as a cornerstone in the successful implementation of HIS. The lack of adequate training has been cited as one of the reasons for failure.

Frequent reference is made to the importance of training in developing awareness, knowledge, skill or commitment to information utilization for the planning and management of services. Skills training that enables health workers to define, manage and apply the information they need, can foster partnerships and strengthen use of information for decision-making (Bentley, 1987; Emmanuel, 1998; Hull, 1994; Omaswa et al., 1997; Panerai, 1998; Power, 1994; Sabbatini, 1987; Sandiford et al., 1992; Tanahashi, 1978).

While training in HIS is an essential ingredient, it in itself does not ensure successful implementation. Experience has demonstrated that unless there is management support for practice within a framework of political will, organisational infra-structure, delegation of authority and adequate human, financial and technological resources, available information cannot be used for decision-making and thus does not, and in fact, cannot contribute to improved coverage and quality of health care.

Sandiford et al emphasised that, while the lack of skill in data analysis and interpretation limit the effectiveness of HIS, training does not lead to improvement in MHIS unless "attention is given to the other constraints within the system." Power (1994) stated that "a well trained staff that evaluates its performance" is the most important aspect in the realisation of the vision of health informatics that could support health care in South Africa.

Forjuoh et al. (1998) proposed that "it is desirable to use currently available information as a starting point for action rather than waiting for improved evidence to emerge, or spending scarce funds on gathering and analysing sophisticated data" that may be aggravated by a lack of inter-sectoral collaboration. This provides an important starting point for deciding on content of training courses. It is suggested that use of available information serves to strengthen interest in and understanding of the use of information in decision-making for improving coverage and quality of services.

Braa et al. (1997) identified two types of training presented in the Western Cape as part of the HISP. On-the-job and formal short courses as step five in a six-step plan to develop a district information system. On-the-job training is facility based, often one-on-one, and involves practical hands-on training in problems related to dealing with aspects of data processing. Formal training comprised two types of course. A one-week, Introduction to Information Management course, presented at the PHP UWC summer/winter school, was targeted at mid-level managers. An evaluation of this course found that while the course was perceived as useful and beneficial, the need for ongoing training and support was highlighted (Shung King, 1997). A certificate course, Introduction to Information Management, targeted at facility based health worker, was introduced in response to an increased demand for district-based training. The researcher will evaluate this course.

Training in computer technology has received widespread debate. While the role of computers in facilitating data processing and freeing up health workers time for other activities is well documented (Southall 1993, Heywood 1997), it is suggested that as the technology is not readily accessible to many health workers in developing countries, promotion of computer technology at the expense of developing manual skills may "undermine the development of basic analytic capacity". (Campbell 1997).

There has been discussion on the importance of developing a culture of information. It has been suggested that if health workers are to use HIS as a management tool, health managers & policy makers must develop a culture of information. A review of the literature commonly read by nurses shows a void of articles on HIS. Many articles use analysed data or interpretations of data to describe, motivate or explain interventions.

Anecdotal evidence suggests when one is dealing with a largely innumerate population, where there is little internal or external support for informed decision making or a lack of an information culture, they largely ignore technical data and obtain the gist or thrust of the article. They are largely uncritical of data handling methodologies and issues of validity & reliability (Lerwill, 1999).

2.3 The Principles of Adult Professional Continuing Education

Knowles (1984), in his theory on adult learning identified four key points on which successful adult learning is based: adult learners are aware of their own learning needs, they want to learn skills that apply to real-life situations, adults are self-directed and learn more effectively through active learning experiences such as case studies rather than lecture-based instruction.

Knowles (1984) found that the conditions necessary for adult learning to take place, include a need to learn, shared responsibility for planning and implementation of the learning process and acceptance of ownership of a learning process that is related to and builds on actual experiences leading to gains in both knowledge and skills that allows progress towards goal achievement. Factors that contribute to successful training can be summarized in terms of several key points:

- New skills are more easily retained if adults are given opportunity to use the skill immediately after training
- Knowledge of skills learned will fade if not practised
- Training outcomes that are not supported in the job setting will fade
- Knowledge and skills taught must relate to relevant problems and the real world

- Training that is based on what is already known facilitates integration of newly acquired knowledge and skills and its application in practice

If training refers to those activities which are designed to improve job performance by introducing a new behaviour or modifying existing behaviours, consideration must be given to the impact that attitudes have in contributing towards positive changes in practice. Developing knowledge and skills in training is a collaborative process that involves mutual learning and cooperation (Nadler, 1970).

2.4 The Principles and Practice of Evaluating Training Programmes

Evauation for Programme Improvement

The high demand for both cost and outcome effective continuing professional education in a world of diminishing resources, escalating costs and rapid technological and knowledge explosion, with changing role expectations and marketable skills, has generated an extensive resource of research in the field of educational programme evaluation. A variety of models and methodologies have been developed that evaluate educational programmes for purposes of justification, funding and accreditation (Bullock et al., 1999; Clarke, 1983; Upvall, 1998; Watson, 1990).

Stufflebeam & others used the slogan "not to prove but to improve". Negotiating the curriculum provides an opportunity for action research for those involved in the planning, presentation and evaluation of courses to examine and learn from the experiences presented by the teaching and learning process. Stufflebeam's CIPP Model involves repetitive cycles of the processes involved in the planning cycle, and include an evaluation of context, input, process and product (Watson, 1990; Chambers, 1988). This model will be used for the study (table 5.1.1).

The use of formative evaluation as a means of improving the process of training is widely accepted as the most appropriate method in a world of constant change. McLagan (1996), in a discussion of future trends in human resources development emphasised the importance of developing methodologies that support ongoing development, learning and performance enhancement.

Organisational change requires changes in job function and responsibility. This results in a demand for the acquisition of new skills. This in turn impacts on the type of training courses that are developed. Content selection, justification, use, relevance and reality: "what concerns industry is what is relevant to industry", but one needs to know whom, for what and how it should be useful (Barrow, 1984). While the needs & interests of trainees are important, consideration must be taken of the personal and professional development needs of the individual. Needs, not simply their absence or lack, but something that is necessary to some desired end or objective agreed to be desirable, must be considered. The identification of needs linked to knowing the objectives to be reached is influenced by the cultural setting of the trainee. Outcome or product evaluation is summative in nature and evaluates learning outcomes.

Course implementation involves formal adoption of the design and application in a given setting, recognising that evaluation and change are part of the process. A critical (self and others) approach and willingness to learn and adapt to new ideas are integral to an ongoing process of quality assurance (Jeffreys et al., 1997).

Evaluation of Health Information Systems Training Courses - A Review

Evaluation in health information systems (HIS) training is a limited, but much needed aspect of a successful training programme. Information on training evaluation in South Africa occurs internally, is experiential and currently unpublished (HISPP and UWC summer school courses).

Osibogun et al. (1996) described a "learning by doing" training programme designed for facility level staff in Nigeria, aimed at increasing appreciation of the value of reliable data as a means of raising service standards. The emphasis of the course was on data use and communication. While the authors stated that the course evaluation demonstrated "immediate staff development and health centre management", the failure to describe either the methodology employed in evaluation, or the time interval of evaluation, severely limited its validity and replicability.

Campbell (1997) in a comparison of the use of HIS between Ghana and Nepal, found that improvements in overall performance were 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.

Strategies for Evaluating Training Programmes

Kirkpatrick (1959, 1996) proposed a four tiered model that has become the most widely used approach to evaluation. The model evolved out of a recognition that evaluation of training comprised different aspects and elicited specific types of information that could be used to validate an existing course, identify areas for improvement or serve as a basis for deciding whether to continue with a specific type of course.

Kirkpatrick initially proposed a series of four steps in the process of evaluation that are neither ascending in importance or relevance. The literature on training evaluation technologies provides extensive illustration of the increasing complexity in terms of skill, time and cost involved in applying the different levels of evaluation. A summary of the key points of this model is described.

1. Evaluation of reaction to training:

Trainee perceptions and opinions on aspects of course design, structure, content and presentation are elicited. This level of evaluation is qualitative in nature, but can provide quantitative data. Rating scale questionnaires with a section for comments are most commonly used. Trainee reaction is "basically a measure of customer satisfaction" and can influence trainee motivation for and interest in the learning process.

As participants may distort perceptions so as not to antagonize the trainer, this method does not provide a reliable indicator of reaction to training. Anecdotal evidence suggests that true and honest responses may be encouraged by ensuring anonymity and confidentiality. This is seen to be a minor limitation and does not exclude its use. This type of evaluation is commonly used by trainers and managers in making judgements on the quality or worth of a training course.

2. Evaluation of learning:

This evaluation of knowledge, skills or attitudes is a more objective form of evaluation that utilises strategies such as pre and post-tests. While an increase in knowledge may be demonstrated, learners may however, not be able to apply learned knowledge to the job and this is clearly not the aim of this type of evaluation. Acquiring knowledge and skill is seen as the first step toward positive work performance changes.

3. Evaluation of behavioural change:

This level of evaluation while more difficult, is essential in determining whether participants' apply new knowledge and skills to the job, thus transfer knowing to doing. The time and cost investment may be justified if positive changes in work performance are demonstrated. Techniques such as observation, interviews, action plans and case reviews can be employed to deepen an understanding of the changes caused by training.

4. Evaluation of result or outcome:

This level of evaluation is most difficult and costly in terms of design and achievement. It aims to determine whether training results in changes in organisational performance. Increasingly, education researchers are focussing on this area.

In summary, 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. The literature provides many examples of methodologies used in the evaluation of training courses. Although the methods and techniques can be replicated, the development of locally appropriate strategies for use in the evaluation of vocational training requires further research.

AIMS AND OBJECTIVES OF THE STUDY

3.1 Statement of the Problem

To date there has been no formal evaluation of the current in-house training course, Certificate in Health Information Management. The level of effectiveness of training is not known. It is essential that prior to a national expansion of this training course, such an evaluation be done. An evaluation of the current training course will provide information on course effectiveness and areas for improvement.

Anecdotal evidence suggests that despite training, nurses and other health care workers working at the primary level do not use information as a decision-making tool in the planning and delivery of health care. This was reinforced in surveys and evaluations of the Health Information systems conducted in the HISP pilot project sites (Heywood et al., 1995: Rendall-Mkosi K, 1999).

While the failure to use information in the management of health care delivery suggests that the training does not adequately equip health care workers to use the proposed health information system, the level of effectiveness of training is not known. Currently, the only evaluation of in-house training is a qualitative evaluation of the experience of training conducted on completion of training. No international studies that evaluate the quality of HIS training or its impact on job performance have been found.

The relative newness of the Health Information Systems Programme (HISP) training initiatives makes it appropriate to start at the basic level, that of reviewing the course design process, implementation and perceived benefits of training. As health care workers become more informed and familiar with information systems, it will be appropriate to evaluate the application of knowledge and skill in the work setting.

3.2 Purpose of the Study

The purpose of the study is to inform HISP managers and trainers on the quality of the current in-house training course, Certificate in Information Management, in order to determine whether the goals of training are being met and to identify areas for improvement.

An evaluation of current training will enable realistic and relevant changes to be made to the course design, format and style of presentation, thereby increasing its appropriateness for use in developing knowledge and skill in the purpose, process and use of health information systems. The experiences gained in the study shall inform the development of appropriate courses and evaluation methodologies.

3.3 Aim of the study

The aim of the study is to evaluate a current HISP in-house training course, Certificate in Information Management, with regard to the stated goal of training, which is to empower facility and district staff to use locally generated information to improve coverage and quality of primary health care services.

3.4 Objectives of the Study

To evaluate a current HISP in-house training course, in order to determine whether it is appropriate for use in developing knowledge and skill of primary level health workers in the use of health information systems:

3.4.1 To describe the course design process

3.4.2 An evaluation of course implementation with regard to content and presentation

3.4.3 An analysis of the perceptions of course participants of the learning experience

METHODOLOGY

4.1 Study Design

4.1.1 Study Type

A cross-sectional descriptive study design with both qualitative and quantitative techniques was used to evaluate the training course.

4.1.2 Study Population and Sampling

The study population was comprised of key informants who were involved with the inception of HISPP, current HISP managers, course trainers and participants who have attended selected training courses observed during the period of the study. The sample comprised:

Key informants

Purposive sampling was used to select five key informants who were involved with the initial inception and implementation of HISPP consulted. Three of these informants are still actively involved with the HISP project.

Trainers

Purposive sampling was used to select three site facilitators, working with HISP, who are involved with the presentation of the training courses.

Training courses

Convenience sampling was used to select two available courses presented during the period of the study.

Course participants

Convenience sampling was used to select participants for the on-site observation and focus group discussion. Participants are primary level health workers who are employed by provincial or local authority health services in the Cape Metropole region.

4.1.3 Data Collection Techniques and Instruments

A combination of qualitative (observation, interviews and focus group discussion) and quantitative (questionnaire) techniques and sources (document search) were used to collect data. This process of triangulation serves to strengthen, verify and validate the accuracy of data collected. The reliability of qualitative data is increased if opinions and perceptions are expressed by the majority.

4.1.3.1 Document search

An audit of all documents, reports and materials related to the course was conducted. The search process included a historical review of all documentation related to course design, structure and evaluation strategies.

4.1.3.2 Observation

Direct observation of training courses in session was conducted in order to obtain qualitative data on the implementation of the course. Notes were used to record the observations of the researcher. A modified observation of training skills rating scale was administered to obtain qualitative data on teaching effectiveness (Crawford 1998) (Annexure 4). Six criteria evaluated the method and style of presentation, two criteria evaluated aspects of course management and six criteria evaluated the quality and contextualisation of content. Validity and reliability of the rating scale has not been determined.

On-site observation of randomly selected participants in their work setting was conducted to obtain qualitative data on learning outcomes in terms of both knowledge and use of data processing and information systems. The findings obtained informed the development of an interview guide for use in the focus group discussion.

4.1.3.3 Interviews

Semi-structured interviews were conducted, with the informed consent and in the language preference, of selected informants. Note taking used to record the data. A standardised interview format was designed for each group of interviews.

- Five, individual interviews were conducted with key informants to obtain data on the course design process (Annexure 2)

- Three, individual interviews and a series of informal group discussions were conducted with course trainers to obtain qualitative and quantitative data on course structure, planning, presentation and evaluation (Annexure 2)
- Five, informal individual interviews were conducted with the observation sample of post-course participants to obtain data on learning outcomes and course relevance that would inform the development of an interview guide for the focus group discussion

4.1.3.4 Focus Group Discussion

One focus group discussion was conducted with a sample of post-course participants in order to obtain qualitative data on the relevance of training. An interview guide was used to focus the discussion. Notes were used to record the data (Annexure 3).

4.1.3.5 Questionnaire

An analysis of the course evaluations completed by participants on one of the two courses observed by the researcher was conducted in order to obtain both quantitative and qualitative data. An analysis of the data was used to gain an impression of participant perceptions of the course content and method and style of presentation.

The questionnaire is comprised of nine rating scale and four open-ended questions (Annexure 5). While the validity of the questionnaire has not been formally determined, it has been extensively applied, and modified. Reliability cannot be obtained as the tool is only administered once per course and the participant group for each course is different.

4.2 Ethical Considerations

Consent to access and use training material, course evaluation forms, and attend training courses was granted by the HISP managers and trainers. Consent to use instruments was obtained from the relevant authorities. Interviews, observations and focus group discussion were conducted with the consent and cooperation of informants and relevant health authorities. Informants were notified of the aim of the study and their right to confidentiality, and withdrawal from the process at any stage. The potential benefits of the study were explained and the right to feedback on the study findings ensured.

Confidentiality of information was ensured as no personal information was extracted. Confidentiality of interviewees was maintained. Questionnaires were administered anonymously.

4.3 Analysis

The study used both qualitative and quantitative techniques. The analysis of combined qualitative and quantitative data has reflected a high degree of commonality in observations and views expressed. The process of triangulation used in the method of data collection has demonstrated a degree of validity and reliability in the data.

An examination of the course design process included both an audit of documentation and a series of interviews with key informants. The findings were collated and examined to contextualise the historical and structural development of the design process.

The quantitative data items from the questionnaire and observation of training skills were collated and analysed on an Excel spreadsheet. The findings were converted to percentages, summarised and interpreted. The open-ended questions were collated. The qualitative data was examined to identify common themes that that could be used to improve the course in terms of the design, structure, content, presentation and evaluation. An assessment was made of the level of critical evaluation demonstrated by the participants.

The interviews, observations and focus group discussion were administered and analysed by the researcher. The qualitative data was examined. Notes were transcribed, collated, coded, categorised and summarised. A content analysis was made to select the main themes and identify trends that could inform the recommendations regarding course revision.

The findings were presented to course managers and trainers for verification and comment. Their feedback informed the discussion and recommendations made.

4.4 Limitations of the Study

Sampling and Sample Bias introduced limited the validity and reliability of the data. This was counteracted by the use of triangulation. A convenience sampling of the larger group nurses was carried out in order to promote the validity of the qualitative data through group homogeneity. The accuracy of the data was reflected by the high degree of correlation in the qualitative data.

Training Courses

A sample of three courses, but limited to one per district, that have a minimum number of twelve participants per course were proposed for the evaluation of course implementation. However, as planned courses were cancelled due to staff shortages, a convenience sampling of two courses was done

Participants

A proportional, stratified random sampling procedure to select participants for the analysis of perceptions of the learning experience was proposed. One of the courses observed had twenty one participants, comprised of twenty nurses and one environmental health officer, the other five administrative clerks

4.5 Dissemination

The results of the study were reported in the form of verbal and written reports:

- HISP managers and trainers, in a series of workshops
- District information team, November 1999
- Paper presented at HISA conference, February 2000

RESULTS

5.1 Course Design Process

An examination of the course design process included both an audit of documentation and a series of interviews with key informants. The informants referred the researcher to relevant articles and documents. The data obtained from the interviews is incorporated in the description of the course design process.

An audit of documentation showed that the course design process is largely undocumented. The search process found a number of articles that made reference to training issues, reporting on training experiences, identification of training needs and issues relating to course design, presentation, selection, content and materials. These have been incorporated in the discussion and recommendations made.

Stufflebeam's CIPP Model of Evaluation (Clarke, 1983; Watson, 1990) will be used to describe the development, implementation and outcome of the training course, Certificate in Health Information Management.

Table 5.1.1 Modified Stufflebeam Model of Evaluation (Watson, 1990)

CONTEXT EVALUATION (formative)	INPUT EVALUATION	PROCESS EVALUATION	PRODUCT EVALUATION (summative)
Training demand	Resources	Implementation	Learning outcomes
Purpose • Goals • Objectives • Content	Facilities Teaching methods	Feedback on • Strengths • Weaknesses • Constraints Evaluation methods • Trainer • Learner • Programme	Feedback to/from • Learner • Trainer • Organisation

Context of Development

In the Western Cape, initial training in health information systems was provided, on an on-site, ad-hoc basis, to district information team members of the Health Information Systems Pilot Project (1996-1998). A **situation analysis**, conducted in the latter half of 1996, found that in order to expand and sustain the project, the development of a more structured vocational training course that would develop both a positive attitude and skills aimed at information use among a wider audience was required. The findings are summarised in table 5.1.2.

Table 5.1.2 Situation Analysis of Training (Heywood, 1998)

Strengths of training	Weaknesses in target audience
• interest in and enthusiasm for training • increased demand for training • perceived benefit of training • multi-disciplinary participant mix • participants learn by doing	• lack of culture of information, thus no reference point • lack of numeracy skills • poor understanding of health information systems • poor understanding of catchment population
Opportunities for district based training	**Threats to success**
• wider target audience • less service disruption • flexibility in presentation to meet local needs • use of district-based data to promote local relevance and use	• lack of technical infrastructure • lack of organisational infrastructure • lack of management support structures • lack of supportive training mechanisms

A one-week introductory course, (Public Health Programme, Summer School, University of the Western Cape), was developed in the latter half of 1996 and introduced in February 1997. The course targeted both management and operational levels. Interest in the course was enthusiastic and a demand for ongoing district based training identified. Development and implementation of a computer software programme for district level use, in the latter half of 1998, hastened the demand for decentralised, locally run training.

Success in training was constrained by the difficulty in translating theory into practice within a poorly developed, supported and resourced district health service. The slow pace of health service restructuring was aggravated by poor management support, rapid staff turnover and difficulty in providing ongoing training support.

Course Development

In an attempt to co-ordinate the various training initiatives, an introductory in-service training course, Certificate in Information Management, was **conceptualised** in the latter half of 1998. The process was influenced by the collective experiences of key role-players in HISP. An action research approach was used to pilot and modify the course. The course structure, objectives and materials were developed by programme managers and site facilitators within a series of workshops conducted in the latter half of 1998 and early 1999 (Annexure 1).

The course was based on a **need** to enable health workers to use the health information system through development of a culture of information use, insight in health information systems and basic skills in information management, such as analysis, interpretation and presentation of information. The **aim of training** was to empower facility and district staff to use locally generated information to improve coverage and quality of primary health care services. Computerisation was seen as a useful tool to support and complement existing processes.

The **course structure** was flexible, allowing for part- or full-time presentation of ten sessions over thirty hours. Teaching strategies used adult education methods such as small-group work and interactive discussion to promote participation and involvement in the learning process. The **content** had specific, though flexible, learning objectives and training activities. Emphasis was on the use of local information to develop goals, targets and indicators, do relevant calculations, draw graphs and provide feedback (Heywood, 1999).

Training was now **targeted** at all health care workers, at district and facility level, who could potentially use the information system. The target audience included a generic mix of facility-based nurses, administrative clerks and environmental health officers. The bottom-up approach and generic mix of participants was seen as advantageous by both trainers and participants. The opportunity to develop collegial networks was identified as an important spin-off of training. The **recruitment** of course participants was based on a series of informal discussions at a variety of meetings held with service managers and facility staff. No formal **selection** processes were implemented.

HISP **trainers** were recruited from professionals with a background in the health sciences. Appointment was based on a demonstrated interest in health informatics, willingness to train and good communication skills. While formal training and experience in education was recommended, it was not a criterion. Trainers were appointed as site facilitators in order to implement the district based health information system within the Cape Metropole region. An informal induction and orientation process was applied. No formal training in presentation skills was provided.

Course Implementation

Site facilitators were responsible for the planning and presentation of district based courses as part of a broader health information systems implementation process. A series of **locally run courses**, within the framework of the course structure, were presented over a period of one year within the Cape Metropole region. A certificate of attendance was presented to all participants who completed the thirty-hour course. Training in the use of the computer software generally occurred, on-site, within small groups. On-site, ad-hoc post-training support was available on request.

Implementation was characterized by a lack of organisation and planning. The lack of documentation available on the number of courses run and identity or number of health workers who completed training, demonstrated an inadequate administrative infrastructure. The lack of adequate training materials and poorly developed course content, was aggravated by inexperience in training methodology.

Although a series of courses were planned, few took place. Competing demand for training in clinical skills, rapid staff turnover and staff shortages were the main reasons cited for cancellation of planned courses. HISP failure to target middle level managers for training, may have influenced the lack of management support.

Interviews with site facilitators revealed a number of experienced time and logistical constraints. Much of their time was spent in troubleshooting problems the district information officers were experiencing with data capturing and manipulation. Trainers doing data entering themselves, tended to take on far too an implementation role, rather than a facilitation role. This may have masked the lack of actual training done. Organisational constraints identified include:

- service fragmentation
- lack of organisational infrastructure to facilitate implementation
- lack of authority and management structures
- lack of management involvement, commitment to and support for the process
- lack of ownership of the process
- lack of appropriate skills in information use
- lack of technical infrastructure
- lack of access to technical structures
- lack of training facilities and resources

Outcome of Training

No formal mechanisms have been implemented to measure learning and performance outcomes. Participant course evaluation provides a subjective perception of the training experience. To date, these tools have not been formally analysed. Requests for post-training support and involvement in data collection procedures provided a barometer of training need. No formal administrative procedures were established to record either the formal training or post-training support initiatives. The lack of a training database has limited strategies to evaluate learning and behavioural outcomes.

The common problems and recommendations regarding training issues, highlighted in an evaluation of the Mitchells Plain health information system, conducted in the course of 1999, are summarised in table 5.1.3 (Rendall-Mkosi, 1999).

Table 5.1.3 Training Issues: Problems and Recommendations

PROBLEMS	RECOMMENDATIONS
• inappropriate selection of course participants • lack of immediate implementation of new skills • Sisters-in-charge not all trained in principles of HIS and decision-making • 'training of trainers' in clinics failed	• plan selection so that trained people return to fulfil new role • follow-up trainees to ensure carry over into work situation • design & present specific course using local data • pass on of new skills in clinic too high an expectation

The HISP district interim reports to the CMC highlighted key factors that impede successful training and application of new skills in the work setting. (HISP, 1999)

- Staff shortages and time constraints make it difficult for staff to attend training sessions
- Lack of computer hardware for training purposes and mentoring activities
- Uncertainty of staff regarding responsibilities for data handling
- Lack of sufficient responsibility to implement changes
- Lack of project ownership, resistance to change and staff apathy
- Lack of information culture
- Lack of management involvement in the project

5.2 Course Implementation

The two training courses observed, were presented in two districts within the Cape Metropole region by different trainers. The courses were each facilitated by the relevant site facilitator, who acted as primary trainer, with occasional outside speakers for specific sections. Course one, presented on a full-time three-day basis, was attended by five administrative clerks. Course two, presented on a part-time bi-weekly basis for four weeks, was attended by twenty facility-based nurses and one environmental health officer. The findings are summarised in table 5.2.

The observer, noted that the overall method and style of presentation reflected androgogical principles and practice in small group facilitation. This perception was reflected in the participants' evaluation of the course. The format of presenting a theory input followed by discussion of clinical issues and a problem solving exercise was effective in reinforcing both knowledge and skill. Presentations were generally interactive. The findings are summarised in table 5.2.

Table 5.2 Training Effectiveness Rating Scale (modified Crawford)

(n = 20) Skills observed	4 + 3 %	4 Yes, always	3 Yes, often	2 Yes, seldom	1 Not at all
Trainer					
1. Knowledge of content area	85%	10% (2)	75% (15)	15% (3)	0%
2. Interpersonal skills	95%	35% (7)	60% (12)	5% (1)	0%
3. Delivery skills	70%	35% (7)	35% (7)	30% (6)	0%
4. Teaching methods & style	80%	55% (11)	25% (5)	10% (2)	10% (2)
5. Facilitation of group process	75%	45% (9)	30% (6)	25% (5)	0%
6. Facilitation of exercises	85%	30% (6)	55% (11)	5% (1)	10% (2)
7. Session management	80%	35% (7)	55% (11)	10% (2)	10% (2)
8. Classroom management	80%	35% (7)	45% (9)	5% (1)	15% (3)
Content					
9. Conceptualisation of content	65%	20% (4)	45% (9)	25% (5)	10% (2)
10. Quality of content	60%	20% (4)	40% (8)	25% (5)	15% (3)
11. Accuracy of content	80%	55% (11)	25% (5)	20% (4)	10% (2)
12. Correlation of content to objectives	90%	70% (14)	20% (4)	10% (2)	0%
13. Quality of exercises	50%	15% (3)	35% (7)	40% (8)	10% (2)
14. Quality of handouts	85%	30% (6)	55% (11)	10% (2)	5% (1)

The overall quality of content was poor. Both the quality of content (60%) and conceptualisation of content (65%) scored for the upper two limits were low. In sharp contrast, the correlation of content to objectives scored 90% and accuracy 80% respectively. The low scoring obtained for the quality of exercises (50%) is verified by participants, who identified the need for better exercises and more time for practice, as the second, most needed, improvement in the course. Courses were generally perceived as being well managed. This is reflected in the high scoring of 80% and 90% for session and course management respectively.

5.3 Participant Perceptions of the Learning Experience

5.3.1 Course Evaluation

An evaluation of the course is described, based on the responses on a quantitative and qualitative analysis of course evaluation forms, completed anonymously by 21 students at the end of one of the courses observed. The rationale for only using the evaluations of one observed, was to ensure greater group homogeneity, that of nurses, thereby strengthening the accuracy of the data obtained. Nurses formed the main focus of the study as they are potentially the main users of information at facility and district levels. The quantitative analysis is summarised in table 5.3. The high scoring (above 70%) obtained for each criterion demonstrates a high degree of subjective approval and acceptance of the course.

Table 5.3 Summary of Quantitative Criteria

(n=21) Performance criteria	4 + 3 %	4 Yes, much	3 Yes	2 Sometimes	1 Not at all
1. Felt challenged & motivated	85%	33% (7)	52% (11)	14% (3)	0%
2. Reconsidered attitudes	76%	33% (7)	43% (9)	24% (5)	0%
3. Understanding of concepts	86%	48% (10)	38% (8)	14% (3)	0%
4. Objectives clearly stated	90%	57% (12)	33% (7)	10% (2)	0%
5. Content relevance	81%	38% (8)	43% (9)	19% (4)	0%
6. Ability to apply skills to work	86%	38% (8)	48% (10)	14% (3)	0%
7. Trainer helpfulness	100%	52% (11)	48% (10)	0% (0)	0%
8. Time for discussion	100%	43% (9)	57% (12)	0% (0)	0%
9. AV aids & materials helpful	71%	33% (7)	38% (8)	29% (6)	0%

The responses to the open-ended questions are summarised in terms of the most common themes stated.

What did you like most about the course?

The style of presentation (9) and active participation (11) in terms of the interactive (9) nature of discussion (14) and group work (13) were most commonly cited. Practical exercises (8) and clear, useful handouts (9) reflect the importance of the quality of content.

What did you like least about the course?

The lack of computers (15), length of the course (7), afternoon slot (9) and travelling difficulties (9) identified logistical issues that require attention. The "too theoretical" nature of inputs (7) and difficulty experienced with calculations (5) and indicators (5) highlighted content and contextual issues that impact on training effectiveness.

What improvements would you make to the course?

Logistical issues of venue (8) and access to (11) and time spent on (13) computers were most commonly cited. Issues relating to course structure, proposed reducing course length (7) and increasing the time spent on practical exercises (8), specifically on indicators (5) and calculations (5). A need for post-course training and support (5) was identified. Three participants participant proposed use of a pre-course evaluation to assess knowledge and experience base so as to adapt the course to suit group needs.

Other comments

Participants found the course informative (9), enjoyable (7) and stimulating (5). One participant found the course "a waste of time as no change is possible due to service constraints".

5.3.2 Post-Training on-site Participant Observation

On-site observation of informants was conducted in their work setting three months after completion of training. The sample, comprised of six facility-based nurses, was randomly selected in a single district. The purpose was twofold:

- To determine whether training resulted in a change in the practice of data handling

- To determine whether informants perceived training to have been beneficial to practice

All informants had partial responsibility for the collection and collation of data. While no change in practice was demonstrated, all informants voiced an intention to become more involved in the data handling process, specifically, direct inputting and validation of data, creation of graphs, monitoring of trends, writing of reports, giving feedback to colleagues and comparing trends between clinics within the district. Informants, keen to develop their computer skills, expressed their frustration at the lack of direct access to computers.

Perceived benefits of training relate to an increased awareness of the purpose of health information systems and the application of statistics to improve service rendering. The strengthening of collegial links and creation of mechanisms to access relevant district-based information were identified as a step in the right direction.

5.3.3 Focus Group Discussion

A focus group discussion was conducted with participants three months after completion of training in order to promote an interactive process through an exploration and clarification of views. The focus group discussion was held with eleven facility-based nurses who responded to the invitation.

The findings of the on-site observation visits informed the development of the scope of enquiry (interview guide) for use in the focus group discussion. The purpose of the focus group discussion was threefold:

- To determine the strengths and weaknesses of training
- To explore the constraints to implementation of the skills learned
- To formulate recommendations for action

The main findings are described and illuminated with participant quotes.

General comments about the course

Participants were generally poorly informed of the **purpose of training** prior to attending the first orientation session. A large number of participants stated that they were given to understand, by their supervisors, that they were going to attend a computer course. This apparent misrepresentation was noted by the researcher on the first day of the course.

While a number of sessions were felt to be boring and/or repetitive, the overall **training experience** was positive. While participants readily recognised the useful application of a district based health information system, the logistical difficulties of access, time and lack of technical infrastructure negated a lot of the enthusiasm. While the handouts were regarded as very useful (80%), three months later, only two participants reported that they had referred back to them.

The need for regular discussion and debate of HIS issues within a district based support team was highlighted. Many issues raised were logistical and technical difficulties in use of and interpretation of the RMR and MDS.

What are the strengths of training?

An **increased awareness** of the use of information for improving the coverage and quality of primary health care services, with a conceptual shift from collection of statistics to interpretation and use of information was described. "...I realise stats can work for me ... one can determine what impact one's work has on patient care ... be more critical of what you're doing ... prove we're doing our work, identify problems and motivate for staff... ".

The **course content** was generally seen as new and relevant "... know why and how to collect stats, what rates are and do calculations... ". Participants felt that they would be better able to identify health problems and monitor trends. The **skills acquired** promoted a feeling of confidence and affirmed practice. The use of feedback was identified as a useful mechanism to promote staff morale, teamwork and collegial networking. A sense of "acceptance and globalisation" was identified "... we felt isolated and can now be part of policy and planning ... more acceptable to communities ... ".

What are the weaknesses of training?

Inappropriate recruitment, **selection** and orientation of participants resulted in a lack of ownership and commitment to a **change in practice** after training " ... the course was misrepresented ... I did not want to be there, I was just told to come ... I was told it was a computer course... ". The part-time nature of the course diffused the impact of skills taught. Course content was felt to be too theoretical, with insufficient time for skill development through practice of exercises. Difficulty was experienced with both understanding **concepts** and applying them in practice, specifically, RMR, population factors, indicators and calculations. **Exercises** were generally not related to local problems " don't know how to get information, what to do with it and how to use it in practice...". The lack of **computers** and time for computer training was identified as a major weakness of training.

What are the constraints to implementation of the skills learned?

The lack of computers, a heavy workload, staff shortages and uncertainty regarding role boundaries, coupled with a tradition of non-involvement in information use and decision-making that has promoted poor morale and staff passivity.

The lack of **technical and organisational infrastructure**, coupled with poor **management support** structures, supportive training mechanisms, and a lack of autonomy to implement change has promoted **resistance to change** and acceptance of **ownership of the process**.

What are your recommendations for action?

While it was felt that all staff should have training, there was uncertainty as to whether they should be trained together and have the same type of course. Appropriate recruitment, orientation and **selection** of targets were identified as aspects that should be investigated. Adaptation of the course **content**, with more **exercises** to the local situation and to meet the needs of different targets was endorsed. **Computer training** was identified as a major component of training, with " ... dedicated time for computer playing ... ".

DISCUSSION

Evaluation: not to prove, but to improve (Stufflebeam et al.)

The main benefit of training to date has been in creating a general awareness, through an increased knowledge, of the potential use of health information systems as a tool for management of health programmes. The ownership of district information systems as a model for health management was demonstrated at a health summit in June 2000, where programme and service managers reported positively on the use of information systems to monitor health trends (HISP Summit, 2000).

The failure of current training initiatives to consider the influence of external constraints in the planning and presentation of courses, has negated much of the impact of training to date. The planned approach that the course structure would be flexible and relate to the work setting was not realised. Newly trained staff could not practice their skills, as data handling and information use were not part of their responsibilities within key performance areas of job function.

6.1 Course Design

The course was well **conceptualised** as an action-oriented, participative design with **content** structured to facilitate **skill** development. The type of training and structure were good, but the target was wrong, it was not marketed and therefore did not work.

The bottom-up, grassroots approach to implementation of the health information system is reflected in the stated **target audience** for training of all health workers actively involved in data handling and information use. This study showed that training needs to be focussed, with **appropriate selection** of candidates for training as a crucial element in promoting both a culture of information use and **management support**. Although both trainers and participants have favoured a generic mix in courses, it has proved ineffective in meeting the specific needs of different job functions and responsibilities of managerial, clinical and administrative health workers. The lack of clarity regarding the specific purpose and aim of information giving, awareness raising, marketing, recruitment, selection and orientation of health

workers has diffused and confused health workers, generally, as to their role within the HIS implementation process.

Training was designed as an ongoing **process**, in which formal training was combined with work based practice through ongoing training and support as integral components over an extended period of time. The rationale for this **structure** was to provide a conceptual framework and knowledge base, provide participants with opportunity to practice skills between sessions, facilitate evaluation and provide feedback of the HIS implementation process in practice. This was not realised in practice.

The stated **aim of training**, to empower facility and district staff to use locally generated information to improve coverage and quality of primary health care services, has proved to be unrealistic and over ambitious. Health workers traditionally have limited involvement in data handling and lack a culture of information use. Poor change management and a lack of organisational and technical infrastructure and support from top & middle management has limited the ability of health workers to implement acquired knowledge and skills in the workplace. HISP training is regarded as a vertical programme, rather than a support process, as extra work, not streamlining of current work processes. HISP failed to adequately consider that, if training and innovation for change were poorly marketed and supported, health workers would lose skill, motivation and offer resistance to change.

6.2 Course Implementation

While training courses were generally well conducted, training was not practice based. Implementation was not supported by training follow-up and poorly supported by district and facility management.

Implementation failure may be attributed to a number of factors; lack of trainer knowledge and skill, inappropriate teaching strategies, poorly formulated core competencies, lack of content relevance and lack of resources. The 'part-time' flexibility in the **course structure**, aimed at enabling participants' opportunity to practice skills between sessions, was not achieved.

The **method and style of presentation** was generally effective in utilising small groups to encourage interactive discussion among participants. The format of presenting a theoretical input followed by discussion of clinical issues and a problem solving exercise was effective, however, too much time was spent on theoretical classroom instruction, too little, if any on the practice of newly introduced knowledge and skills.

The observer found while **trainers** demonstrated a good knowledge of subject content, they were not able to conceptualise and contextualise health information systems appropriately - the 'world-view' was absent. The high rating scored for correlating content with objectives, lower ratings for conceptualisation of content and the low rating for quality of content and exercises, reflects the relative inexperience of trainers, and may reflect an underlying lack of conceptual understanding of health information systems design and implementation. This failure may be related to an inadequacy in the appointment, induction and preparation of site facilitators in terms of role expectation.

Localisation of **content** failed to challenge participants to identify, examine and monitor local health problems and realistically explore the information and resources needed to manage them. Discussion of problems and findings was not sufficiently rigorous. Any suggestions were accepted, demonstrating a failure to encourage problem solving and critical appraisal skills.

Feedback was discussed as an important mechanism for sharing information, but plans to do so were too vague, resulting in a lack of direction on what feedback to give and how to do so, reinforcing the gap between theory and practice, and invalidating the relevance of content and learning outcomes. The researcher suggests that this is counter-productive to developing critical skill in identifying problems and interpreting information for use in decision making.

The type of **exercises** used demonstrated trainer lack of understanding of the value of exercises in consolidating knowledge and skill, and a lack of skill in how to do so.

Researcher observations and participant perceptions reinforced the importance of contextualising exercises within realistic role expectations. Specific skills that require more practice include indicators, population data, calculations and feedback. The lack of adequate **training materials** has limited the availability of appropriate, localised examples and exercises in ensuring content relevance. The failure to access and use training materials handed out on course may suggest a lack of perceived relevance. This has been found in other studies (Osibogun, 1996).

Trainers were generally resistant to the concept of evaluating participant knowledge, skill and attitudes. The main reasons cited were the concern that formal evaluation or 'testing' would impact negatively on participant willingness to attend training courses. It may be argued that HIS programme failure may be partly due to the lack of a conceptualised monitoring and evaluation mechanism that feeds into the whole process.

The lack of resources, with regard training materials, venues, time, computers and transport presented an ongoing challenge to trainer ingenuity. While training was always done in working hours, close to the workplace and disrupting work as little as possible, staff shortages, heavy workload and competing demands with other clinical skills training, reinforced the low priority and lack of management 'buy-in' into HISP.

6.3 Participant Perceptions of the Learning Experience

The perceptions expressed in the open-ended questions and in the initial phase of the focus group discussion, demonstrated both superficiality and lack of critical appraisal. This may be partly due to a socialisation into a culture of non-questioning acceptance. There was poor contextualisation and conceptualisation, 'world view' of content. The use of probing to stimulate discussion and clarify statements, highlighted a lack of participant experience in reflection and validation, the 'what' and 'why'. This has implications for HIS skills training in strategies to give and receive feedback.

The overall learning experience was positive. While participants readily recognised the useful application of a district based health information system, the logistical difficulties of access, time and lack of technical infrastructure negated a lot of the enthusiasm. The failure to change practice training, despite a stated intention to do so, may be constrained by both internal factors, such as a lack of 'real' knowledge and skill, and external factors, of lack of infrastructure, job descriptions, support and access.

Weaknesses highlighted, demonstrated the effect of a lack of organisational infra structure and poor management support on staff morale and their ability to use information systems tools for identifying and monitoring local health problems. Many issues raised were related to logistical and technical difficulties in the use of and interpretation of the RMR. Strategies to address this include the creation of mechanisms to facilitate regular discussion and debate of relevant issues within a district based support team.

6.4 Recommendations

The way forward requires both return to the drawing board and organised action. **Training** initiatives must commence with clearly formulated **strategy** for action that must be marketed to top and middle level **management structures** to promote 'buy in' as part of the overall information systems implementation strategy. The tangible benefits of training must be articulated in job descriptions that reflect the new skills and their use.

Training should involve careful **selection** of target groups for training applied to all cadres and categories of health workers. The 'buy in' of management and other levels, should involve **generic training** in the rationale for health information systems as the tool needed to handle relevant data as the basis for making informed decisions in the management of health services. The **skill training** component should be modified to meet the job specific needs with appropriate courses for management, clinical and administrative levels.

A three-pronged approach to course design should involve the development of three courses; one, training in information concepts, two, skills training in the planning, interpretation and use of information and three, computer software training. These courses should support a comprehensive approach to implementation of DHIS. The purpose, aims and goals of training must be clearly formulated. **Course structures** must be flexible to reflect the job specific **skill requirements. Content** relevant to the local context and specific job requirements must be formulated and objectives must clearly reflect expected learning outcomes. A database of relevant **training material** in the form of a facility based reference and reading file should be developed. Problem solving **exercises** must be practice based and opportunity to apply skills within a work setting milieu created. The role of computers in the overall implementation strategy must be clearly formulated and the current computer training directed at appropriate cadres of health workers.

Training requires organisation and planning. A good data based **administrative infrastructure**, is the central core from which action is planned and recorded. A team of dedicated consultants and training facilitators should form the control centre through which action is directed, monitored and evaluated. Feedback mechanisms must be articulated. Demand for training and training needs must be regularly determined and the resources and facilities needed determined and developed. Appropriate teaching methods and training skills must be formulated, developed and evaluated. The development of locally appropriate strategies for use in the evaluation of vocational training requires further research.

CONCLUSION

The implementation of a health information system as a vehicle for the delivery of accountability in the management of health services, demands organisational change. Training, as one component of the implementation process, must be linked to action. Without a change in organisational infrastructure, there can be no mechanism for application of acquired knowledge, skills and attitudes in information use.

Challenges that must be addressed if training initiatives are to succeed in developing a culture of information use can be described in terms of three main areas, that of the **training programme**, the **organisation** that provides the service and the **participants** who need or undergo training. Accountability and transparency are facilitated if initiatives are specific, measurable, appropriate, realistic and time-bound.

The **training programme** must be sensitive to service related issues, participant and content specific, yet be flexible to adapt to the local context, undergo realistic and regular programme review and establish monitoring and evaluation time frames.

The **organisation** must promote programme sustainability, develop and implement strategies to measure organisational outcomes, focus on local health priorities, create a supportive infrastructure and set reporting and feedback timeframes.

Participants must be selected to meet programme and job-specific needs and demonstrate measurable learning outcomes on-the-job through the creation of appropriately modified skills training component and provision of ongoing training and support.

A **localised**, **grassroots approach** to training that is actively marketed to promote interest and involvement of health workers in health information systems, should facilitate the development of a culture of information among health workers.

If we are serious in our commitment to adopting a primary health care approach to service delivery, we must give service providers the tools to do so. Effective use of health information systems is such a tool. Training that enables 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.

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ANNEXURES

Annexure 1

Certificate in Health Information Management

Target Audience:
All health workers actively involved in collecting, analysing or using information at district, local or facility level

Course objective:
To empower facility and district staff to use locally generated information to improve coverage and quality of primary health care services

Learning objectives:
At the end of the course participants should be able to:
1. Describe the principles of an action-led district based information system
2. Explain basic epidemiological principles as applied to districts
3. Calculate target populations for a given catchment population
4. Do an audit of the existing information systems at district level
5. Develop goals, targets and indicators for district level programmes
6. Calculate different types of indicators using local data
7. Present information in the form of tables and graphs
8. Analyse indicators for trends over time and compare between facilities and districts
9. Privide feedback to data collectors and community structures
10. Use a computer to enter data and get basic feedback
11. Present information using a poster and in plenary session

Facilitators
The HISP project staff will be overall coordinators of the course.
Appropriate people will be identified as local coordinators in the districts concerned.
Facilitators will be drawn from district level workers wherever possible, using external facilitators for specialised inputs.

Course structure and methodology
This 30 hour course will consist of ten three-hour sessions (or equivalent) held during working hours at district level. This may , locally tailored according to needs, be a session held one or two days a week, four eight-hour sessions or any other locally appropriate structure.
Adult education methods, particularly small-group work and interactive discussion will be used throughout the course. The course will emphasise use of locally generated data which participants will be expected to find from their work situations to present for analysis at training sessions. Each of the sessions will build up to a final presentation of data, indicators, graphs and interpretation of a particular theme for the district.

The first session will, in addition to technical content,
- Introduce participants to each other
- Examine expectations of all participants
- Allocate people to groups who will deal with particular themes

Certification
A certificate will be issued to participants who have actively participated in 80% of sessions.

CERTIFICATE COURSE IN HEALTH INFORMATION MANAGEMENT

SESSION TOPIC	SESSION OBJECTIVES	ACTIVITIES
1. Principles of a new, action-led information system	• Describe the problems of the existing information system • List the basic principles of HMIS • Describe the health & management components of the information systems • Give examples of data sets at different levels of the health service as shown in the information pyramid • Describe the district information model	• OHP – principles • OHP – Werner's "family" diagram • OHP - info funnel • OHP – Spaghetti model • OHP – District info model • Role play - different role players in current HMIS & how this could be changed
2. Basic epidemiological principles	• Explain the fundamental questions asked in epidemiology • Calculate rates, ratios, percentages & proportions with local data • Give examples of prevalence & incidence • Explain averages	• OHP – Werner's "family" diagram • Calculate rates, ratios, percentages, proportions using local examples
3. Population Data – the essential ingredient	• Explain the concepts of catchment population, target population, operational target • Explain the population pie • Calculate target populations for programmes for a given catchment population	• OHP – population pie to be explained • Groups – calculate catchment populations for (sub) districts/ facilities • Calculate target populations for programmes
4. Audit of existing information system	• List all routine data collection tools & reports used in the district • Describe the rationale behind a minimum data set at each level • Explain definitions of some items in the RMR • Describe methods of collecting & validating data	• OHP – provincial data set plus others • OHP – info funnel • Groups to list all data items & forms in use by programmes • Discuss definitions • Classify data collected as "must", "nice" and "dangerous" to know • Draw diagram of current flow of data
5. Goals, targets & indicators	• Describe the use of information in a basic planning cycle • Describe the criteria for selecting good targets & indicators • Develop goals, targets & indicators for district programmes	• OHP – planning cycle • OHP – SMART targets • Characteristics of a good indicator • Groups – develop GTI for a programme • Plenary – use criteria to critique GTI of groups • OHP – District example of a GTI

6. Indicators	Continuation of no. 5	
7. Interpretation & presentation of information	• Draw line graphs & bar graphs • Draw a cumulative coverage graph • Compare indicators between individual facilities & districts as a whole	• OHP – different ways of presenting same data (tables, graphs, pie charts) • OHP – examples of local trends • Groups - draw line & bar graphs, pie charts & cumulative coverage graphs • Plenary – examine & compare
8. Analysis of information	• Validate data manually • Prepare a table comparing indicators • Analyse indicators for trends over time	•
9. Provide feedback to data collectors & community structures	• Explain the need for feedback at local level • Identify current & potential sources of feedback • Provide feedback to local data gatherers	• OHP – purpose of feedback • Groups – explore current & potential feedback sources & mechanisms • Plenary – mechanisms to promote feedback to (sub) district / facility level using own data
10. Use of computers in a district information system	• Describe the use of computers in the HMIS • Explain hardware & software components of a computer • Enter, validate & refresh data • Use DHIS software for basic calculations	• OHP – district model • OHP – how computers work • OHP – how database, spreadsheet & paper based systems work • OHP – case study of a district
11. Presentation of groupwork	• Present a full set of course outputs on a given theme to plenary session • Do a poster presentation	• Groups – make a poster of course outputs • Plenary – groups to present posters • Graduation ceremony

KEY INFORMANT INTERVIEW GUIDE

STUFFLEBEAM'S MODEL OF EVALUATION (modified – LJW, 1999)

CONTEXT EVALUATION	INPUT EVALUATION	PROCESS EVALUATION	PRODUCT EVALUATION
Context of course development • Historical • Changes over time • Funding – type, source, costs Demand for training • Needs assessment Purpose of training • Goal • Aim • Objectives Content • Contextualisation • materials Trainer • recruitment, appointment • orientation, preparation Learner • who, why targeted • selection – what, how • recruitment	Resources – type • needed, available • costs Facilities • advantages/disadvantages Teaching/learning strategies • approaches Administration • type • strategies • mechanisms • records • reports Documentation • who • what • where	Programme implementation • strengths • weaknesses • opportunities • threats Follow-up support • who • what • where • how Evaluation • type • tools • analysis	Learning outcomes • knowledge • skills • attitudes Application to job • change • Strengths • Weaknesses • Opportunities • Threats Course Design (overall) • Structure • content Feedback strategies • HISP • Service • Learner

Annexure 2

PARTICIPANT – FOCUS GROUP INTERVIEW GUIDE

1. Facilitator
- Welcome
- Rules: confidentiality, role of facilitator, group interaction, time
- Recording of procedure – note taking

2. Ice -breaker
- Agenda
- Scene setting
- Introduce themselves – job function, work environment

	STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
Involvement in data handling				
Change in practice post training				
Benefits to practice				
Recommendations for future action				

Annexure 3

Annexure 4

OBSERVATION OF TRAINING SKILL: TRAINER PERFORMANCE

❖ Rate the observed skill of performance in each category

Skill observed	4 Yes, always	3 Yes, often	2 Yes, seldom	1 Not at all
TRAINER				
1. Knowledge of content	4	3	2	1
2. Inter-personal skills	4	3	2	1
3. Delivery skills	4	3	2	1
4. Teaching method & style	4	3	2	1
5. Facilitation of group process	4	3	2	1
6. Facilitation of exercises	4	3	2	1
7. Session management	4	3	2	1
8. Class management	4	3	2	1
CONTENT				
9. Concept of content	4	3	2	1
10. Quality of content	4	3	2	1
11. Accuracy of content	4	3	2	1
12. Correlation with objectives	4	3	2	1
13. Quality of exercises	4	3	2	1
14. Quality of handouts	4	3	2	1

Interpretation:
* 4 very skillful * 3 satisfactory *2 needs improvement *1 unsatisfactory

Annexure 5

HISP
CERTIFICATE IN HEALTH INFORMATION MANAGEMENT

COURSE EVALUATION

COURSE: _____

FACILITATOR: _____

In order to assess the performance of the course and make changes to improve it in future, we would appreciate your assessment of the course. Please therefore assist us by completing this evaluation form. Thank you very much.

Indicate your response by **circling** the appropriate number:

Yes, very much (4) **Yes (3)** **Sometimes/Somewhat (2)** **Not al all (1)**

1. In the course I always felt challenged and motivated to learn	4	3	2	1
2. The course caused me to reconsider many of my former attitudes to information use	4	3	2	1
3. The course builds understanding of concepts and principles	4	3	2	1
4. The objectives of the course were clearly stated	4	3	2	1
5. The content of the course is relevant to my needs	4	3	2	1
6. I will be able to apply information/skills learned in this course in my daily work	4	3	2	1
7. The facilitator was actively helpful when participants had problems	4	3	2	1
8.There was sufficient time in class for questions and discussions	4	3	2	1
9. The audio-visual and reading material used in class are a great help to learning	4	3	2	1

Answer the following questions

What did you like the most about the course?

What did you like least about the course?

What improvements/ additions/ deletions would you make to the course?

Any other comments: