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Towards an understanding of ICT in The Hamad Health Science Library in the State of Qatar

By

Rabab Hussien Mohammed Abdulla

A Doctoral Thesis
Submitted in Partial Fulfillment of the Requirements for the Award of Doctor of Philosophy of Loughborough University

2004

Supervisor: Prof. Ron Summers

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Abstract

Information and communication technologies (ICTs) are increasingly changing the way in which working, learning, doing research and administrations are carried out. ICTs have the changed nature of many academic, public and organisations libraries. Health service is an important and essential element of any modern society. Therefore, development of this service and updating its services is a priority for most of modern governments. Current developments in ICTs are changing the nature of health science libraries. Therefore research in this area is important to provide guidelines, recommendations to improve the health services.

This study explores the impact of ICTs in Hamad Health Science Library in Qatar. Physicians and staff in the Hamad Medical Corporation were surveyed by questionnaire to identify the use of ICTs and their effect on them. Then personal interviews determined their perceptions of the impact on the research productivity of end-users.

There is a lack of this type of study in the literature. Those that there are specifically address the impact of ICTs in health science library. ICTs have become a major link to health care resources for many health care workers.

The study employs a systems methodological approach in order to better understand the impact and value of ICTs in Hamad Health Sciences Library (HHSL). Using the systems intervention, issues that affect the system were identified (technological issues, cooperation issues, cultural issues and staff (and user) training and development) and the problem situation improved. An ordered roadmap of elements necessary to bring about change was produced and a HHSL systems model constructed to understand the change processes in context.

Conclusions drawn reflect the level of success of the aims and objectives and indicate ways in which the problem situation can be improved from a systemic standpoint. Recommendations to management include aspects associated with operational planning, policy objectives and strategic formulation.

KEYWORDS: ICT, Health Science Libraries, Hamad Medical Corporation, Qatar, Soft Systems Methodology, Interpretive Structural Model.
Dedication

I dedicate every single word of this work to the memory of my loving mother and father, and my soul mate and caring husband Jassim who has supported and encouraged me during my long scientific journey. Finally, I dedicate the work to my dearly loved children, Fatima, Maktoum, Ghadeer, Mohammed, and Abdulaziz; their patience has inspired me to achieve my goal.
Acknowledgments

This thesis would have never seen the light of day without the help and blessing of God. I am very grateful to my academic guru Professor Ron Summers, who has helped me to develop my thinking about Systems Science as a way of improving dilemmas. His creative mind encouraged me to continually stretch existing ideas to new levels of knowledge. I am deeply indebted to Professor Charles Oppenheim, whose constructive and critical comments helped me to clarify my thoughts. He has provided expert advice and detailed feedback throughout.

I am grateful to the Qatari government for their financial support for the study, in particular to Ministry of Education for giving me the opportunity to pursue my higher education.

I would like to thank my husband who has always been my source of inspiration and for his continued support and encouragement all the way through my studies.

Last but not least, I extend my sincere thanks to my brothers, Mohammed and Ahmed, my sisters, Fatima, Mariam and Fawziya, for their patience while I was away from them.

Others to whom I am obliged are my colleagues in HHSL, who assisted me in the organisation of data collection. Special thanks for all my friends in Qatar for their continued moral support. I am very grateful to Mariam and Samira for their sincerity and openness which has enabled me to enter into and discover the world behind the scenes of the academic life.
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<tr>
<td>BL</td>
<td>British Library</td>
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<td>BLDSC</td>
<td>British Library Document Supply Centre</td>
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<td>CPD</td>
<td>Continuing Professional Development</td>
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<td>DHSL</td>
<td>Digital Health Sciences Library</td>
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<td>EBM</td>
<td>Evidence-based medicine</td>
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<td>EMR</td>
<td>Eastern Mediterranean Region</td>
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<td>EMRO</td>
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<td>Electronic Patient Record</td>
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<td>HHSL</td>
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<td>HISD</td>
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<tr>
<td>ICT(s)</td>
<td>Information and Communication Technology (Technologies)</td>
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<td>IFLA</td>
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<td>ILL</td>
<td>Interlibrary Loan</td>
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<td>ISM</td>
<td>Interpretive Structural Modelling</td>
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<td>ISP</td>
<td>Internet Service Provider</td>
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<td>MEDLINE</td>
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<td>NGT</td>
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<td>NLM</td>
<td>National library of Medicine</td>
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<td>PCs</td>
<td>personal computers</td>
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<td>RCBERs</td>
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<td>RD</td>
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<td>RP</td>
<td>Rich Picture</td>
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<td>SDI</td>
<td>Selective Dissemination of Information</td>
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<td>WWW</td>
<td>World Wide Web</td>
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Chapter 1
Introduction

1.1 Background

This research study investigated the role, impact and value of introducing information and communication technologies (ICTs) to the Hamad Health Science Library (HHSL) in the Hamad Medical Corporation, Qatar (HMC). Whereas IT enables management and delivery of high quality content within library and information services, communication technologies facilitate electronic and mobile interactions. HHSL is organisationally a part of the Hamad Medical Corporation (HMC), the major health facility in Qatar.

Many studies (including Mahmud 2002; Quibria & Tschang 2001; Marshall 2000) have predicted that the impact of ICTs will shape the way people, organisations, and markets behave; the healthcare sector is no different (Al-Shorbaji 2000). The ICTs of the future are likely to be faster, cheaper and more easily understood by end-users. Therefore, it is very important for developing countries, such as the State of Qatar, to investigate and analyse the benefits and advantages of implementing and adopting ICT into the State's organisational infrastructure, health services in particular, and its impact on patient welfare and well-being. Health libraries in Qatar, as elsewhere in the Gulf States region, are under increasing pressure to provide greater access to electronic services. An important link exists between high quality, evidence-based, medical care and quick, easy access to the current medical literature. New technologies and developments in library information services now make it feasible and economically viable for the health care professionals to obtain clinical information in a timely manner to effect evidence-based medicine (Itayem 2002).

The appropriate use of ICT in situ at HHSL will allow library staff to incorporate information literacy skills within an integrated staff development programme and develop courseware that will enable healthcare professionals to search, manage and retrieve medical information at will. It is a goal of HHSL to empower users with information skills to reduce the reliance upon stretched resources within the Library itself.
1.2 Research Aims and Objectives

The aim of this study is to investigate the role, impact and use of ICTs in HHSL as an indicator to meet the information needs of clinicians in their quest to deliver high quality healthcare. This aim is problematic because there is no measurable end-point for the study which indicates the type of methodology to be employed, as indicated in Objective 3 below.

The main objectives are to:

Objective 1. Examine the current role, impact and use of ICTs in Health libraries throughout the English-speaking world. This will be achieved by:
- analysing the literature on the impact of ICTs on health libraries in advanced countries; and,
- relating these findings to the HHSL.

Objective 2. Investigate the future role, impact and use of ICTs in HHSL. This will be achieved by:
- investigating current library users’ opinions regarding the role, impact and value of ICTs in the HHSL;
- identifying any barriers that are holding back the use of ICTs in the HHSL;
- investigating the relationship between training and use of ICT; and,
- investigating user information needs and how they are currently satisfied.

Objective 3. Identify change processes required to bring about systemic improvements in HHSL delivery of high quality content for the provision of evidence-based medicine. This will be achieved by:
- establishing the problem scenario;
- using a systems intervention to improve the problem situation.

1.3 Significance of the Study

In the current work, empirical evidence from a number of experts and HHSL users were collected and a systems intervention was conducted using a combination of Soft Systems
Methodology (Checkland 1981, Checkland & Scholes, 1991) and Interpretive Structural Modelling (ISM), (Warfield 1973). Analysis (questionnaire and interview, HHSL documents) based on the fieldwork information and data, of the 'problem situation' provided objective information on users' perceptions of the future needs of ICTs in the development of library and information services within HHSL. The Interpretive Structural Model developed established the elements in the change process and ordered them in a way that provides a precedence order for taking action.

There have been no comprehensive research studies on the impact, role and application of ICTs in HMC in general and HHSL in particular. The State of Qatar has seen sharp changes in democracy, economy, and open society since 1995. One of the highlights of these changes is the process of modernising the State organisations and their public services. The State authority is supporting research and studies to help their decision making. This research is funded in order to provide the information and data for the authority to be used as a guideline for their decisions to adopt of ICTs in HHSL.

In particular, this research study will:
- constitute a reference for further research in the same domain, since this is the first systemic study of the role of HHSL in healthcare provision in Qatar;
- act as a case study for health libraries in other Gulf Co-operation Council (GCC) countries and provide lessons for other units under the remit of the Eastern Mediterranean Regional Office (EMRO) of the World Health Organisation (WHO);
- contribute to the body of knowledge on the application of the chosen techniques and methodologies in the healthcare sector.

These activities demonstrate aspects of the wider system of interest and interact with the stated aims and objectives of this research study.

1.4 Thesis Structure

The roadmap for the development of ideas throughout the study is shown in Figure 1-1 (Research Roadmap Showing Threads-see p. 6). Brief descriptions of all Chapters are as follows.
Chapter 1

Introduction

Critical reviews of relevant literature on the research subject is presented in Chapter 2. It provides a definition of the ICT and knowledge transfer in developing countries. The research highlights the role, impact and value of ICTs in the field of health science libraries.

The research methods employed in the study are presented and discussed in Chapter 3. Details will be found on search strategies for the critical literature review; questionnaire design considerations; interview design considerations; Soft Systems Methodology and Interpretive Structural Modelling are also discussed.

Chapter Four provides background to the State of Qatar. This includes a historical review, geography and presents data on population. The health services provision in Qatar, the impact of the improvement in the health care and HHSL are also presented and discussed.

The use of systems thinking in this study is described in Chapter 5. A discussion of Mode 1 and Mode 2 of Checkland's Soft Systems Methodology is undertaken, and the decision to use Mode 1 in this study is indicated. Emphasis is given to the methods used in establishing the 'problem situation': questionnaire survey, semi-structural interviews with ICT experts and a document analysis. Details of a pilot questionnaire survey are given, which help in the formation of the research instruments used in the main study. The application of Interpretive Structural Modelling is also discussed in the context of the results from the pilot study.

Descriptive and analytical results from the empirical data collection are presented and discussed in Chapter 6. Tables of frequencies and cross-tabulations of chosen variables in the questionnaire are also presented. An analysis of the interviews is also presented.

The systems intervention in terms of the application of Soft Systems Methodology to the 'problem situation' identified via the empirical data collection is presented in Chapter 7. All seven stages of the methodology (Mode 1) are identified. A number of ways to improve the 'problem situation' follow from the three root definitions established. Output from the Soft Systems Methodology to investigate organisational change is also presented in the form of organisational models, which are developed from the
conceptual to the highly organised. Use of Warfield's Interpretive Structural Modelling process aids the understanding of the elements that comprise the model and their order.

Chapter 8 brings together the various research strands established throughout the study. Recommendation for the activities to be undertaken to establish HHSL as a beacon site within the GCC states for library and information service provision in the 21st century are given.

Finally, the conclusions of the study, which map back to the original aims and objectives, are listed and discussed in Chapter 9 together with recommendations for change and future research.
Chapter 1: Introduction

Aims and Objectives

1. Introduction
2. Literature Review
3. Research Design
4. Health Service in the State of Qatar
5. Soft Systems Thinking
6. Survey Finding and Analysis
7. System Interventions
8. Discussion
9. Conclusion and Recommendations

Figure 1-1 Research Roadmap Showing Threads
Chapter 2
Literature Review

2.1 Introduction: ICT and its Provision

To investigate ICT in HHSL in Qatar, it is essential to understand the basic definitions associated with ICT and HHSL and to build the basic theoretical background through a literature review. Therefore, this Chapter is structured in a way to give a literature review that provides a general introduction to the concepts to be addressed and a critical literature review of the use of ICTs in the HHSL.

The 21st Century provides opportunities for librarians and other information workers to improve health libraries services (Brice & Gray 2004) that are perhaps unparalleled in history (Marshall 2000). It is difficult not to be aware of the information age. There is a telling impact of information and communication technology (ICT) on everything that we do; from visiting the library to shopping for groceries.

ICT has become an important element of the working life of any healthcare service. There has been a sharp increase in the amount of clinical information (Hughes, Bellis & Tocque 2002), most of which is available on the web. The quality of web-based health information needs to be controlled to prevent individuals from making inappropriate self-diagnoses and treatments. Quality criteria do exist (Lancaster 2000) and rely on qualified physicians making judgements on the content of web-pages. Unfortunately, there is evidence that people are giving themselves life-threatening concoctions (Weisbord, Soule & Kinnel 1997) that have led to death (Mark, Hainer & Naoky 2000).

ICT can also provide the basis of an integrated patient information system for which the Electronic Patient Record (EPR) or Electronic Health Record (EHR) is an important component. Computer workstations can be installed on all wards and clinics, providing each clinician with access to web-based records at the point of care. The EPR also has links to the evidence base, such as that provided by on-line journals such as The Journal of Clinical Evidence (British Medical Association) and pharmacopoeias such as those from the Royal Pharmaceutical Society in the UK. It is assumed that the quality of healthcare
provision will be improved with well-organised access to the vast amount of knowledge available to the health profession. To support this view, Lancaster (2000) stated that:

There is a growing body of evidence, which demonstrates that when the knowledge base of healthcare is used in a systematic and properly considered way, its impact on the quality of healthcare can be significant and even profound. (Lancaster 2000, p. 6)

Healthcare professionals themselves have a growing need to distinguish between different information sources, as indicated by Palmer and Streatfield:

Healthcare workers are faced with the need to discriminate between growing quantities of apparently relevant information, to decide which treatment and procedures are the most effective. (Palmer & Streatfield 1995, p. 153)

New ICTs could be divided into three broad categories: computing; communication; and Internet-enabled communications and computing, as proposed by Quibria and Tschang (2001). ICT provides people with access to more and better information. It also facilitates new ways of representing, structuring and creating information, both collaboratively and at a distance. ICT has revolutionised, not only communication, but also commerce and computing in all fields, including scientific computing and business automation.

Today, ICT has proliferated in the healthcare sector. Qatar has seen rapid growth in the use of electronic communications, which indicate the opportunities that lie in utilising ICTs to enhance healthcare services for the benefit of the general population. The challenges are still also enormous, especially because the infrastructure is not adequate to be able effectively able to benefit from ICTs, both in the urban centres but critically in the rural areas.

2.1.1 Definition of ICT

For the purpose of this research study ICT is defined as:

"...any product that will store, retrieve, manipulate, transmit or receive information electronically in a digital form (Hughes, Bellis & Tocque 2002, p. 14)."
2.1.2 Information Technologies

Computers represent the most significant technological breakthrough in the last half of the 20th century. The cost of computing has declined rapidly and the use of personal computers has increased exponentially in developed countries, with a doubling time of approximately 18 months (Tan & Edejer 2000). ICTs play an ever-increasing role in all organisations today and libraries are no exception. Lavagnino (1998) pointed out, in her interviews with seven library directors, that libraries face many challenges that could be assisted by technology. It is clear from this study that managing the explosion of information available, user issues, financial challenges, and facilities for archiving can all be helped by the use of ICT and/or computer networking.

New information technologies are making it possible for libraries to make the transition from a traditional library facility in one location to a corporate information centre providing information products and services at the point of need. Healthcare professionals and other customers no longer need to enter the physical library facility in order to take advantage of its services.

2.1.3 Communication Technologies

Communication technology is one of the most important aspects of modern life. Typically, it has been classified into one of two forms: one- and two-way communication. The most common form is one-way communication and that includes broadcasting media such as radio and television. Two-way communication devices, such as telephones, constitute perhaps the most important component of the information revolution, having improved significantly since 1980. The growth of the Internet is largely a function of the combination of two-way communication links (telephone lines) and personal computers (PCs) (Meadows 2003, p. 85).

Carpenter (1999) defined good communication as a two way interactive process. Good communication is a vital process in every organisation, as well as a skill; as such, it is subject to the same cultural, procedural and structural influences as other aspects of work.
2.1.4 The Internet

The Internet is a unique information medium allowing information to be accessed at any time from anywhere in the world. The World Wide Web (WWW), or more simply the 'Web', is one part of the Internet. Organisations publish web pages, which are single or multiple documents that can contain text, images, audio and links to other pages. A collection of web pages developed and maintained by an organisation is called a Web Site.

One definition of the Internet is quoted as:

Internet is network of networks. A group of networks connected together by BRIDGES or ROUTERS so that data may be passed from one network into another, which allows users of all these networks to communicate and share data with one another. The Internet permits email to be sent to and from anywhere in the world that has access to it via an internet services provider. (Pountain 2001, p. 251)

The Internet provides people with access to more and better information (Quibria & Tschang 2001). It also facilitates new ways of representing information, structuring information and creating information (for both collaborative and distance work).

Ubaydli (1998) describes the current situation of the Internet in the Arab World. He includes details of infrastructure and level of adoption which shows pockets of first world activity (e.g. Star City in Riyadh) but otherwise an area of neglect. This contrasts with the view that the Internet has become the largest and most important network of all networks today, and has evolved into a global information superhighway. The Internet has also become a key platform for a rapidly expanding list of information and entertainment services and business applications, including enterprise collaboration and electronic commerce systems.

Suddenly it seems that the Internet is everywhere. After two decades of relative obscurity as a government and research network, the Internet burst upon the 1990s to penetrate the public consciousness, capturing headlines and attracting million of users around the world. Every indication points to even faster growth in the 21st century. (O'Brien 2001, p. 213)
Lown, Bukachi & Xavier (1998) demonstrated that evidence from costly medical journals in paper format can be replaced by using Internet connectivity to its abundant, distributed databases and online journals. At present, Internet connectivity is growing rapidly in developing countries, including Africa. Public access to Internet services is now available in the capital cities of 42 of the 45 African nations. Numerous agencies, such as the Information for Development programme, are promoting this development that has as its goal the full integration of the developing nations into the information economy.

2.2 Health Science Libraries

Al-Ogla (1998) defined the terms 'hospital library' and 'medical library' and found that they are used interchangeably, despite their sometimes differing connotations. From searching the literature, the term 'hospital' has more of a healthcare meaning, whereas 'medical' has an academic connotation. Issues surrounding the establishment of hospital libraries have been discussed by Myers (1998). He found that the main problems include lack of appreciation of what a hospital library can bring to healthcare, finding adequate financial backing to support the setting up of a hospital library; dealing with the view that some regard evidence-based medicine as not important; and finding the space resource to house the library in the first place. The finding that not all hospital developers support evidence-based medicine is controversial, as the majority of clinicians would take the opposite view.

Palmer (1996) has shown that health libraries are early adopters of new technologies: they were among the first to install an automated library system, to adopt CD-ROM technology and to introduce end-user searching. Many clinicians realised that they need help in retrieving information for systemic reviews and to support clinical decision-making. They also require support in making effective use of electronic databases and text retrieval systems. However, although it is important to recognise that the advent of electronic libraries will not solve all problems, they will provide a solution to the problems of access to the Internet. One of the most important points made by Palmer (1996) is that she believes that if health libraries are not to be increasingly marginalised, librarians must consider how best to become more proactive and supportive to people.
struggling with the increasing diversity of information. An investment in their own continuing professional development is also one of the most important weapons for librarians if they wish to continue to be taken seriously by other professional groups and by those who use the libraries.

Myers (1998) and Lancaster (2000) support these views, going further in their analysis to suggest that hospital libraries:

- Meet clinicians’ needs for access to medical publications,
- Have ready access to knowledge bases to inform clinical practice, to sustain continuing professional development, and to support research activities, wherever required,
- Make the World Wide Web, Web-based databases, electronic journals and other digital information systems be components of a hospital library,
- Have rooms for private study,
- Be used as a place for meetings and consultations, with sufficient resources at hand to settle discussions and difficulties without delay,
- Communicate with other health libraries for exchange of information.

From another perspective, health science library services provide information necessary to ensure high quality clinical, research, technical education and consumer health information (Loo 2003, p. 217). The health library must also provide easy and effective access to, and delivery of, knowledge-based information services and ensure that clinicians are fully aware of the services and resources that are available, as well as encouraging and promoting their use (ALIA 2001). Libraries with a healthcare interest will be found in government departments, hospital services (providers and purchasers), higher education institutions, research institutes, drug companies, public libraries and the voluntary sector. The literature, which is required by all these users, extends beyond medical and health sciences to economics, ethics, engineering, statistics, law, management theory and the behavioural sciences.

Specialist libraries in the health sector have been formed to satisfy the needs of the sophisticated user. Bailey et al. (2000) outlined a collaborative user need assessment, which was undertaken to inform the establishment of a specialist palliative care/cancer
Chapter 2 Literature Review

care library and information service within the Education Unit based at the Marie Curie Centre in Newcastle Upon Tyne, England. The study provides a case study that illustrates how a library and information service can be shaped by a user needs analysis. In this respect, the analysis was conducted over a 3 month period, and comprised a literature search, questionnaire survey and interviews. The findings, which indicated that the appointment of a professional librarian was crucial, have ensured that the Library and Information Service being developed is underpinned by a strong evidence base. The researchers found that the types of information most heavily used in this library were books and current journals. The authors recommended that:

- The most important requirement was the appointment of a qualified librarian,
- An IT skills training programme should be drawn up and implemented,
- Electronic journal subscriptions should be explored as an alternative to hard copy, in view of the lack of space in the library,
- Access to the Internet should be provided in the library,
- The information service should be equally accessible to all staff and students, and
- The subject range of book and journal subscriptions should be widened.

However, the Centre lacked a formal co-operation agreement with local authorities, Universities and Colleges, and NHS related health libraries in the city. The Centre also lacked a formal ICT strategy which weakens the provision of a modern information service.

From an alternative perspective, D'Alessandro et al. (1998) carried out a study in order to determine the user demographics of a digital health sciences library (DHSL), motives for its use, the nature of users' information requests, and the success rate in finding answers. The motivations for use were primarily related to health advice and patient care. The motivation of use of ICTs in health libraries are therefore essential in any research, and was an ingredient of this study.

As discussed above, health libraries are playing a major and important role in the provision of modern health services. Developed countries have moved fast to introduce ICT as an effective tool in their health libraries to deliver increased functionality, to
provide a strategic plan for continuing professional development of health library staff, and to meet the needs of the change management process is also a crucial component for success. The next section will introduce health libraries in developing countries, as this research study is based on a developing country, namely Qatar.

2.2.1 ICT and Health Libraries in Developing Countries

Given that countries around the world are moving towards being information societies, certain challenges present themselves (Johnson 1999). These include developing high levels of skill and knowledge to allow people to use the new technologies and to meet the needs of such users in helping them to utilise the information they access. In this, greater responsibility is placed on information service providers than ever before, as the new technologies permit easy transmission of vast amounts of information and systems are more vulnerable to abuse.

The enormous advantages of information technology in easing the delivery of information around the world were reported by Jimba (1999). He claims that information will play a central role in the new global economy. Moreover, he forecast that ICT will shape the dynamics of the future of the third world, once these countries are encouraged to invest in information technology. Of course, any technological change should be gradually implemented, considering the cultural and structural differences between the developed and advanced countries. Jimba (1999) goes on to explain how ICT systems offer enormous potential information advantages for the development of any nation. What is at stake, and what needs to be questioned, is the extent to which Third World countries will actually benefit from the potential of ICT. The attention of information specialists needs to be drawn to the fact that the whole range of the ICT economy (from conception to implementation) is lopsided towards the business and political interests of Western countries and their various research and development laboratories. This, then, places all the benefits of ICT squarely in the hands of these countries. Therefore, it is doubtful if the often proclaimed advantages of ICT will be of any significant benefit to the populace of the Third World. This is true to some extent, but the fact is that the developing countries have already started using ICTs in many aspects of their application to library development.
Pakenham-Walsh (2000) considers how healthcare delivery in developing countries could be improved by the use of ICT, as many of the existing healthcare services in such countries depend on observation, building experience, advice from colleagues, and so on. Access to up-to-date information would enable services to be improved. However, information needs to be clear and simple while also being locally relevant, and in a language which is accessible. Furthermore, it must be reliable and accessible at the point of care. Access alone is insufficient: it must also be used and applied effectively since much material, in order to be cost-effective, is gathered together in libraries and resource centres. Local production of information allows better access to quality source material, but for this to be effective there needs to be clear information about what is actually available, and the material must be both appropriate and affordable. In contrast, the GCC countries have effective and reliable access to electronic data sources and acquisition of health data from international sources is relatively easy.

Ornager (2003) refers to UNESCO’s role in the training of library and information professionals in the use of ICT in south-east Asia. There is a wide range of abilities and skills among these specialists with some having a high degree of skill and others have no skills at all. There is a similarity between Ornager’s findings in south-east Asia and what can be found in the developing countries such as Qatar.

In terms of library development, Ball (1995) indicated that the technology rich environment within many new library buildings will transform the library into an informatics institution, allowing the information to be made available when, where and how it is needed. Technology is transforming how we learn, how we practice and how we create knowledge. Libraries themselves are changing to become more of an informatics institution. It is this transformed library that will become central to the new organisation, leading the development of a post-modern, digital, knowledge-management system for medicine.

Gorman and Cullen (2000) argue for a new approach to the modelling of networks in which libraries enter at one point and then move along a continuum, ideally ending in an advanced, integrated model of the knowledge environment. The study shows that there is limited evidence that some library consortia in Asia are moving in this direction, but for the most part, Asian consortia and networks are of the traditional, static variety. They
have also established that in most developing countries, information professionals agree that it is important to maintain the richness, diversity and values of the traditional library service as we move into an electronic future.

Tan & Edejer (2000) examined the evidence gained from searching MEDLINE and other websites relative to health research and ICT in developing countries. While advances in technology make the global distribution of huge amounts of information seem effortless and open to almost all, this is not the case in developing countries. For example, in developing countries, few women have access to the Internet, while fewer than 1 million people in Africa (with a population of 700 million) have access. One country, South Africa, accounts for 80% of Africans that had access. The lack of access in the developing world is contributing to a 'digital divide', adding to the inequalities such advances were supposed to lessen. Some technologies, however, are being used to increase access to health information in developing countries. For example, a low earth orbit UN satellite provides health information to 30 countries in Africa and Asia. Furthermore, Tan & Edejer (2000) stated that the UN proposed the right of universal access to ICT services in September 2000 at the Millennium meeting in South Africa. Once access is more open, efforts must be made to evaluate the quality of information available since websites are dynamic in nature; they change and proliferate too quickly for the quality of the information in them to be judged. Also, users cannot be expected to know whether some or any of the various amounts of information available is relevant to them. A further issue that relates to information sources is that much of their content is derived from material used in the development world; this content may not be always entirely appropriate for application in the developing world. Further barriers are literacy and language; most of the material on the Internet is in English. These problems must be addressed urgently due to the rapid introduction of websites in developing countries. This article consists of very intensive presentation of extremely important health information related issues that can be found in the developing countries. It does not give 'justice' to the importance of issues such as access, the digital divide, and information dissemination in the third world. What actually concerns people in the Arab countries in general, and the Gulf countries in particular, is the lack of a clear strategy for the adoption of ICT. There should be a clear policy which gives rights to people to access this information. Therefore, a combination of governmental (e.g. Public Health Service)
and non-governmental (e.g. National Library of Medicine) web-sites should be offered in a language that is well understood by individuals within the society of these countries.

A study has been carried out on the ICT application in Zambia by Kanyengo (2000). He said that the application of ICT in Zambia facilitated the exchange of information between ICT specialists. Many of new ideas and tools were evolved from this exchange for the dissemination of medical information such as “List groups”. Another example is the Blue Trunk library project started in 1996 as an effort to promote access to essential health information by district health workers and try to bridge the knowledge gap that is prevalent in many health communities in developing countries. WHO is running this project in 38 countries in Africa and the Middle East. Certain (2002) and Pakenham-Walsh (2000) also described this project in their studies of libraries in the Middle East.

2.2.2 Health Libraries in the Arab Countries and GCC

The ICT infrastructure in the Arab region has improved dramatically in the last few years, as reported by Al-Shorbaji (2000a). Libraries in all EMR (Eastern Mediterranean Region) countries are now connected to the Internet. The number of trained computer and communication specialists has substantially increased. Health libraries are in a better situation than many other types of libraries as medical education requires libraries to support the education and research process. ICTs are used for providing intellectual access to the content of these collections and for making available all or parts of the collection needed. This can be achieved by using the Internet and other electronic publishing media to identify resources and access them. The main criticism of the Al-Shorbaji study is the omission of the role and impact of non-qualified librarians on decision-making, lack of ICT hardware, lack of awareness of perceived value of information by potential users of health information. In fact the research shows that the vast majority of the health libraries in the EMR are controlled, managed and administrated centrally by non-information professionals.

In a more specific example, Hamadeh (2000) considers an inexpensive operation for automating practice in a Lebanese health clinic, and the impact of that this automation has on the health sector. A basic requirement is to transfer health clinic functions from paper to machine-readable systems. Since many of the developing countries correlate
with poverty and shortage of money to develop clinical health services, this article presents an adaption of the more advanced health clinics.

Ashoor (2000) described the various technological and social requirements for planning an electronic library, including special libraries. He suggested guidelines for building an electronic library in developing countries with a focus on the GCC countries. Many developing countries, such as Malaysia, are taking advantage of ICT have already invested in building their information infrastructure. However, most of the workshops teach users how to navigate through the various electronic databases on the Internet. It is an interesting study which shows the importance of the electronic library as a means to establish a network between the GCC libraries. Over the last two decades, many academic libraries in the GCC region have introduced electronic resources into their library operations (Ashoor 2000). It is therefore not surprising that an increasingly important function of academic libraries in the GCC today is the provision of information in an electronic format.

In contrast, there are six traditional libraries in Qatar. They lack medical resources. Librarians in Qatar rely on models that may no longer be robust enough to deal with the emerging reality of global electronic information networks. For example, the ‘Holdings’ model, so long dominant in the academic library sector that it has effectively maintained traditional values of libraries and librarianship, has largely failed to meet user needs in the new environment. Likewise, the ‘System’ model might have been valuable in teaching that the library is a process and not a static organisation, but it has failed to take into account the meaning of libraries in a broader, more competitive arena.

A study done in Saudi Arabia by Al-Ogla (1998) examined the status of hospital libraries in Riyadh, their sponsoring organisations, their staff, the academic qualifications of the head of the libraries, collection size, available space, building and services. The study stressed the need to establish a library in each hospital, to develop greater international co-operation to improve library services, to shift the focus from ownership to access, and to hire qualified librarians to improve the information services for users. The data were collected through questionnaires sent to a sample of fifteen hospitals with health libraries three from the private health sector. Responses were received from twelve (80%) of the
hospital libraries. The surprise in these data is that there were four heads without university qualifications or library science training. The drawback of this study is that the author restricted his research method to questionnaire survey. He mentioned that all health libraries provide services such as Selective Dissemination of Information (SDI), but he didn't clarify in his study if the results were based on his own empirical evidence or from other resources, which made his findings suspect.

The continuing emergence of new ICTs brings tremendous change to the library environment in general and to its services in particular. Qari (1999) strongly supported this dichotomy when he stated that the library environments and the methods of providing services to library users are changing with the availability of new technologies (e.g. On-line Public Access Catalogues and CD-ROM databases). To help librarians cope with these new technologies and to get the most out of them, it is imperative to enrol librarians onto training schemes to familiarise them with cutting-edge technologies used in libraries. In this sense, Qari is a very strong advocate of self training schemes, in particular those applied in King Abdulaziz University (KAU), Saudi Arabia. He believes that self-training packages help the population of the university to learn ICT at their own convenience, which he considers to be an advantage. The author failed to state the success of the training programmes and statistics used were descriptive only.

Al-Ansari & Al-Enezi (2001) reported the health library services available in seventeen health libraries in Kuwait. They studied issues such as: number of staff, information resources available, access to internet and other on-line facilities, use of ICT, and co-operation within the GCC. The results show the majority of health libraries were established during the 1980s. Their collections are relatively small. The majority of their staff are non-qualified. The majority of libraries provide only basic information services. Co-operation among libraries is limited. Survey results also indicated that a significant number of libraries are not automated. The article mentioned that the health libraries collection is small due to "the loss of some collections, during the Iraqi occupation in 1991, which have not been returned or replaced". Given the ten year gap between the Gulf war and the publication of the paper, this argument is unconvincing.
Chapter 2 Literature Review

Boumarafi (1996) stated that health libraries provide good facilities via the National Health Library in the United Arab Emirates, UAE. The library provides good facilities such as access to MEDLINE and current contents for life sciences, in addition to inter-lending to libraries within and outside the country, including free photocopying of up to 50 copies for students and staff. In addition, students are entitled to a free copy of all the textbooks required for their courses. It also supplements its collections by using the information delivery system of the British Library Document Supply Centre (BLDSC). The health library is important as a tool for information, communication, guidance, help and support for the medical staff. In this article that describes some aspect of the health library a contradiction of the author can be noted. He has described NLM in the USA as an academic institution that provides a good service and has good facilities. However, despite the provision of some outstanding services by the academic libraries in the UAE, there are some drawbacks due to the non-qualified nature of the staff. It is known that the librarians have an important role in assessing the library and the author has shown this very clearly in this paper. The use of communication technology in health science libraries of the United Arab Emirates has recently been discussed by Bishawi (2002). This article lacked the relevance of the subject to the health libraries in the UAE. However, it is one of few published works on communication aspects within the GCC countries.

Alian (1999) surveyed the present status of ten health libraries in the State of Bahrain in terms of their history, collection, staff and services. He concluded that the main problems facing health libraries in Bahrain are: lack of financial resource, poor collections and resources available in general with respect to quality and quantity. Due to the absence of qualified cataloguers, most of the stock in the health libraries are not catalogued or classified. Poor physical locations and lack of co-operation were also issues facing these libraries. ICT and an on-line network were available in only three health libraries.

2.2.3 Healthcare Librarians

There is a need for health librarians to develop strong partnerships with all kinds of health information professionals to understand how best to provide health information, how best to evaluate the information in terms of its quality, and how to share
information across delivery systems from the library to the bedside. In addition, health professionals and health librarians should work together to link clinical information systems to consumer health databases and design easy-to-use interfaces or single entry points to these resources in order to make the best information available that directly benefits consumers and care givers.

Librarians should consider how best to become more active and to support users struggling with the increasing variety of information if they wish to be taken seriously by professional groups and other users. Librarians should capture the opportunity to make their libraries the centres of evidence in the organisations in which they work.

Kaane (1997) reported that librarians in health libraries need to be more active in identifying needs and finding ways of getting information to users in rural areas. The WHO has put forward a concept of national focal point libraries in which the development of policies and library services are concentrated. It further advocates the establishment of an infrastructure for health library co-operation, the maintenance of links with national and international information systems, and monitoring potential applications of new technology. Libraries and information centres have to work with health professionals for the promotion of the health community.

The success of any health library, no matter how well designed or equipped, depends ultimately on the quality and number of personnel responsible for it (Itayem, 2001). Palmer (1999) illustrates the extent to which the effectiveness of the health care library and information services depends on the skills, knowledge and expertise of health care librarians. She also refers to the efforts made by the NLM, USA to award grants to encourage the health sciences community to plan for continuing professional development. This planning has focused on three areas:

- The evolving role of healthcare librarians.
- Professional education.
- Recruitment.
Much of the work done reflects similar interests throughout the profession on the changing role of the librarian and the importance of traditional and new skills in effective professional practice.

Qureshi, Alam & Naqvi (2000) noted that librarians in developing countries are trying hard to catch up with the change in ICT. Public library systems are not well organised and academic library systems are also quite poor in terms of collection, services, information retrieval and communication facilities. The condition of special and research libraries is somewhat better in terms of providing information retrieval facilities using basic information technology equipment and skills, but they too face a number of problems, including poor ICT equipment (hardware and software), and communication facilities. In general, there is an encouraging trend of awareness and acceptance of information technology in libraries and information centres. However, due to a lack of proper communication and co-ordination, in many cases there is a duplication of effort in the collection and processing of information.

Health Librarians should be able to provide help, support and give advice to the medical profession in their information searches. Many clinicians expressed their need for help in searching the major databases, such as MEDLINE, for systematic reviews and other evidence of clinical effectiveness and that they require support in making effective use of electronic databases and text retrieval systems (Cahoon & Marriott 1999). This article proposes MEDLINE services rather than the internet as the best means to retrieve health information.

In another study, Schacher (2001) describes the role of a Health Library in ensuring that the healthcare provider has access to reliable, relevant and up-to-date information. He asks if the Health Librarian should perform the searches for the healthcare provider. The answer to this is that it is best for the healthcare provider to perform the search; it is, however, difficult to do so if no training has been given. The role of the librarian is to teach healthcare providers to perform searches and to assist in performing the search.

A Health Librarian should have basic training in computer studies, and be accepted as an integral member of the healthcare delivery team. Over the past few years, it is clear that
the role of a specialist health librarian has not been well developed (Martin 1998). The main change has been limited to the conversion of printed sources into electronic means.

Martin (1998) focused on consumer health information in order to understand the information needs of non-clinical users and to identify who they are. The article highlighted the types of information resources needed by consumers. Some reliable sources of Internet-based medical information were suggested and the role of the Health Librarian recommended to provide quality health information to consumers. The Health Librarians teach formal and informal classes in searching MEDLINE using PubMed, or the Internet Grateful Med search system, and in finding Internet health resources on the Web. Health Librarians play an important role in helping users to locate the best information resources to meet their needs, as noted by Martin (1998). More often, they find themselves in new roles in teaching, quality and in organising Internet searches in order to provide access to more resources.

2.2.4 ICTs and the Healthcare Sector

The International Telecommunication Union (ITU) Regional Symposium in Tunisia (1997) was held as a driver towards forming an information society in the Arab States. The meeting reported on the development and use of ICT in the healthcare and education sectors. The objectives of the meeting were to provide a better knowledge of the new trends in ICT; promote the elaboration of concrete national and regional strategies and policies for the development and use of IT services in the Arab States; and present, promote and recommend further directions for the regional Arab information technology network, which was created by Arab institutions with the support of UNESCO and the ITU. These ideals were amplified by Cramp and Carson (2001) who investigated the increasing developments in ICT from a clinical perspective.

A framework was developed which assists in evaluating the use of ICT and gradually increases its value in the healthcare sector. Furthermore, the researchers mentioned some of the challenges facing the ICTs in developed and developing countries. The developing countries face the problem of “acute shortage in trained manpower”, although the same challenge is considered to be a serious concern in the UK as well. For an effective and
efficient healthcare future, an infrastructure based on ICT is an essential requirement. At the same time, a team of professionals is also needed in order to utilise such as infrastructure. Therefore the GCC countries in general and Qatar in particular, need to take the concept of infrastructure and the need for an associated team of professionals into an implementation stage for better ICT delivery in the healthcare sector.

Plaice, Newton & Perry (1997) indicated the importance of healthcare librarians in supporting clinical effectiveness. The authors emphasised the point that healthcare librarians are well equipped to offer this support. This may be true, but it also illustrates a further training need for librarian. The development of technology and the introduction of ICT in the workplace have led to a new era in the medical field. Anderson (1999) found that physicians have expressed a real need for efficient, online health information, because it is easy to use at the point of care, saves time, and is both trustworthy and helpful. He outlined a number of major benefits: support of patient care such as cost savings through decision-making, improved quality of healthcare, and increasing efficiency in managing clinical information systems.

Keeling & Lambert (2000) considered the role of ICTs such as telemedicine and evidence-based medicine (EBM) in the NHS in the UK. These are changing the ways in which care is provided. The quantity of information is ever growing and Keeling and Lambert argue that clinical knowledge management may be a method of managing and exploiting the huge quantity of resources available. They present a model (see Figure 2-1) to demonstrate how librarians could play a central role in the dissemination and organization of healthcare information by processing routine information resources.

In the UK, the NHS has its own private wide area network, called the NHS-net. Associated with this resource is NHS-web, which is an Internet for NHS staff that provides a wide range of data and information. This has the facility to provide knowledge networks that can be personalised for the specific purposes of healthcare users, including the hosting of some specialist zones. For example, the National Electronic Library for Health (NeLH) hosts full text versions of 300 medical journals and a comprehensive collection of specialist material.
However, Keeling & Lambert (2000) revealed a range of difficulties highlighted by end-users in using these systems. For instance, clinical users lacked the required skills and competencies to use HTML or a web-page editor and experienced a number of difficulties in using the interface and its content. The use of the technologies available will be limited if these negative experiences are widespread. Moreover, connection to NHS-net was patchy, with a number of hospitals having no connection at all, while there were limited connections in others. Where connection was provided, use was inconsistent. On the other hand, a significant proportion reported that their skills in using ICTs have raised their profile across the NHS trust.

The authors identify three main elements to force changes throughout the NHS to maximise the effectiveness of their competence. These elements are government policy, new technologies and the push towards the practice of information-based medicine. The authors did not expand on the role of each of these elements towards the changes. It would be very interesting to identify the impact of the policy makers as well as the decision-makers within the NHS towards these changes.

In the USA, Valenzi (1998) examined briefly the example of Linda Watson and her work at the University of Virginia Claude Moore Health Science Library in Virginia. This work
involved offering access to online resources published by the National Library of Medicine to clinicians and medical students in order for them to acquire up-to-date information easily. Networking infrastructure was the next step and then computer-aided instruction was also introduced for students. In addition, medical journals were made available in electronic format to which there is 24-hour access. However, since many users still prefer to access information in print form, the cost of duplicating all the material is relatively high. There are also legal challenges. Publishers are nervous about allowing material to be accessed on-line and no clear guidelines are available. Librarians are justifiably concerned about long-term access to electronic journals since archival access cannot be guaranteed (Valenzi 1998). Finally there are challenges regarding constant changes to infrastructure to accommodate new technology and the maintenance of the financial resources needed to keep the systems running and up-to-date.

Information poverty is one of the most serious obstacles facing health professionals in Africa. ICTs in the health sector in Africa are about fifteen years behind other sectors. This will reflect the poverty of the sector to meet the needs of the new era of health services worldwide (African Development Forum 1999). One of the problems in Africa is the lack of clinicians. In the mid 1990s, for example, there was an average of one clinician for every 400 people in high-income economies, while there was only one clinician for every 1,000 people in low income economies and one clinician to 7000 people in some rural areas; this ratio can go up to one in 200,000 in some poor areas. This high ratio means that a great deal of effort is required to meet the health needs of the people. Which includes administration as well as health care. Therefore, introducing ICTs in Africa could help to promote health behaviour, reduce administration, reduce disparities between the services in urban and rural areas, and reduce the costs involved in transporting patients to urban facilities.

The African Development Forum (1999) recognized six major areas which could play a substantial role. These areas are:

- Improving access to health services in rural areas and to primary health care;
- Underpinning public education campaigns to promote healthy behaviour in critical areas such as AIDS;
- Transferring diagnostic information to specialized centres;
- Strengthening the basis for decision-making;
- Promoting information exchange among researchers and students; and
- Enhancing the effectiveness of health institutions.

Time will tell if the resources become available to address these issues.

2.2.5 The Impact of ICTs in Health Science Libraries

ICTs are increasingly considered as development tools for next generation information systems. A number of different solutions are emerging as experts balance cost and access. ICTs offer a new opportunity to build a confident, skilled and participatory community in terms of knowledge that includes libraries and information centres. Expensive, potentially disruptive, and extraordinarily beneficial ICTs are here to stay, and developing countries can ill afford to sit on the sidelines, so they must find resources to take a full part in their research and development.

Today ICTs have proliferated in the healthcare sector, the health library has seen rapid growth in electronic communication usage, and this has created both opportunities and challenges. The opportunities lie in utilising ICTs in the enhancement of health care services for the benefit of the general population. Challenges are also enormous especially with infrastructure not being adequate both in the urban centers, but critically in the rural areas to be able to effectively benefit from ICTs.

ICTs have provided new tools for bibliographical control and have the potential to give better access to health facilities and health promotion activities. In this respect, developing countries suffer from many disadvantages. One of the most serious is the lack of access to adequate healthcare services. Developing regions are making use of systems such as Web MEDLINE to link healthcare workers around the world and to provide access to medical information from other countries about diagnosis and treatment. Again, as with other ICT applications, it will be necessary for policy makers to establish at what point in the healthcare system's development that such ICT-based system should be added to complement the traditional system (Lancaster 2000).

In a study done by Al-Ansari (1999) on all libraries in the GCC (including health libraries), technology was identified as one of the major factors driving changes in the
way people communicate, locate, retrieve and use information. Libraries and information centres have embraced this new technology more successfully than many other fields and most are currently using some form of automated product or service. These technologies include all forms of media such as CD-ROM databases, interactive media, electronic journals and texts, online resources, integrated library systems, and the Internet. The Internet has become standard equipment in most libraries and information centres for their operations and services.

The decade of the 1990s saw a significant push for health care reform throughout the United States. Healthcare librarians were under pressure to increase their efficiency and expand their services beyond the boundaries of the library and its parent institution. The availability of new ICTs made it possible for librarians to achieve some of the efficiencies demanded by the changing financial environment, and librarians incorporated these technologies into their daily work routines (Foster & Warden 2000).

Plaice (2000) confirmed the different levels of impact of technology on library and information services (LIS) in the UK NHS. He suggested that in the NHS, hospital libraries and computer departments should become amalgamated into single units. In the United States, the relationship between the hospital librarian and information system can be significant to the success of the hospital library. This article shows the opportunities for LIS staff to work in partnership with other health informatics professionals. Librarians possess the knowledge and education to serve as a bridge between the available technology and its users through their obligation to service, their knowledge of health care information needs, and their awareness of and competencies in LIS within ICT systems.

The Internet has become part of the daily life of administration, management, and the searching for information and entertainment. While the Internet has proven a valuable tool for information seekers, there are many issues which confront today’s healthcare librarian. For example, Madge (2000) stated that there are a number of key professional issues which are of concern to health libraries and librarians in the UK at the beginning of the twenty-first century. The Internet connection problem in NHS libraries with their limited budgets is the unknown cost of unlimited Internet connection. For librarians,
another key issue is CD-ROM versus the Internet. Offering MEDLINE free on the Internet from NLM meant that CD-ROM suppliers were worried that sales of CD-ROM versions of MEDLINE would drop dramatically. From empirical evidence many users prefer the CD-ROM interface rather the Internet interface.

Rashbass (2000) stated that new technologies are empowering individuals and communities to gather and access information without the need to refer to experts for assistance. This review gives a brief introduction to the information technology and how it may lead to the death of the printed document and index catalogue. Users may browse the Internet from their own computers for access to the information they require. Web technologies provide an easy, user-friendly interface to distributed information, retrieval search engines and access to web servers. Internet technologies make it easy for organisations to provide information and to allow access by world-wide end users. The author claims that the emerging e-publishing technologies will reduce the need for health libraries based on journals needs only, in his words "...healthcare libraries are dying. Over the next 5 years we can expect to see emerging technologies destroy the need for those institutions, especially libraries..." (Rashbass 2000, p. 51). He based his argument on individuals having no need to go to a health library to access help, support and advice. He claimed that, "new technologies are empowering the individual whether it is in the laboratory, clinic or the community, to gather access and assess information without the need to refer to experts for assistance" (Rashbass 2000, p. 51). This prediction from 2000 has some validity in health library provision in Qatar. A new national library for Qatar is in the advanced planning stage of procurement; one of its design principles is that the journal collection will be completely in electronic form. The other factor is the high rate of change in the ICT sector. Therefore, the role and functions of the health library may change due to the change in ICT. His claim of five years for the "death of the health libraries" is perhaps a little underestimated. However, it is clear that ICTs are more than just another tool, their potential for increasing the range, relevance and accessibility of information and communication in health libraries is very significant, as is its potential for supporting library staff in their everyday roles and in their continuing training and professional development (Itayem 2001).

A study done by Siddiqui (1996) notes that all libraries in Saudi Arabia are using GULFNET as the Internet Service Provider (ISP) to communicate with each other.
Even with these developments, it is clear that the use of technology in libraries in Saudi Arabia is lower than in developed countries such as the UK and in less developed countries such as Malaysia (Khalid 2000). One of the main problems in using the Internet in the Gulf States is the language barrier, as the vast majority of articles available on the Internet are in English. Due to the lack of Arabic script HTML editors (and browsers able to read the vernacular) text has to be rendered as graphics, making it extremely slow to load pages (Houissa 2000).

The United States Department of Health and Human Services meanwhile is looking at how best to promote quality in consumer health information networks. Professionals and the public alike are hungry for quality information and will, over time, recognise efforts to provide it. Martin (1998) stated that health professionals and health librarians should work together to link clinical information systems to consumer health databases and design easy-to-use interfaces or single entry points to these resources in order to make the best information available that directly benefits consumers and their caregivers. The study showed that, in 1997, there were as many as 12,000 medical Internet Web-based consumer health information sites. This number is no doubt much higher now. However, the numbers of high quality medical websites which allow access to the National Library of Medicine’s MEDLINE databases are limited.

As asserted by Silberg, Lundberg & Musacchio (1997), healthcare professionals and patients alike should view the exponential growth of the Internet with equal parts of delight and concern because the Internet hosts a large number of high-quality medical resources and offers seemingly endless opportunities to inform, teach and connect professionals and patients. The problem is not too little information but too much; it may also sometimes be incomplete, misleading or inaccurate. It is a medium in which anyone with a computer can serve as author, editor and publisher since the Internet is a new and exciting communication medium and is therefore highly attractive. In fact, the effective use of technology can be an important indicator of quality and especially utility in community medical information on the Net. The time has now come to discuss vigorously how a set of basic quality standards can be developed and applied in an electronic context. Such standards must be built on the foundation of accountability. These principles amount to a framework for critical thinking, allowing consumers and professionals alike reasonably to judge whether what they are reading is credible,
reasonable or useful, and to make measured, informed decisions about how to apply this information in the real world (Silberg, Lundberg & Musacchio 1997, p. 1244). Websites and other Internet-based sources of medical information that fail to meet at least these basic standards should be considered suspect. It should made clear to the user that information presented in a net discussion group or on any medically oriented website is designed to be part of, and not a substitute for, the relationship that is central to the health care decision-making process: the relationship between the patient and the professional.

The Internet has become also one of the main channels for the electronic publishing of health information as stated by (Tu and Zimmerman 2000). This includes abstracts of research findings, health news and health guidelines. The Internet has allowed worldwide access to health-related information. However, the researchers found that health-related information on the Internet can be overwhelming, incomplete and inaccurate. This may be due to the lack of rules and regulations to control of such information. The Internet will continue to grow as a primary source of information in our culture. Librarians and information professionals need to continue to seek ways to assist users. The success of health promotion in the 21st century depends on adequate, accurate and easy to use information. The Internet can also serve as an effective tool for the general public to access and acquire health information and knowledge, including patients’ treatment of disease, diagnosis, information on health promotion, health alerts, preventive medicine, the determinants of health, and accessing the health care system. Among the developed world and the advanced technology in many countries this article describes not only how to obtain health information but also the importance in terms of how reliable and accurate the information is. However, this article supports a need for ‘quality control’ of health information and how to implement it by the health librarian, specialists and the publishers.

A number of vendors license MEDLINE data and offer searchable interfaces to the Internet Grateful Med resource via their websites, meaning that anyone with Internet connection can use their services (Sikorski & Peters 1997). These vendors cover commercial ventures such as health gate (www.healthgate.com) and Medscape (www.medscape.com). MEDLINE sites vary considerably. Some require no registration
and charge no fees, whereas others only provide free abstracts and the user pays a fee to obtain the full text of articles.

The diversity within an electronic health science library and the application of ICTs made the building of a virtual library more difficult but more challenging (Al-Shorbaji 2000b). Health libraries that might be rated as very good in terms of their collections, technology and services include HHSL in Qatar which already uses limited ICT resources for providing access to the content of its collections.

Al-Shorbaji & Nour (2001) discussed the EMR (Eastern Mediterranean Region) Index Medicus which covers articles published in health science journals published in the region since 1984. Indexing the backlog of the journal articles was completed in 1997 with five volumes having been published in printed form. The database is published on the Internet and includes 82,000 records. It is planned that the Index will be distributed along with other library databases. The authors mentioned the 'Blue Trunk Libraries Project' whose aim was to train operators of libraries in district health centers. This project has provided training for over 160 staff. A website in Arabic and English was created for the project within the EMRO (Al-Sorbaji & Nour, 2001). The authors discussed the need for an EMR virtual health science library and issues on implementation of the network of virtual health libraries in GCC. Although they state factors which connect the libraries in the GCC, they do not clarify how the partnerships will evolve. This should not be only by participating in the GCC network of virtual libraries but also by developing and sharing information and knowledge.

Clinicians need information from a variety of sources, through either their own libraries or from other partner libraries via Inter Library Loan (ILL). Health libraries should have additional trained staff to improve services to users. It is therefore very strongly recommended that every health library be headed by a qualified librarian who should be provided with a certain number of professional, paraprofessional and non-professional staff to ensure the smooth and efficient operation of the library.

Bishawi (2001) described Tawam Hospital Medical Library (FHMML) in Abu-Dhabi, UAE, in the past and compares it with the present. The author evaluated Tawam
Hospital Medical Library in the UAE according to the standards of the Medical Library Association (MLA). The process it underwent to begin changing to become a digital library is described. It is expected that Tawam health library will continue following the latest and up-to-date techniques in librarianship through communication with other libraries. Through the experience of the author, it is possible for each specialist in hospital libraries to assess and evaluate hospital libraries services and healthcare by using development improvement programs.

O'Connor (2002) reviewed the literature regarding the impact of health information on patient care particularly that were conducted in the USA, the UK, Australia and New Zealand. He found no specific technique or methodology that can determine the level of impact on the performance of the library services. O'Connor argues that most of the studies focus on the efficiencies of services provided by the health library. O'Connor also discovered that most of the participants in the studies acquired knowledge both for immediate use and as an investment for the future. The study proved that health information was very useful as it “can affect patient care outcomes in various ways and has high cognitive and clinical value in diagnosing and treating patients” (O'Connor 2002, p.9). With the information provided by the library, health professionals become more accurate in giving treatment to the patient. However, all the studies do not involve non-professional and how health library information could benefit them.

Franklin & Plum (2002) provided a comparative study on the use of resources between ‘in house’ and ‘remote access’ users of a health library. Results indicated that there were many more ‘remote access’ users that their ‘in house’ counterparts. This finding provides evidence for the needs of a digital library with full access from a personal computer workstation wherever it is placed (home, work, or elsewhere). Resource issues associated with the use of digital libraries require a different business plan. However, the Franklin and Plum study took place in the USA where ICT infrastructure is rarely a problem. The resource base available in the USA entrusts sharply with that available in the GCC countries, so solutions for remote access suggested by Franklin and Plum are at least a decade away in the GCC countries.

Khadan (2002) studied the use of electronic databases as a means to meet the information needs of users. Her conclusion indicated that medical academic staff use
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electronic databases more than qualified clinicians. This situation may be as a consequence of legacy training issues in that at the time qualified clinicians were undertaking their medical education, there was no provision in the curriculum for the investigation of electronic sources of information.

Kandelgi & Mekael (2001) indicated the urgent needs for co-operation and co-ordination among the medical institutes to establish a medical network to share information. The researchers indicated the needs for the help and support of the regional and international help to provide the infrastructure required. However, the researchers failed to emphasise the role of the decision-making in introducing the network and failed to provide any information about the users' ICT education and training.

2.3 Resources

In the interests of providing a quality service, libraries have an obligation to obtain material to meet the information needs of users when local resources do not meet those needs. Interlibrary loan (ILL), a mechanism for obtaining material, is essential to the vitality of all libraries. ILL is the process by which a library requests material from, or supplies material to, another library. The purpose of interlibrary loan is defined as: to obtain, upon request of a library user, material not available in the user's local library. ILL is intended to regulate the exchange of material between health libraries in the GCC, between health libraries in the GCC and the National Library of Medicine (NLM) in the United States, and between health libraries in the GCC and the British Library at Boston Spa in the UK.

2.3.1 Resources sharing among libraries in GCC countries

Co-operation and networking in library and information systems provide a wider access to collections, improve public and technical services and enhance operations by sharing resources, reducing duplication and offering more cost-effective services (Khalid 2000). Alian (1999) studied health libraries in Bahrain and pointed out several obstacles facing co-operation among the GCC and Arab countries. These obstacles include an absence of
clear national policy, poor financial abilities, lack of government support for co-operation, and lack of communication. Moahi (2002) stated that ILL in developing countries has been a very slow and painful process for those waiting for material. Participating in electronic document delivery services would go a long way towards improving this situation.

Resource-sharing and co-operation among libraries have become an important method to reduce cost, increase resources and simplify resource management. These are still not taken seriously in GCC, Mumtaz & Al-Jasem (2001). One of their findings in their survey on 17 Kuwaiti libraries was:

It was found not only that the current resource-sharing activities are at a minimal level, but also that all libraries do not actively participate in these. (Mumtaz & Al-Jasem, 2001, p.225).

According to Al-Hummood (1998) there is a lack of close relations and cooperative activities among libraries in Kuwait. She proposed a plan for the creation of a national bibliographic network comprising a group of libraries participating in a set of cooperating programmes and working together under unified standards, methods and procedures.

In a very interesting article by Arif, Sibai & Sulaiman (1998), the inter library loan (ILL) services in the health library of the Saudi Arabia was comprehensively covered. The study discussed various methods for providing ILL service including direct inter-lending, lending through union catalogue, and centralised lending. They referred to many published references which were not reported by Al-Ogl (1998) although these two papers were published in the same year. Recently, most libraries in the Gulf region have acquired CD-ROM databases and also some direct on-line access to databases, such as DIALOG and MEDLINE; Internet access is also available for research in some Arab countries.

One of the main aims of the GCC is co-operation among the member states. Although, the state authorities encourage and support co-operation, the co-operation reinforcement resources is still minimum and not convincing as stated by Mumtaz & Al-Jasem:
At present time resource sharing in the Arabian Gulf region is at the minimal level, mostly limited to document delivery. (Mumtaz & Al-Jasem 2001, p. 225)

This lack of co-operation may be due to the attitudes and opinions of the vast majority of management appointed centrally and especially, those who make decisions about libraries and information science. The current research will investigate these above opinions and attitudes. The authors focused more upon the lack of communication and co-operation, while it is clear that the lack of 'information policy' plays a major role in minimizing the role of resource-sharing and other library activities and services.

2.3.2 Staff training and development

Staff training and development is understood to be a management function of any organisation, concerned primarily with learning activities provided by the organisation to its staff members in response to a changing environment. From an organisational perspective, staff development is an investment in human wealth and intellectual capital, and therefore the return on investment should be more knowledgeable and skilful employees who have a greater chance to improve their performance.

Ashoor (1996) argued that the current staff training and development programme does not seem to match the needs of the information market in support of the fast-growing economy and rapidly developing education and research sectors of the region. He has found that employers are critical of the library education programme in the GCC region for being traditional and superficial and for lacking adequate education facilities, resources and evaluation. Although this study was done in 1996, there has been no improvement on training or library education in the GCC region.

Haycock (1997) applied the results of educational research in training and development to librarians' professional development. He emphasised that the focus of all staff development should be on the individual unit, such as in a library context. Distance learning must provide for follow-up practice and peer support in the implementation of new skills and behaviours. Haycock (1997, p. 319) looked at the provision of free time to attend external training. He stressed the importance of providing time "away from the regular responsibilities" to facilitate the sharing of understanding, to explore applications of the satisfied, and to incorporate new understanding into professional and personal
perspectives. He urged library directors to recognise that change was a gradual and difficult process requiring adequate time and resources to produce verifiable results.

Johnson (1998) stated that the scientific contribution in the ICT field is increasing and many studies show the increasing popularity and use of ICT. There are many research studies which highlight the importance of educational programmes in ICT. Johnson criticised the shortcomings in the use of these technologies and the lack of well qualified/skilled new graduates in the ICT field within the library and information science. This shortcoming is more serious in the developing countries and even more in the GCC countries. It is hard to justify the lack of proper ICT educational programmes and skilled manpower in the GCC countries that are ‘rich’ and not short of relevant resources.

One of the main problems of the Gulf States is manpower. Therefore, training has become part of any governmental policy to promote training and IT is a priority. Many libraries in the Gulf give priority to developing their manpower by recognised, accredited, training programmes. The library in King Abdulaziz University (KAU), in Saudi Arabia, realised that rapidly changing technology has created the need for the effective development of training initiatives, based on a sound strategy to provide the necessary steps towards developing skilled and experienced people (Qari 1999). The following objectives have helped the KAU library to establish the required training initiatives:

- To announce the expansion of electronic information services in the KAU to all campus users.
- To train librarians to fully utilise information technology.
- To provide users with a flexibility to choose his/her own learning strategies. For example, users may choose a manual, computer-based training and/or a video for easy and convenient learning.
- To promote training in a networked environment. For example, what is networking and how it is remotely connected to the databases available at the KAU library?

By following these initiatives, the KAU library has found itself in a dominant position in the Gulf States as a provider of well qualified library staff.
Khalid (2000) states that the training and development of any library staff is a crucial issue for the development of technologies in libraries. There is a need to start programmes for solving this issue on an urgent basis. He also has views on the importance of educating library users, mostly in the use of technology. It provides opportunities to make effective, efficient and independent use of library and information sources, resources and services. In order to develop awareness of the use of technology in libraries, new approaches for the use of libraries within the staff and user-communities must also be developed. Libraries can organise seminars, workshops and conferences to develop this awareness and can develop links with other professional bodies through formal and informal alliances. The article discusses the present weakness in Saudi libraries in the use of the information technique despite the presence of a strong foundation in the communication system. What this article lacks is a response to the question of what causes the present weakness in Saudi libraries in general.

Summarising views of library provision in the GCC region, many authors, such as Itayem (2001), Al-Shorbaji (2000), Alian (1999), Al-Ogla (1998), Qari (1998) and Ashoor (1996) have all expressed similar criticisms of library education and training. They reported that the library school curriculum is very traditional and that there is an absence of ICT in it. Itayem (2001) highlights the importance and role of continuing education in career development of health librarians.

Qualified library staff themselves will play a central role in shaping the developing use of health library services. To realise their potential, staff need to be trained to develop new skills and abilities. In particular, they need to become familiar with ICT and to feel comfortable both when using it themselves and when helping others to make constructive use of it. Anwar & Al-Ansari (2002) reviewed ICT skills in their study and noted that the nature and extent of the use of ICT in the institutions covered varies a great deal. As expected, the perceptions of staff, some of whom might not necessarily be library or information science professionals, might vary from one to the other. Their questionnaire survey listed 14 topics related to ICT for the respondents to express their opinions regarding the importance of professional development. Searching electronic resources databases, and planning and managing automated systems were ranked first (100%) with more advanced ICT skills being perceived as less important. In developing
countries, such an activity is necessary because Western databases do not cover some minority-based research literature.

Maynard (2002) studied the training needs of NHS library staff in the United Kingdom. The study involved all NHS library staff and used a questionnaire as the main instrument to gather information. Maynard argues that the advancement of ICT has affected NHS librarians' in their work. Most of the respondents were given adequate training in various electronic resources such as CD-ROM and online searching, information retrieval techniques and internet searching. However, up-to-date training on certain areas such as internet/LAN and HTML design and programming are still needed by a relatively high proportion of respondents. Pertaining to types of training, the survey found that the most popular training methods were external courses available locally, work-based training, and in-house (off work) training. The research done by Maynard provides evidence that adequate training especially on ICT is very important and is a high requirement for librarians. The research however, does not survey users to the NHS library. It is important to know the training and development needs required by both library staff and users in order to better identify services to be provided by the library to be more efficient and effective, in giving health information to improve healthcare.

A study conducted in Kenya, by Odini (1999, p. 101) on the changing information environment showed that a workforce which is familiar with the emerging ICT on which information will depend is required. Librarians must arm themselves with the necessary skills in the use of various software packages, the Internet, CD-ROMs and, of course, traditional printed resources. The workforce should possess the personality and competence to marry traditional and ICT services to deliver a modern library service. The best education and training and the most effective management structures must also support them.

In order to meet the information needs of present-day users, library personnel should be acquainted with the latest developments in the field of information services and information science. In this context, training institutions play a vital role in designing their curricula to provide the required education and training at the appropriate level. Information systems in most African countries are still not very advanced. However, since rapid developments in information handling techniques are taking place in many countries, it is important that training and the development of skills provided to trainee
information professionals should not only prepare students to work in the actual conditions, but should also improve them to be able to operate with the more advanced techniques which are likely to prevail.

Al-Shorbaji (2000a) described the Virtual Library for WHO-EMRO. The important statement in this study is that the role of the librarian is to train the healthcare providers on how to access information, giving a new role to healthcare librarians.

The effectiveness and efficiency of the use of ICT in the learning field supports and stimulates the re-engineering of the library. Librarians must be aware of the changing trends in education and training and the impact that these trends have on the delivery of library services. Using new technologies in the field of ICT has meant continuously recasting libraries according to the cultural contents offered, to the access services, to internal organisation, and to skills. The evolution of libraries over the last few years, oriented and spurred on by the rapid innovation of technologies, gave these structure the ability to cope with the increasing needs of users and the new opportunities offered by technologies (Bargellini & Bordoni 2001, p. 154-155).

In a study on education in library and information skills in the GCC countries, Ur Rehman & Al-Ansari (2003) found that ICT-based skills were not sufficiently represented in the curriculum. This finding has implications for the adaptor of ICT in health libraries in GCC countries, and many prove to be a significant impediment to progress in this area.

2.4 Systems Thinking

System thinking refers to activity related to understanding complex organisational structure and processes by holistic, systemic research methods. It is recognised that these structures and processes are not static, and a lot of work investigates the dynamics of complex adaptive systems. Traditionally, the health sector is often used to expose new systems-based ideas, concepts and management structure as it provides the ideal systems environment in which to work. The health management system is awash with examples of systems that are both complex and adaptive. For example, the drug development process is centred on the use of a clinical trial. These trials can be multi-centre and multi-
national, requiring the managing and understanding of the various stakeholder views, while part of a highly regulated environment.

Two ways to investigate such systems are by Checkland’s Soft Systems Methodology (SSM) and Warfield’s Interpretive Structural Modelling (ISM) (Checkland, 1981; Warfield, 1973). Both of these techniques are used in this study.

2.4.1 SSM Application to Health Systems

Several projects have involved studies of healthcare provision in various countries, but published evidence is limited to case study reports detailing how SSM has been used. In health, SSM-based case studies have focused on a wide range of issues including the following: Le Fevre & Pattison (1986) carried out a case study on information systems in hospitals and health care institutions; Macias-Chapula (1995) used SSM to investigate information problems at the structural level of healthcare in Mexico and applied SSM to identify the value and impact on and barriers to accessing information in healthcare; SSM was adapted to examine nursing in the case of Mathiassen & Nielsen (1995); Connell (2001) has used SSM in the design of an information system for health service users providing care in South and West Health Region in the UK; SSM and organisational change in the NHS was considered by Illis & Sutherland (2001) Fennessy (2001; 2002) used SSM as problem improving approaches within knowledge management systems for a health information provider; Atkinson et al. (2002) provide a systems intervention that they call ‘SISTeM’, which is described as similar to SSM; (further discussed on p. 47) Shapiro & Shapiro (2003) discuss the application of SSM to the UK NHS. Most of these studies focus on providing descriptions of analyses and modeling processes, as well as the learning experiences gained from adopting an SSM approach.

In the health field, Checkland & Scholes (1990, p. 89-114) applied SSM at the community level within the NHS in the UK. The Chapter noted above stated that SSM grew out of the failure of established methods of ‘Systems Engineering’ (SE) when faced with complex problem situations. In SE there is an agreement on the objective to be achieved, and the solution of the problem is to select the most effective and efficient means to achieve it. In most situations the objective is not cleanly formatted, but is more vague, such as ‘better health’, ‘quality health care’ or ‘information to deliver quality health care’. To ‘manage’ anything is to try to cope with events and ideas which continually
occur through time; a ‘manager’ is always trying to ‘improve’ a situation which is seen as professional.

SSM is an organised way of tackling an ill-defined problem and is based on ‘Systems Thinking’ or, in other words, taking action to ‘improve’ situations that are continually creating the first problem. Macias-Chapula (1995) has also presented a case report of a health care system where SSM was used to identify the value, impact and barriers to information access and use, as related to the quality of health care. The research was based on 36 regional co-coordinators for Biomedical Education and Research (RCBERs) at Mexico’s Social Security Institute (MSSI). She identified four root definitions, for the education system; research and development system; library system; and information system.

Each root definition led to the creation of its own conceptual model and when they were combined the consensus conceptual model comprised six activities that were described as being indispensable as indicated in Figure 2-2 below.

By reducing the conceptual model in this way to six basic activities, Macias-Chapula made the questionable assumptions that 1) these six activities were exhaustive and severable, and 2) that all information seeking done by the researchers was done in support of these activities. In this way, Macias-Chapula created tacit barriers by drawing lines around discrete activities for ease of analysis that may not have existed in practice. From the consensus conceptual model, debate was generated regarding feasible and desirable changes with an action plan being finally drawn up to tackle the identified problem situation. Results showed that RCBERs did believe that information was an important resource and a list was generated to show the order of their perceived importance. They considered that the benefits of information were: improvements in the quality of healthcare; improvements in decision-making; better planning and design of healthcare programmes; and, improved transformation processes. The research provided a general insight into the development of the SSM at the process and outcome levels of healthcare but failed to provide, identify or measure the different indicators that are needed to assess the impact of information on the quality of health.

Le Fevre & Pattison (1986) described the importance of planning for the introduction of information systems into hospitals and healthcare under the aegis of the Health
Department of Western Australia. The paper is based on using SSM as the main tool for description. The authors discussed the potential advantages of SSM in various aspects of information planning, namely the in-depth analysis of internal and external environmental factors impacting on the problem. The researchers concluded that the users play an important role in the planning of information systems in health institutes. The paper lacked a comprehensive rich picture and any model to support the study's main argument. This is due to the fact that the authors are dealing with a large institute which needs to be simplified in order to understand all the main players and their institutions.

Figure 2-2 The consensus model, Source: Macias-Chapula 1995 p.285
Iles & Sutherland (2001, p. 34-38) described SSM (mode2) as a method for examining complex social processes in a participatory way that allows different views of the world situation be expressed, brought to light, challenged and tested. They describe the value of the rich picture in that it expresses quite simply the complex relations and how these influence the situation. SSM comprises the following main stages, which can be undertaken sequentially or as an iterative process: finding out about a problem situation and its causes from stakeholders and examining cultural and political perspectives without attempting to impose a preconceived structure or over-simplifying the process; articulating 'root definitions' of relevant systems, that is, statements which encapsulate the main purpose, dynamics, inputs and outputs; debating the situation with those involved by depicting activities required to achieve the root definitions, for example, through process flow charts or influence diagrams; comparing models with reality by observation and discussion; defining possible changes of structure, process, and/or attitude; and taking action to implement the changes. Proponents of SSM argue that the initial situation will be changed by the very use of this methodology. In SSM the role of any external agent is to facilitate the understanding of those players within the system so that they design and implement changes themselves.

In the health field Connell (2001) has used SSM in the design of an information system for health service users providing care in the community in a part of South and West Health Region in the UK. The author mentioned that there were some difficulties in adapting SSM, those concerning the methodology; management of the intervention and the problem content system. Connell also asserts that further exploration needs to be pursued with respect to measuring success of using of SSM, in particular:

- Success in assisting users to understand the problem area, and
- Its use as an effective tool for change management.

However, the author argued that there are two aspects of unsuccessful SSM use: relating to structure and implementation. The first lies in the contribution of the methodology in identifying the problem in hand. The second deals with the post-problem identifying procedure, in which the process is tested to determine whether it achieved the desire outcome. Ormerod (2001) in his comment on Connell (2001) pointed out the success of SSM he achieved through its implementation. The success of Ormerod's study was
achieved as a consequence of the SSM serving all his interests, together with the fact that the process and outcome were satisfactory to the clients. The main participants in the methodology thought that they could significantly contribute in the process of the SSM intervention.

Fennessy (2001) discusses how knowledge management problems arising in evidence-based practice can be explored using SSM and action research. A health information centre working exclusively in evidence-based practice is used as a case study to explore how work teams and systems can be better utilised to provide clinical effectiveness information for healthcare practitioners. Using clinical questions raised by healthcare practitioners the author explores the knowledge management skills needed to turn the question into meaningful knowledge relevant to the healthcare situation. A particularly useful root definition and CATWOE analysis was performed (see Table 2.1 below) that gives some direction for the present study.

Root Definition:

An information service within a publicly owned health system staffed by appropriate professional information officers who retrieve, sift, appraise and evaluate the best available evidence to support clinical decision making.

CATWOE analysis:

C: healthcare practitioners
A: information officers (intermediaries) who provide the transaction
T: request for evidence → information to inform decisions
W: using the best available evidence can enhance decision making about effective healthcare
O: information officers
E: time to search for evidence and availability of 'good quality' evidence

Table 2-1 RD and CATWOE, Source: Fennessy 2001, p.6

The results of the research show that the ranges of knowledge skills required by the information professional working in this process are broad and complex. They include an understanding of the context in which the health professional works; knowledge about the patient context; what type of information is relevant; how the professional works and how they would use the information produced by the knowledge worker.
Piech & Kirkham (2002) examined how to use SSM to help and enable the partnerships among the public and private agencies in Sandwell, UK. One of the outcomes of the research was to enable a fully expressed business case to be placed before the partnership which endorsed the funding of a dedicated set of resources charged with formulating and delivering a Borough-wide ICT strategy. Another outcome was not only a set of themes and principles regarding what ICT strategy should contain, but also a defined set of tasks as to how it can be achieved across the Borough. SSM has helped the stakeholders in Sandwell, not only to agree the component elements of this ICT strategy, but also to define the tasks and means by which it can be brought about on an agreed basis for all stakeholders in the borough. Although the research indicated that there ‘was no clear strategic leadership and a powerful and influential ‘champion’ was required to drive the agenda’ it failed to explain the reasons. The research also described the cultural background of Sandwell as a highly diverse ethnic mix, high levels of social deprivation, lowest levels of educational attainment (30.7% of adults have no qualifications), and poorest set of health indices within England, but failed to include an exploration of these issues in the research.

Atkinson et al. (2002) provide a systems intervention that they call ‘SISTeM’, which is described as similar to SSM. It comprises two iterations of the SSM in which cycle 1 is the traditional route through the methodology to improve the defined problem situation and said to be ‘strategic’ in nature. Cycle 2 employs the same tools, but their status is described as ‘developmental’. They used tools such as data flow diagrams and entity relationship diagrams as ‘add-ons’ to the familiar SSM conceptual model. In this study, the need for a further iteration to operationalise the strategic objectives identified in methods to improve the problem situation was provided by the use of Warfield’s ISM. Although the outputs are different, the identified need to transform the output of the SSM into a more useful form was acknowledged. This study used SSM to identify the strategic needs and ISM to structure these needs into operational order.

Fennessy (2002) identified several crucial issues with respect to applying SSM in clinical knowledge management systems. Again, the root definition and CATWOE analysis can be seen in the Figure below (Table 2.2).
Chapter 2

Root Definition:
A Centre owned knowledge management system operated by Centre staff and owned by the Institute that enables knowledge creation, storage and sharing.

CATWOE analysis:
C: knowledge workers at the Centre
A: IT staff, knowledge workers
T: knowledge at the Centre transformed into knowledge system components
W: knowledge creation, storage and sharing are necessary for effective knowledge management
O: knowledge management facilitator, IT staff
E: knowledge workers, IT staff

Table 2-2 RD and CATWOE, Source: Fennessy, 2002; p. 4

In addition, Fennessy argued that there was a lack of conformance towards activity in evidence based healthcare between the services delivered by the clinical professional and the needs of the service users. This research linked knowledge management and SSM. However, the focus was more on the influence of knowledge management than the impact of SSM on knowledge management, and hence the rich picture as an important element in the SSM generation was not clearly represented.

Shapiro & Shapiro (2003) discuss the application of SSM to the UK NHS in the context of ‘soft OR’. There is some debate about the boundaries of soft approaches to operational research, but it is acknowledged by all that SSM resides within it. In their application, they note that:

Soft systems methodology is particularly appropriate for tackling healthcare problems, where conceptual understanding of an interactive system may be more important than devising a quick fix solution. (Shapiro & Shapiro 2003; p.247)

Their use of SSM resonates with its use in this study, in which a multi-stakeholder analysis is also undertaken, although by a different method. They first attempt to provide a model of the NHS as a whole before providing a generic support function SSM conceptual model typified by its cleaning services. Although such a top-down focus may find use many assumptions have to be made to interpret finding. This study adopts a bottom-up approach in which the evidence is formed from responses to stakeholder questionnaires and interviews, complemented by a document analysis for context.
Kirkham (2000) focuses on work being carried out by a Healthcare Trust in the UK which is taking a systemic approach to the implementation of Integrated Care Pathways. The author started her work in the context of recent thinking and practice in knowledge management and examines both the technical aspect and the socio-cultural aspect of knowledge management. The author continues by examining the current cultural climate of the NHS, and outlines the research undertaken at Hereford Health Authority, UK.

The article explains SSM, which takes into account the human and social factors of organisations. Many Health Trusts in the UK are currently in the process of implementing major organisational change, such as the establishment of Integrated Care Pathways (ICPs) and Primary Care Groups (PCGs). Such changes have significant implications for the restructuring and development of the knowledge infrastructures which support the clinical and administrative communities within each Health Trust environment. They also imply a shift in the cultural paradigm of the UK National Health Service, which seems to indicate a loosening of the grip of traditional professional bureaucracies as clinical groups adopt an increasingly 'teamwork' approach. Systemic information models are being explored in some Trusts in an attempt to put in place more enabling information systems which can support flatter organisational hierarchies and lateral, team-based communication requirements.

There have been a number of examples of the application of SSM to the field of health libraries. Brember and Leggate (1985) carried out an intensive survey of health library users in the Oxford teaching hospitals and in university science departments. They used six survey techniques and selected results were given for each technique. They concluded that the characteristic having most influence on information-seeking behaviour and library usage was the relative amounts of the user's time devoted to clinical practice and to research respectively. This intensive survey was analysed and discussed in more detail by Brember (1985). The SSM was used as a way of relating the evidence of a user survey to the practical problems of library management. He provided an extensive explanation and a useful discussion on SSM methodology. A particularly useful root definition and CATWOE analysis was performed (see Table 2.3), which relates a NHS library to the use of medical information. The study by Brember in 1985 is similar to the aims and objectives of the present study. However, the links between library provision and evidence-based healthcare is through a more systemic intervention in the current work.
Root Definitions

A university and NHS funded, professionally run system, specialising in the acquisition, organisation and exploitation of recorded medical information. This system serves me, a worker in the medical field (i.e. USER), by providing the medical information I need and facilitating its use.

CATWOE analysis:
C: Worker in the medical field, User
A: Professional library staff
T: Serve, through the provision of medical information and facilitation of use
W: The exploitation of medical information is necessary and desirable
O: NHS and Oxford University
E: Competition for funds amongst other services

Table 2.3 RD and CATWOE, Source: Brember 1985, p. 66-67

One of the main outcomes of the research was the use of SSM methodology in finding the values of combining information about the user population, their needs and ways of meeting their needs. He stated

The application of Checkland’s methodology to the Oxford medical libraries revealed the value of combining information about the user population, their information needs and ways of meeting these needs into a formal statement of library function (Brember, 1985, p. 73).

One of the main aims of the research study was to identify and analyse the information about the users needs and satisfaction towards ICT within HHS and provide suggestion and recommendation to meets these needs. Whereas the SSM does not provide a solution for the problem situation by using SSM.

It does try to take into account the factors relevant to the problem under consideration. (Brember, 1985, p. 60)

Furthermore, understanding the problem situation within a holistic view was the fundamental issue.

Although, there are differences in the two research studies. Brember (1985, p. 73) also suggested that:

The key message is that the vital link between users and libraries is a management and control system.
This statement impacts on the scope of this research study, therefore role, attitudes and opinions of the management, especially the decision makers, is important to this study and will be investigated and analysed.

Hernando (1997) applied SSM and carried out a research study to investigate the importance of basing health care decision-making on research evidence. She found that "there are many current initiatives to disseminate information on evidence-based practice, but only a small proportion relate to nursing intervention or to care outside the setting of the district general hospital" (Hernando 1997, p.116). The main criticism of this argument is that health care professionals are governed by strict rules of compliance as they deal with human health (safety); the author failed to provide a practical, realistic solution to this problem. Therefore, any research finding needs more than one piece of evidence to support its validity. A question remains as to who recognises training needs for current nursing staff. In the Hernando study, SSM was used in the following way, the first three stages are similar to the intervention of this study.

Stage 1, Questionnaire collected hard and soft data, Focus group but in the intervention study is individual interview, Stage 2, Data from Questionnaire formed the Rich Picture. A particularly useful root definition and CATWOE analysis was performed (see Table 2.4 below) that gives some direction for the present study.

The root definition for the health library service was defined as follows:

a system for obtaining high-quality, up-to-date and relevant health care information, and disseminating this to nurses in order to help them provide the most efficient and effective care for their patients, in consultation with the wishes of these patients and within the resources available to South Buckinghamshire NHS Trust and the HEI. (Hernando 1997, p. 114)

CATWOE analysis:
C: Nursing staff and ultimately patients.
A: Library staff
T: The procurement and dissemination of high-quality, relevant and up-to-date health care information.
W: Working towards more efficient and effective health care, in the context of the concept of evidence-based health care.
O: The health care provider, South Buckinghamshire NHS Trust (SB'T).
E: Competing demands for resources mean that both the HEI (Higher Education Institution) and SBT seem unprepared to contribute sufficiently to information delivery for patient care purposes.

Table 2-4 RD and CATWOE, Source: Hernando 1997; p.113-114
The following criteria suggested by Hernando (1997) for stage 6 can be related to the present scenario of this study, as follows:

- To enhance the level of professionalism among staff that handling library services such as imposing minimum level supporting of qualification in recruiting new staff and promoting career enhancement programmes for the existing staff.
- Even though existing practice in information source acquisition is reliable, such as suggestion from users, reminders from publishers, without sound knowledge from a qualified librarian (HHSL staff), updating the library collection may prove to be based on ad hoc decision-making.

Based on above suggestions by Hernando we can refine the selected criteria to the following:

- Top management investment, such as the level of hierarchy of HHSL compared to HMC is not well defined, as will be shown in Chapter 4 in Figure 4-4.
- Librarian competency and skills set, and lack of investment in resources such as continuing education courses.

Again in the nursing field, Mathiassen & Nielsen (1995) showed how SSM (mode 2) has been adapted and explored in a number of potentially relevant systems: provision of a professional and efficient surgical service for the community; reorganisation of surgery into one unit; preservation and development of nursing skills and values; obtaining resources for the unit; support of sections and co-ordination between them; and, communication between sections.

In addition, the developed root definitions for the reorganisation and management systems were identified with developed conceptual models for these root definitions. The researchers argued that SSM needs to be complemented with a different kind of systems concept to facilitate its usage within Information Systems (IS) development. This application is based on many attempts to apply SSM to the area of information systems and the authors proposed a possible difference between what are called interaction and transformation systems; they then relate this difference to Soft Systems practice.
2.5 Interactive Management Application

Interactive Management was developed in 1973 by Warfield as a tool for consensus decision-making. This has been used in a number of studies but without it breaking into the mainstream of research methods. Warfield (1987) highlights the adoption of the brainstorming approach as a means of generating ideas for group-based decision making process. Among the selection criteria for group members is that they should have knowledge about the subject at hand and be aware of the tools and techniques to be employed (Janes 1988).

Warfield (1973) states that consensus is very pertinent to group-based decision making. This can be achieved effectively when a group gets together to discuss issues related to people and organisations. However, group members are required to put aside personal interest in the forum. The consensus method approach has been identified as an effective mean to enhance interdisciplinary efforts to communicate about system improvement for an organisation (Warfield 1982). Warfield (1987) goes on to suggest that the adoption of consensus methodologies can enhance a groups' productivity in dealing with complex issues. He also says that several methods are suitable for consideration to serve for the purpose such as Nominal Group technique (NGT), Delphi technique, and ISM.

As the facilitator must be skilful in motivating groups to work together to ensure achievement of common objectives, familiarity with the ISM process and knowledge about business processes are fundamental for the purpose of decision making. Therefore, the success of the ISM process relies heavily on the capability of a facilitator (Warfield 1982). Janes (1988) emphasised the importance of a trained facilitator to enable to draw out various opinions among group members and guiding them to achieve the intended mission.
2.6 Summary

The literature review undertaken has indicated that there is little existing research on health libraries in Qatar. Thus, this research study is the first opportunity to raise awareness about the state of HHSL in Qatar. The pace of change in ICT, education, and the policy and practice of healthcare delivery has had a major impact on health libraries as indicated in this Chapter. In most developing countries, information professionals agree that it is important to maintain the richness, diversity and values of the traditional library services as we move into an electronic mediated future. However, it may be refreshing to see the alternative view expressed by Rashbass in 2000, (see p. 29) in which he foresees the demise of health libraries by 2005, giving rise to user-based information delivered electronically.

The dominance of literature resources in the English language on the Internet is one of the main issues for access to information in the Gulf States. As stated, the librarian and users in the GCC region have formed a partnership to best identify and retrieve the required information resources. However, if only one party understands written English, the result is an unequal partnership, with one side being information rich and the other information poor. This inequality also has an effect on personal effectiveness with consequent action on understanding and use of information retrieval methods.

The literature revealed on systems science based research methods will be discussed in context in the next Chapter. The use of both Checkland’s SSM and Warfield’s ISM is a first opportunity for their application in a Qatari health sciences library setting. Issues associated with the implementation of systems thinking is uncovered in Chapter 5 and findings and instantiations of the methods can be found in Chapter 6 and 7.
Chapter 3
Research Methods

3.1 Introduction

There are two well known paradigms used in research, the positivist and interpretive approaches (Burrell & Morgan 1979). The positivist approach uses data for prediction and control and is generally the approach adopted in scientific studies. The interpretive approach is a paradigm that considers understanding and interpretation. This approach is quite common in social sciences research. However, many social science studies also support the positivist approach. This research study, based on a systems science approach to problem understanding, uses both a positivist and an interpretive approach. The former is used when collecting data that can be used to predict and control the current and future needs of ICT; the latter is adopted in this research for understanding and interpretation of the findings taken from the Directors and Heads of Medical Departments, their decision-making methods, and the role and impact of ICT on these processes. As there are no defined end-points for the study, and that aims and objectives are difficult to formulate, Checkland's interpretive Soft Systems Methodology (SSM) - a complex, pluralist approach as defined by Jackson & Keys (1984) - was chosen as the main investigative tool. The way in which improvement is achieved is outlined in this Chapter, which ends with actions necessary to 'improve the problem situation'. To take the work further, an interpretive structural model is used to define an 'intent structure' which allows issues to be structured according to the transitive relation 'helps to achieve'. In this way, the issues that should be tackled first appear at the bottom of the structure, and the issue that proves to be the goal is at the top of the structure. The SSM and ISM are outlined in this Chapter and further explored in Chapter 5. As the Figure 3-1 indicates the SSM is dependent on the richness of the information gathered that describes the 'problem situation unstructured'. To generate this information for Stage 1, a literature review and empirical data collection were undertaken - both contribute to the study findings. The context of the study is the system of interest - the Hamad Health Science Library (HHSL) and the wider system to which it belongs - the Hamad Medical Corporation (HMC). Both units are described in more detail in Chapter 4.
Chapter 3

Literature Review

Empirical Data
- Questionnaire survey
- Semi-structured Interview
- Document Analysis

Soft Systems Methodology (SSM - mode I)

Interpretive Structural Model (ISM)

HHSL Systems Model

Intent Structure

Figure 3-1 Research Design
Within the context of this study data collection, via primary and secondary methods, allows for an understanding of the issues surrounding the role, impact and value of ICT adoption within HHSL. (Role in this context can be defined as the position and the responsibility of ICT to achieve the optimum performance of HHSL). It is the empirical data collection, when combined with current knowledge taken from the literature review that forms the 'problem situation unstructured', and constitutes Stage 1 of the SSM. The literature review was the subject of the preceding Chapter, thus, the methods used for the empirical data collection are detailed below.

3.2 Empirical Data Collection

Various methods and techniques were used to acquire the empirical data. These were: questionnaire survey, semi-structured interview survey, and document analysis. Data were collected during the period November 2000 to January 2001.

Adams & Schvaneveldt (1985) indicated that questionnaires and interviews are the most common methods of data collection in many of the branches of social and behavioural science. Both methods are highly flexible and adaptable to a variety of research designs, populations and purposes. According to Fontana & Frey (2000), the interview asks all respondents the same series of pre-established questions with a limited set of response categories. There is very little flexibility in the way questions are asked or answered in the structured interview setting. Instructions to interviewers often include some of the following guidelines:

Never digress from the study introduction sequence of questions or question wording. Never let another person interrupt the interview, Never suggest an answer or agree or disagree with an answer, Never interpret the meaning of a question, just repeat the questions and give instructions. (Fontana & Frey 2000, p. 649)

The main reason for adopting interviews as a means of data collection is the richness of information that can be derived and/or obtained. As Oppenheim states:
There remains the undisputed advantage that the richness and spontaneity of information collected by interviewers is higher than that which a mailed questionnaire can hope to obtain. (Oppenheim 1968, p. 32.)

The research methods used in this study to collect data and information were semi-structured interviews, to elicit information from the Directors and the Heads of Medical Departments, while a questionnaire survey was used to acquire data from the HHSL users.

3.2.1 Questionnaire Survey

In terms of questionnaire design, the questions should be relevant to the research objectives of the study undertaken. Questions should follow a logical order with a smooth transition from topic to topic. Sekaran (1992) stated that questionnaires are most useful as a data collection method, especially when large numbers of people are to be surveyed. Questionnaires are popular methods of collecting data because researchers can obtain data quite easily, and the questionnaire responses can be easily coded. Satisfaction surveys provide a good source of critical feedback by identifying services that are perceived by users as high quality as well as identifying problem areas. Such a questionnaire provides a structured channel for users' opinions, for staff complaints, and for ideas on how identified services can be improved. In this study, a satisfaction survey formed one part of the questionnaire. It is important to note that this is a novel component of this research study, as no such questionnaire has previously been used on HHSL or Libraries in other Gulf States up to the present time.

HHSL was the focus of this research study. A questionnaire was designed to obtain relevant data on a wide variety of issues that impact upon the adoption of ICTs in the HHSL. Several methods of distributing the questionnaire were used to ensure a high response rate while achieving optimal use of available resources. Oppenheim (1992, p. 103) states that the self-administered questionnaire ensures a high response rate, and minimum of researcher bias.
Chapter 3

Research Methodology

Questionnaire Design

Careful consideration was taken in the process of the questionnaire design. This includes the idea that the questions must reflect the aims and objectives of the study, they must be easy to read and understand, and must be both friendly and inoffensive. Referring to the study aims and objectives, five areas needed to be included in the questionnaire. These were the respondents’ personal information, and information on library services, computer skills, on-line database services and ICT services.

Once the five parts were identified, questions were created to reflect the need for issue generation. A total of 42 questions were included in the questionnaire. Four questions were included to elicit personal information. This section was needed to identify and investigate other variables of the questionnaire for cross tabulating. For example, it is important to identify any link between the users’ academic qualifications, grades and job categories with their use and skills in ICT. Twelve questions were included for library services, 10 questions for the computer skills’ section, 6 questions to investigate the use of on-line database services and 10 questions to examine ICT issues. The library service section was intended to identify and investigate the library users’ utilisation of the library, together with their views and opinions regarding the library staff and their help and support of library users. This part also identified the purpose of the user’s search, the method(s) used to obtain the information and the main library services used. These responses were designed to ascertain the level of user satisfaction with library services, as well as helping to identify the future needs of the library in meeting the needs of users. This information can also be used as benchmark to be compared and discussed with the responses in the interviews with the authorities, the library director and the Heads of the Medical Departments of HMC.

The computer skills part of the questionnaire was aimed to identify the skill levels of users, their ability to access the WWW and their opinions regarding this facility. This section also identified the training needs required to improve the library users’ skills. Other questions were inserted to relate the facilities in the library services with the library users’ skill. For example, the users were asked about the number of computers available in the library and the amount of time which was allocated for using the Internet.
One of the main aims of the HHSL is to provide medical information to HMC. The online database service provision, typified by the MEDLINE service, is one of the important tools used within the library as a source of information. Users' opinions and attitudes towards the service were sought. The final section was designed to identify and investigate the users' satisfaction with and awareness of ICT provided by the library. It also asked who trained the user in ICT and the main reasons for using ICT in the library.

**Questionnaire pre-testing (Pilot Study)**

A pilot study is needed before carrying out the questionnaire survey, to detect any errors or unclear wording, to detect fallacies, hidden problems and to ensure the suitability of the questions Nachmias (1992, p. 220). As stated by Oppenheim:

> Pilot work can be of the greatest help in devising the actual wording of questions, and it operates as a healthier check, since fatal ambiguities may lurk in the most unexpected quarters. (Oppenheim 1968, p. 26)

All aspects of the questionnaire should be tested: the questions, alternative answers, the layout, the flow and the timing. Great care was taken with the wording of the questions in order to keep the questionnaire as short as possible and to make sure it was unambiguous and easy to complete.

Mason (2002, p. 44) stated that it is important to test the techniques and questions, and to gather experience of how the questions might be understood by respondents. Pre-testing is useful for obtaining experience of how the questions will be understood. (Stone & Harris 1984, p.27). Frazer and Lawley (2000, p. 44) asserted that pre-testing is an important stage to ensure that potential problems are identified and eliminated. Respondents in the pre-test can suggest the amount of time needed to complete the questionnaire. It is recommended that a group of colleagues be used to pre-test the questionnaire because they understand the study’s purpose and they have similar training to that of the researcher. Their function is to determine whether the questionnaire will be able to accomplish the survey objectives.

Ten questionnaires were distributed to a random sample of PhD students, during the first week of November 2000, in the Department of Information Science at Loughborough University. A brief introduction about the aims and objectives of the research and the fieldwork was given together with an emphasis on the importance of the
pilot study and their role in it. The pilot study respondents were encouraged to comment on every question. Several questions were re-designed in the light of their comments.

The main comment from one of the respondents was the need to identify future training requirements as keeping up to date with ICT development training has become one of the main tasks of ICT. Therefore, a question (Question 26 in the computer skills' section) was inserted to reflect this comment. A second comment was made by another respondent, which raised the issue of productivity within the health professions, giving rise to the question on whether ICT would increase or reduce productivity. Therefore, Question 37 in the ICT section was inserted to reflect this issue.

**Questionnaire Sample Population and Distribution Strategy**

250 questionnaires were distributed in HHSL to HMC library users. This represents 33% of the total population of the library users. The sample was selected randomly as the primary advantage of random selection is the increased generalisability of the finding to the larger population (Keppel & Zedeck 1989, p. 16).

The questionnaire with explanatory notes (see Appendix A) was sent to the Hospital Management for them to respond. To facilitate the questionnaire distribution, a letter from the research supervisor was sent to the Director of Administration, HMC. This letter indicated that the research was directed at all levels of hospital staff. Each questionnaire was attached to a covering letter, (see Appendix B). The distribution strategy used can be summarised as follows:

- The Director of the library allowed the distribution and collection of the data by providing access to the staff, as well as creating a station for collecting the completed questionnaires.
- The questionnaire was handed out randomly at the entrance of the library. Each respondent's name and address were also taken for those who did not have enough time to complete the questionnaire. The majority of respondents were medical consultants and surgeons (see Chapter 6 for a discussion of the respondent breakdown). A self-addressed envelope was provided with the questionnaire for its return, for those who could not complete the questionnaire in the library.
Respondents were asked to return the questionnaire within 2 weeks. The researcher was available to answer any questions or clarify issues.

- Follow-up letters, via the internal post system, were sent to the respondents after three weeks for questionnaires not yet received, (see Appendix C).
- Follow-up telephone calls were also made within a day or two after the two week period, for known respondents. The follow up was carried by the researcher herself and one of the library staff.
- A letter was also written to express the researcher’s thanks and appreciation for the help and support she received from the HHSL Department, (see Appendix D).

Questionnaire Analysis

The data drawn from the questionnaires were coded and analysed using SPSS. The data were analysed in three stages. First the distribution of the respondents’ characteristics was calculated by frequencies, histograms, percentages cross tabulation and hypotheses tested by appropriate statistical methods. This analysis is presented and discussed in Chapter 6. The analysis followed procedures by, Pallant 2001; Guilliam, 1988; and Diamantopoulos & Schlegelmilch, 1987.

3.2.2 Semi-Structured Interviews

The interview is one of the most significant and effective tools in collecting information, especially given that people like to talk directly more than they like to write. Patton (2002, p. 40) listed the following elements which help the interviewer collect as much information as possible:

- The purpose of the study should be identified;
- Responses should be recorded accurately;
- The question should be related to the subject.

The purpose of interviewing is to allow entry into the other person’s perspective. Qualitative interviewing begins with the assumption that the perspective of the other person is meaningful, knowable and able to be made explicit. The purpose of the interview is to find out what is in and on someone else’s mind and to gather their stories (Patton 2002, p. 51). Hakim (1987, p. 26) argued that the central issue in qualitative
research is its concern with individuals' own accounts of their attitudes, motivations and behaviour, offering richly descriptive reports of individual perceptions, attitudes, beliefs, views and feelings.

The interview has also been described as a way to explore an expectation of the opinions, ideas and values of the interviewee. Gorman & Clayton (1997, p. 124) stated that the interview allows researchers to formulate their research problems in a variety of ways. Qualitative researchers are also routinely concerned, not only with objectively measurable facts or events, but also with the ways that people create, interpret and give meaning to these experiences. As Patton (2002, p. 48) notes, qualitative methods typically produce a wealth of detailed information about a small number of people and cases. Such methods increase the depth of understanding of the cases and situations being studied.

According to Robson (2002), all interviews require preparation: making arrangements to visit, seeking permission (which takes time), confirming arrangements, notes have to be written up, tape-recording must be undertaken, and time planning needs to be carried out. Face-to-face interviews offer the possibility of modifying a line of enquiry, following up interesting responses, and investigating underlying motives in a way that postal and other self-administered questionnaires cannot.

One of the important advantages of the interview is the immediate follow-up and clarification, that are possible. and it is a useful way to get large amounts of data quickly, (Marshall & Rossman 1995, p. 108) Nachmias & Nachmias (1992, p. 224) note that the interview should have four characteristics:

- It takes place with respondents known to have been involved in a particular experience.
- It refers to situations that have been analysed prior to the interview.
- It proceeds on the basis of an interview guide specifying topics related to the research hypotheses (aims and objectives).
- It is focused on the subjects' experiences regarding the situations under study.

The use of interview was chosen as the main data collection method for this study because it provides an effective way to find useful information about opinion and
attitude towards ICT. There are five advantages to using interviews for data collection, as indicated in the following text taken from (Gorman & Clayton 1997).

For interviewing methods, data collection can be achieved immediately. Interviewer allows to probe for more detail for clarification. Interviews is that they allow a large amount of data to be collected in a fairly short time. Interviewing gives a friendlier and more personal emphasis to the data collection process. Interviewing may also be appropriate if respondents are unable to read or write for some reason such as the illiterate or infirm aged. (Gorman & Clayton 1997, p. 124-125)

Sekaran (1992) stated that semi-structured interviews can be conducted either face-to-face or over the telephone. Telephone interviews are best suited to studies where many respondents are to be reached over a wide geographic area and where the time that each interview takes is short (less than twenty minutes). Many market surveys, for instance, are conducted through structured telephone interviews. However, this study does not suffer from geographic influences, so face-to-face interviews were used.

**Semi-Structured Interview and its advantages**

One of the main reasons for the semi-structured interviews in this research are: (i) to investigate and analyse the opinions and attitudes of the directors and the managers towards ICT from their understanding and experience. Marshall & Rossman (1995, p. 108) stated, "... interviews allow the researcher to understand the meaning people hold for their everyday activities"; (ii) to explore and dig deep for the unseen on issues related to the research aims and objectives; and (iii) to develop a vision on the problem and obstacles on introducing ICT as well as the ICT future.

According to Nachmias & Nachmias (1992), the semi-structured interview allows great flexibility in the questioning process. It allows the interviewer to determine the wording of the questions and to probe for additional information and detail. An interviewer can collect supplementary information about respondents. This may include background information about respondents and their environment that can aid the research in the interpretation of the data. Moreover, the interview situation yields spontaneous reactions that the interviewer can record and that might be useful in the data analysis stage.
Semi-Structured Interview and its disadvantages

The face-to-face interview method has some inherent disadvantages, some of these are:

- Cost in terms of money and time (costs include the funding of a trial and the cost of travelling as well as time taken to record and process the information obtained);
- Openness to manipulation or interview bias;
- Lack of anonymity;
- Inconvenience to the respondent as well as the lack of an opportunity to consult records;
- Lack of access to respondents because of distance or other factors that may make the survey appear more desirable;
- Difficulty in summarising the findings;
- Interview bias. The very flexibility that is the interview’s chief advantage leaves room for the interviewer’s personal influence and bias (Nachmias & Nachmias 1992, p. 228);
- Interviewees may be unwilling or uncomfortable sharing all that which the interviewer hopes to explore, (Marshall & Rossman 1995, p. 110);
- As the interview is social and personal interaction, therefore, it is possible that the interviewer may not ask questions that evoke long narratives from the participant either because of a lack of expertise or familiarity with local language or because of the lack of skills, (Marshall & Rossman 1995, p. 110);
- Responses to the questions or elements of the conversation may not be properly comprehended by the interviewer, (Marshall & Rossman 1995, p. 110). This is why the interviewer needs to be well trained to carry out the interview as states by Groves: “interviewers should be trained in the concepts inherent in the questions and be allowed to probe, rephrase, and adapt the questionnaire to individual respondent needs”, (Groves 1989, p.404).
Semi-Structured Interview Design

The time schedules of the interviewees dictated that the interviews lasted between 45 and 90 minutes. Instructions to the interviewees were clear and concise. Interviews were conducted in December 2000 with four types of respondent: the HHSL Director; 10 Heads of Medical Departments in HMC; the Director of Health Information Systems; and the Regional Information Officer of EMRO (WHO) based in Cairo.

In order to obtain the richness of data required and to facilitate effective reflection on the interview situation, most of the interviews were tape-recorded. However, two directors did not wish their interviews to be recorded and therefore extensive contemporaneous notes were taken at each interview. The recordings were not routinely transcribed but were used as a source of confirmation or clarification of the written notes where appropriate.

A semi-structured interview was designed for the Directors and Heads of Medical Departments at the HMC. The interview comprised 23 questions for Heads of Medical Departments in HMC and 24 questions for the Library Director on a diversity of issues associated with ICT in HHSL. These questions were divided into four sections, (see Appendix E and F). The Library Director from HHSL had also participated in the collection of quantitative data. The first section of the interview aimed to investigate the respondents' opinions and attitudes towards ICTs, including their opinions regarding the value, meaning and role of ICT in the library. The current situation of ICTs in the library formed Section Two of the interview. This section aimed to investigate their satisfaction with current ICT services and the extent to which they rated the library's progress concerning ICT. The level of co-ordination among the Departments regarding ICT is an important issue in a large institute like HHSL and therefore, this issue was raised with the library director to investigate its level and impact on ICT. The views of the Library Director towards the library users' needs and satisfaction, and the ICT responsibilities covered a large part of the interview. One of the main aims of this research was to identify problems and barriers that are holding back the use of ICT in the HHSL. Section Three of the interview was aimed at opening a discussion regarding the problems and barriers. Whether raising funds was a problem and the level of the library's readiness to cope with the library users' needs were also investigated as part of this section. Stress
and pressure have become part of the difficulties encountered by individuals in a modern work environment. Therefore, the last question of this interview discussed this issue. The final section of the interview was reserved for future plans towards ICT within HHSL.

**Semi-Structured Pilot Study**

After piloting the semi-structured interviews with middle manager colleagues in HHSL, two questions were added to focus more clearly on ICT issues. The pilot interviews themselves were carried out at the offices of the participating colleagues. Each interview lasted between 45 and 90 minutes, depending on the interviewees' responses and their willingness to expand upon a topic which had been raised.

**Semi-Structured Interview Distribution Strategy**

Official and personal contact was made with the interviewees prior to the interview to obtain their agreement, bearing in mind the time constraints due to the nature of medical work. (see Appendix G for copy of letter to arrange an appointment for interview). The taped interviews with HHSL, the HIS director and 10 Heads of Medical Department in HMC were conducted in English. The external interview with WHO-EMRO respondent was performed during the first regional conference and training course for health sciences librarians held in Beirut, Lebanon (Feb 4-8, 2001).

The following strategies were used during the interviews:

- The interview place was selected to be far from the interviewees' offices. The main reasons for this were:
  - To avoid any interruption from their secretaries, telephones and visitors.
  - To make the respondent free to express his/her own views far away from any employees.

- The morning was selected for the interviews. This was due to fact that the respondents would be more energetic and free from the day's work.

- A letter of thanks was sent after the interview to express appreciation for the interviewees' time and effort. (see Appendix H). The researcher also promised to inform them of the main outcomes of the research if they were interested. To date, 8 out of 13 interviewees have sought further information on the findings of the study.
In the GCC environment, personal interviews overcome many barriers. The interviewer can also respond to the mood of the respondent, can clarify points and get fuller, more meaningful responses.

**Semi-Structured Interview Analysis**

The aim was to tape all of the interviews for ease of post-collection analysis. In fact, two of the 13 respondents requested that their responses were not recorded. Subsequent analysis of these data relied on copious handwritten notes made at the time of the interview. For the taped responses, transcription of the full interview revealed issues and topics that were categorized manually.

**3.2.3 Document Analysis**

Document analysis is an important resource for collecting data and information that can save time and effort, as well as providing an insight into the organisation, allowing investigation and understanding. Searching documents can help to give a full description of an organisation's activities. The HHSL Annual Report is published every year and comprises details of acquisitions, changes in service arrangements and budgets. From the organisational chart (see Figure 4-4) in Chapter 4, it can be seen that the HHSL sits in the Women's Hospital in terms of both its physical location and its administrative boundaries. This itself becomes subsumed within the Administrative Directorate. There is an obvious tension between clinical users and the organisers of this Directorate, since both have separate goals and responsibilities.

HHSL policy and procedure documents cover library materials, reading materials, periodical subscriptions, book circulation, library committees, collection development, interlibrary loan, library membership and overdue charges. Library memoranda are also used to communicate user needs, for example, to improve library collections. The publication of the Qatar Medical Directory (Abdulla 1999, 2002) was also used as a source for study materials.
Scope of Document Analysis

Due to the scope of the research, various documents were screened to establish if there were any related sources of information which could support the research. This includes official, non-official, national and regional documents. As this research studies is the first of its kind in the State, a very limited number of documents are available in the open literature. The main documents examined in this research can be summarised in the following:

- **Annual Reports**
  Annual reports are an important resource for information and for investigating future plans. Annual reports present what have been achieved for the year and what plans have been made for the next year. The main problem with annual reports is that they are very brief with regard to the use and development of ICTs. This is due to the lack of the author's awareness of ICT.

- **Organisational Charts:**
  Organisational charts provide information, insight into and understanding of the organisation's structures and the employees' responsibilities. It also provides statistics on the number of staff, the number of departments, job titles and job descriptions. See Figure 4-4 in Chapter 4.

- **National Documents:**
  National documents were also surveyed to identify any materials related to ICTs. This includes documents from the Ministry of Education and the Ministry of Health. In both ministries, the materials were limited to the following:

  - Organisational policy and procedure documents: past and future plans.
  - Library Memorandum: Rules and regulations are used to correspond users' needs and to improve library collections.

- **HMC Policy**
  This policy document indicates the policy of HMC regarding the provision of books, periodicals and other reading and educational materials through the HHSL of the hospital. By investigating and analysing this document, it is clear that the policy and its
procedures lack any mention of ICT within the procedures as well as within the main policy.

- **HHSL committee**

One of the HMC standard practices is the establishment of the library committee. Their document states that the library committee acts in an advisory role to the HMC Director, the Administrative Director and HHSL on matters related to the HHSL within the corporation. The committee members consist of:

a) A Physician representation as appointed by the Medical Director.
b) Administrative representation as appointed by the Administrative Director.
c) The Director of the HHSL
d) The Director of Medical Educational.
e) The Head of Nursing In-service Education.

It is clear from the structure of the committee that there is no ICT representation even though ICT has impact and will become an important tool in the performance of the HHSL.

The HMC documents regarding ICT provided little useful information. This is due to the fact there is a lack of research and studies in this area; lack of awareness of ICT and the fact that State of Qatar has moved toward modernisation only since 1995.

### 3.3 Soft Systems Methodology

A systemic approach to problem-solving is provided in a methodology developed by Peter Checkland, Emeritus Professor of Systems Science at Lancaster University, UK. The Soft Systems Methodology (SSM) is a structured approach to a situation that is seen to be problematic or where improvement is desirable. SSM was initially described as a seven-stage process of analysis which uses the concept of the human activity system to identify and improve problematical situations. The methodology contains two kinds of activities:
• 'Real world activities', involving people in the problem situation.

• 'Systems thinking' activities, which may or may not involve those in the problem situation (Checkland 1981, p. 160).

Checkland & Scholes (1990, p. 280-284) describe two routes through the methodology, simply known as 'Mode 1' and 'Mode 2'. The first is the 'structured' methodology described by Checkland in (1981, p. 163); it comprises seven sequential and iterative stages. Mode 2 is an embellishment of the first process and uses case study history in its design. The systems thinking that underpins SSM is described in greater depth in Chapter 5 and its application in this study is investigated in Chapter 7.

SSM is interactive and allows the person facilitating the stakeholders to observe and to intervene. It comprises a process of analysis in seven stages, as follows.

Stage 1- The 'problem situation unstructured' focuses on the general description of the problem and understanding the process in the organisation.

Stage 2- The 'problem situation expressed' helps to structure and express information from Stage 1. The procedure involves four stage of analyses. First, the analysis of the intervention focuses on the client, problem solver and problem owner. Next, the social and cultural analysis has roles, norms and values. Then, political analysis surrounds the concepts for defining the internal politics of the organization, how power is expressed and structured, and what makes an individual powerful. Finally, the rich picture analysis creates a graphical representation concerning the understanding of the problem situation. The rich picture is like a child's drawing and does not require syntax checking (Checkland 1981, p. 165).

Stage 3- Formulation of root definitions (RDs); these have a formulaic expression characterised by "A system to do X, by means of Y, in order to achieve Z". The "A system to do X" defines what the system would accomplish. The "by means of Y" defines the general framework on how the system can be transformed. The "in order to achieve Z" defines why the system is required. This stage uses a CATWOE 'check' to analyse the RD. CATWOE is a mnemonic that stands for Customer, Actor, Transformation process, Weltanschauung, Owner, and Environmental constraints. Customers are the immediate beneficiaries or victims of the system. Actors are the
people who perform the activities. Transformation identifies what an event may achieve. Weltanschauung defines a meaningful view based on different people in the world. The Owner has the power to direct and stop the event. The Environment is the external environmental constraints that limit the system (Checkland & Scholes 1990, p. 35).

Stage 4- This stage defines a conceptual model that helps to characterize the core of the relevant system. In particular, it is a human activity model describing how each operational activity is carried out through the process, as defined in the RD. The number of activities covered in this stage ranges typically from five to nine, and each activity can be modelled in a sentential way by a verb. Performance can be monitored using measures of efficacy, efficiency and effectiveness (Checkland 1981, p.169).

Stage 5- This stage compares the conceptual model (ideas generated in Stage 4) with the real-world ideas (the problem situation expressed in Stage 2). A comparison Table can be used. It is essential for the participants to keep an open mind. As a result of this stage, participants can identify the similarities and differences between the model and the realistic situation in a systematic and structured approach. In addition, they can take constructive action and make necessary changes to the model (Checkland 1981, p.177).

Stage 6- Based on the costs and benefits identified in the previous stages, this stage defines the feasible and desirable changes which can lead to positive outcomes to improve the problem situation. Two types of change that are commonly investigated are structural and procedural change.

Stage 7- This stage proposes actions to implement the change identified in stage 6. Yet, the introduction of the actions may change the situation, leading to the birth of a new problem (Checkland 1981, p.180). Hence the SSM is iterative.

The overall purpose of SSM is well summarized by Von Bulow (1989):

SSM is a methodology that aims to bring about improvement in areas of social concern by activating in the people involved in the situation a learning cycle which is ideally never-ending. The learning takes place through the iterative process of using systems concepts to reflect upon and debate perceptions of the real world, taking action
in the real world, and again reflecting on the happenings using systems concepts. The reflection and debate is structured by a number of systemic models. These are conceived as holistic ideal types of certain aspects of the problem situation rather than accounts of it. It is taken as given that no objective and complete account of a problem situation can be perceived. (Von Bulow 1989, p. 13)

The advantages and disadvantages of SSM will be discussed in more detail in Chapter 5.

3.4 Interpretive Structural Modelling

Interactive management techniques (Nominal Group Technique and Interpretive Structural Modelling) will be used to translate the outcomes of SSM into a more tangible form for decision-making. The techniques of interactive management form part of the discipline of group decision support for achieving consensus decisions. Applications of interactive management include: idea generation, idea structuring and designing systems for decision-making. Of interest to this study is its ability to structure ideas. This allows priorities and/or root causes to be identified, (Janes, 1988) and allows effective communication in achieving a consensus quickly. It is thus an efficient use of participants' time and provides them with tangible evidence of their work in terms of a plan of work.

Interactive management has been used for managing complex organisational issues in which a small group or team, who have requisite but incomplete knowledge about the issue, are brought together. A facilitator is used to guide the participant group through the methods to be used. In the NGT, a trigger question is formulated and ideas or objectives that respond to this question are recorded. Traditionally, the participant group are in the same location and interaction between individuals takes place to interpret the various responses. In this study, this method has been extended by facilitation of a distributed group of participants. The ideas were recorded via e-mail in three cases and telephone polling in a further two cases — the technique then became similar to the latter stages of a Delphi study. It is the ISM which is of importance to this study, as the input element set is generated from the NGT responses from experts in ICT who have applied their expertise within HMC.
More formally, the stages of the NGT study followed here are:

- Step 1: Clarify trigger question
- Step 2: Generate objectives
- Step 3: Round-robin recording of objectives
- Step 4: Prepare objectives for ISM

The ISM interaction comprises 7 steps, of which the output of the NGT is Step 4. The method can be described as follows:

- Step 1: Identify the issue of concern
- Step 2: Choose the type of ISM to construct
- Step 3: Select the participant group and facilitator
- Step 4: Generate the element set (i.e. the NGT objectives)
- Step 5: Complete the matrix of element interactions
- Step 6: Display the ISM, discuss and amend (if necessary).

The complex issue in an ISM study is usually related to increases in productivity, strategic planning, research planning, or as an educational asset. It will be demonstrated throughout the study that the underlying issue is related to strategic planning. Once the issue has been identified, the second step is to decide on the type of ISM; that is, either an 'intent structure' or a 'priority structure'. Whereas the former uses the transitive relationship 'would help to achieve', the latter uses 'is more important than'. Thus, in the format of the intent structure model, the relationship between elements is given as:

"Would
<element 1> help to achieve <element 2> over the next three years?"

This relationship is explained in more detail, and in context, in Chapter 7.
Successive elements are presented to distinguish their place in the ISM hierarchy until the elements are exhausted. The final model is a linked hierarchy of elements where the relationship between elements is "help to achieve". This allows decision-makers, such as those found on the HHSL management committee, to structure activities for best effect and practice within a prescribed time limit.

3.5 HHSL System Model

To investigate the HHSL system model using the knowledge of survey findings and analysis together with the recommended actions from the output of the SSM was an objective of the thesis. The HHSL system model can be defined as comprising three interacting components: the organisation model; the ICT model and decision-making model. Whereas all these models are of interest to this thesis, the organisational model and decision-making model components are 'soft' descriptions that are best interpreted through SSM. However, the ICT model has a significant 'hard' component associated with it. To interpret the ICT model, an approach has been used that spans both the 'hard' and 'soft' elements- the interpretive structural model (ISM). This is discussed in the following section, more details in Chapter 7.

3.6 Summary

This Chapter has provided an overview of the research methods used in the study. These include a questionnaire survey, semi-structured interview analysis, document analysis, the use of Checkland's SSM and Warfield's ISM. These are sequential and iterative. The next Chapter will place the study in context of the available health systems in Qatar.

Chapter 5 then provides a more detailed account of the systems intervention undertaken in this study and explores the context of use of SSM and ISM. Chapter 7 demonstrates the adoption of these methodologies to the problem situation in HHSL. Chapter 7 also explores the HHSL system models developed as a consequence of the systems intervention.
Chapter 4
Health Services in the State of Qatar

4.1 Introduction

This Chapter will provide the necessary background to the study in terms of a general overview of Qatar, provision of its health service, and an introduction to the Hamad Medical Corporation (HMC) and its relationship with HHSL.

4.2 Geography and Population

The State of Qatar lies roughly in the centre of the eastern coast of Arabia, jutting out into the Gulf northwards towards Iran. At the base of the peninsula, the border is shared with the Kingdom of Saudi Arabia. Qatar covers an area of 11,437 sq km. Its territory also includes a number of islands in the waters around the peninsula that form the hub of oilfield activity from which Qatar draws its wealth, see Figure 4-1 (The State of Qatar and Cities).

The people of Qatar are primarily of Arab descent, reflecting its ties of history, language and religion with the other Gulf States. Arab tribes who migrated to the area in the 18th century form the basis of the population. More than 60% of the present inhabitants of Qatar live in the capital city of Doha. Significant population centres are developing in the Al Thakira area, serving the new industrial city of Ras Laffan, but there are also a number of towns of which Wakrah, Dukhan, Umm Said Al-Khor and Madinat Shamal are the most populous. Total population as of July 2000 was 744,483 (Qatar’s Ministry of Foreign Affairs web site). The population is expected to increase to 800,000 by 2010.

Islam is the official religion of Qatar. Shari’a (Islamic Law) is the principal source of legislation in the country, and Arabic is its official language (Qatar Year Book, 1990). Qatar is one of the six member countries of the Gulf Co-operation Council (GCC.) Other members are Saudi Arabia, Kuwait, Bahrain, The United Arab Emirates and Oman. (Metz 1993a)
Figure 4-1 Qatar Map and Cities
4.3 Health service provision in Qatar

According to HMC (2001) the primary health care service in Qatar is run by the Ministry of Public Health (MPH), delivered via a network of 23 Primary Health Care Centres. Secondary and tertiary health care services are provided by the Hamad Medical Corporation (HMC) through three hospitals - Hamad Hospital, the Women's Hospital, and Rumailah Hospital.

The national health care system is free of charge except for a modest administration fee for Qatari nationals, and is subsidised for all foreign residents. In the absence of a significant private health care sector, almost all of the population uses the state system. Having committed itself to this universal benefit, the government of Qatar is expected to have an interest in achieving optimum outcomes of interventions, and of reducing unnecessary or avoidable waste of resources in its health service (Younis 1993).

In the last decade, Qatar has witnessed a rapid growth and development in its primary, secondary, and tertiary health services. This has been realised through the development of a strategy for the introduction of technology to aid health service provision. The human resource required for the strategy to succeed has also been addressed by recruiting qualified personnel from overseas who are able to offer high quality health care. The Qatari health organisations provide a standard of health care that is similar to any health care system in the developed world, and certainly on par with the best available health services in the GCC region.

The Hamad Medical Corporation (HMC) is considered one of the most prominent specialised medical establishments in the Arabian Gulf region (Arab net 2002). It was established in 1982 from the merger of Hamad General Hospital, Rumailah Hospital and the Women's Hospital.

- Rumailah Hospital

Rumailah Hospital was inaugurated in 1957 and renovated in 1997. It has 290 beds and has recently installed three operating theatres, alongside supplementary observation rooms and intensive care units. There was a facility for dental surgery and a unit for physical
therapy which was developed and furnished with the most advanced services (Gotting 1996).

The HMC is developing Rumailah hospital into a general hospital. To achieve this status, this hospital supports diagnostic services such as those provided by imaging departments (including a magnetic resonance system) and laboratory units (Chemical Pathology, Haematology, Histopathology etc.). The hospital provides geriatric care for men and women, rehabilitation and physical therapy, and therapy services for disabled children. The hospital also has a specialised school for disabled children, a unit for the treatment of burns, a unit for the treatment of tuberculosis and chest diseases and a unit for plastic surgery, as well as dermatology and sexually transmitted disease clinics (Arab net 2002).

* Hamad General Hospital

The Hamad General Hospital was inaugurated in 1982. It has 660 beds distributed across specialties, the most important of which are: Surgery, Paediatrics, Internal Medicine, Laboratory Medicine and Pathology. The Accident and Emergency Section works continuously and the Ambulance Service has catered for urgent medical cases since 1999. The outpatient clinics at Hamad General Hospital were opened in 1999. It is a four-storey building consisting of 104 medical examination rooms, laboratories, and has its own pharmacy.

The Medical Education Section has started a programme to educate medical students who wish to complete their graduate training in HMC. A Patient Relations Section acts as a link between the patients and their families on the one hand and the corporation on the other. This Section receives any patient complaints, conducts studies on patients' welfare conditions and extends necessary advice.

* The Women's Hospital

The Women's Hospital was inaugurated in 1988. It has 330 beds including a neonatal intensive care unit. The hospital is following an integrated immunisation programme according to which both mothers and their new offspring are automatically vaccinated
before leaving the hospital. Expectant women have ultrasound checks, which are operated by a number of trained Qatari women clinicians. (Gotting 1996).

McGivern (1996) was impressed by the role of the HMC in the development and provision of health services in Qatar. In addition to core responsibility for all government hospital based services, it is also largely responsible for the Emergency Medical Services and ambulances, although theoretically the HMC is concerned only with secondary and tertiary levels of service.

Itayem (2001) stated that being the only tertiary health care service provider in the state of Qatar, HMC also furnishes the following public health care information services;

- Provision of information on the administrative organisation of the Ministry of Health and the services provided by its departments. This information can be accessed via the web, at www.hmc.gov.qa;
- It has three journals published jointly with the Ministry of Health:
  - Qatar Medical Journal
  - Heart Views
  - Al-Sehha

4.4 The Impact of the Improvement In The Health Care

There is a significant relationship between health and social well-being, many researchers use this relationship to describe increases or decreases in the general welfare level of a given population or group. For example, the Australian Institute of Health and Welfare (2003) identifies a very significant linkage between health level and welfare status.

Table 4.1 below illustrates some relevant statistics of Qatar through the period between 1992 and 2001. It demonstrates the growth of Qatar's population, the capital of national health expenditure, health manpower, and the crude death rate per 1000.
Chapter 4  
Health Services in the State of Qatar

<table>
<thead>
<tr>
<th>Year</th>
<th>Population (in thousands)</th>
<th>Capital of National Health Expenditure (QRs)</th>
<th>Health Manpower per 10000</th>
<th>Crude Death rate per 1000</th>
</tr>
</thead>
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<tr>
<td>1992</td>
<td>449.6</td>
<td>NA</td>
<td>13.4</td>
<td>2.1</td>
</tr>
<tr>
<td>1993</td>
<td>464.0</td>
<td>1850</td>
<td>13.5</td>
<td>2.0</td>
</tr>
<tr>
<td>1994</td>
<td>478.9</td>
<td>2040</td>
<td>13.4</td>
<td>2.0</td>
</tr>
<tr>
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<td>494.2</td>
<td>1677</td>
<td>13.4</td>
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<tr>
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<td>595.3</td>
<td>1581</td>
<td>15.9</td>
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Table 4-1 Qatar’s health statistics

As population increased by 145,700 during the period of 1992 to 2001 so did health manpower, with an upward trend in health expenditure. On the other hand, the crude death rate remains around 2.0 per 1000 population.

In terms of health spending as a percentage of Gross Domestic Product in 2001, Qatar has a value of 2.8%; this can be compared to the same statistic in some neighbouring countries — UAE is 2.5%; Yemen is 2.5%; Saudi Arabia is 3.1% and the highest health spenders in the region is Jordan with a value of 7.9% (The Economist 2001).

It seems that some health statistics remain steady, whereas others require further control. Perhaps by increasing the evidence base and providing best practice guidelines, an electronic health library may contribute towards increasing knowledge not only about clinical practice but also about strategic health management that will enable managers to be more aware of their sector strategies for achieving long term goals. Any electronic health library would be centred around the HHSL.
4.5 Hamad Health Science Library (HHSL)

HHSL was established in early 1981. Its original goal was to serve as the health information centre for the medical and paramedical staff of the Corporation in particular, and the other health care professionals in the country of Qatar in general (Pathan 1986). Easy access to information led clinicians, medical students, and medical staff to use the facilities of the HHSL that provides a rich source of current medical literature.

The HHSL is staffed by seven non-medical qualified librarians personnel, and is headed by a qualified librarian. The organisational structure of this agency is as reflected in Figure 4-2.

The State of Qatar lacks comprehensive research studies in health libraries. This finding is due to three main factors. The first factor is the political factor. Before His Highness Sheik Hamad Al-Thani come to power, Qatar was a closed society with a regimental regime, without serious plans for modernisation. This era can also be described as one in which there was a lack of opportunities for research and higher education. Since 1995, the State has moved steadily towards a modernisation programme that combines social, economic and political factors. One of the highlights of this era is the establishment of the first permanent constitution in the history of the State (2003) in which women have been given equal political rights. The second factor is the lack of qualified manpower in the State due to the pre-1995 regime’s policies and strategies. The third factor is the rapid development in expansion of ICT hardware and software. This study is the first comprehensive research activity performed in HHSL.

4.5.1 Library Collections

From the latest statistics, (HHSL 2002) the HHSL collection contains over 40,000 items including books, monographs, bound periodicals, serials and audio-visual material. The collections are arranged according to the US National Library of Medicine (NLM) Classification System.

Currently, the library subscribes to 830 different weekly and monthly medical journals. In addition, over 3000 audio visual aid items consisting of audiocassettes and videocassettes
Figure 4-2 HHSL Organisational Chart
and colour transparencies related to health sciences subject are held. The card catalogue of books is available for the items bought prior to June 1988. All books bought since then are on an OPAC. The automation of the card catalogues is presently being implemented and it is schedule to be completed during 2004.

4.5.2 Medical Library Association Exchange

The HHSL belongs to the Medical Library Association (MLA), Chicago, USA. The MLA exchange programme has assisted the HHSL in its acquisition of many important back-volumes of numerous periodicals from the 1950s to the 1970s. As the aim of HHSL is to build a strong collection of important periodical medical/clinical literature, the MLA scheme allows the introduction of material that would not necessarily otherwise be available for users.

4.5.3 Reference Service

The HHSL offers highly specialised reference services to its users, ranging from answering simple queries to providing extensive medical bibliographies. The reference section contains most of the current titles in clinical medicine and its allied fields. Resources in this section are non-circulating. The library also provides special service to professionals and staff, and assists them in verification of the reference citations for scientific articles that are being prepared for publication.

In enhancing the provision of the reference service, HHSL forged a collaboration with related institutions in the GCC region, as well as other established health science libraries in the USA (including NLM and MLA).

4.5.4 Online Medical Services

The HHSL uses CD-ROM Medicine for biomedical literature searches via Index Medicus and Medline databases. Users can download the required articles from the searches done automatically.
4.5.5 Interlibrary Loan

HHSL has developed interlibrary-co-operation with several institutions. To assist in this process among the health sciences libraries of the GCC countries, the HHSL published in 1987 the first ever United Gulf (UNIGULF) list of periodical holdings in the health sciences libraries of GCC countries. This catalogue is the only source giving the needed details about holdings, and availability in the regional health sciences libraries. It lists 2,443 titles from the collections of fourteen health science libraries in the different Gulf countries. The second edition of this catalogue was released in 1993, with a further revision in 1996.

Since the Gulf War in 1990, HHSL has replaced the Library of the Faculty of Medicine of Kuwait University as the hub for medical science libraries of the GCC region. Therefore, it is now shouldering the responsibilities of providing photocopies of articles to the health sciences libraries in the GCC region.

Figure 4-3 (HHSL - Inter library loan services) shows the total number of ILL received from overseas such as NLM and BL were 46 Inter Library Loans while 429 were from the medical libraries in the GCC States (HHSL statistics, 2002).

4.5.6 Qatar Medical Directory

This Qatar Medical Directory consists of a compilation of abstracted healthcare articles that have been published in English from periodicals and conference proceedings from around the world since 1971.

The compilation comprises:

- MEDLINE electronic library, using electronic search engine;
- articles in Qatar Medical Journals;
- medical conference proceedings, with subject to Qatar medical care; and,
- Identifying and consulting whoever since 1970 has working experience and published journal articles during their time in Qatar.
Figure 4-3 HHSL - Inter library loan services between HHSL and local and international institutions
Chapter 4 Health Services in the State of Qatar

The material is available in the form of a hardcopy publication; the first edition was published in 1999 and was followed by a second edition in 2002. The electronic form is accessible on the web at www.hmc.org.qa/hmc/default.htm.

4.6 Organisation Chart of HMC

Figure 4-4 shows the Hamad Medical Corporation Organisation Chart and the location of HHSL within it. Although the HHSL provides a service to all three hospitals in HMC, it is physically located within the Women's Hospital. The Organisation Chart does not indicate organisational reporting structure, as the librarian reports directly to the Administrative Director at a level in the hierarchy above the Hospitals that the HHSL serves. This anomaly is known by HMC management, but there has been no update in the Organisational Structure chart since 1999.
Figure 4-4 HMC Organisation Chart HMC documents: 1999
4.7 Summary

The HHSL plans to continue to serve as the medical/clinical information centre for the staff of the HMC organisation, the health professionals in the nation and the GCC region. It is ready to serve as centrepiece of the formative medical school, jointly with the University of Qatar.

This Chapter has provided the necessary background in which to place HHSL in context of other HMC organisational units and from a wider systems perspective, the GCC States’ interdependencies. The HHSL is in a system of transition, from the barber-surgeons of the 1950s to a modern health service currently. Some services, such as those provided by the HHSL, have lagged behind the tremendous pace of change seen in other medical service units. Development of ICT systems to facilitate e-health library provision is one way to ‘catch up’ – but this technological change requires changes in management culture. The tension between the two types of change will be explored in later Chapters of this thesis. One perspective to understand change processes in context is provided by systems thinking and practice. The underpinning concepts that describe a systems perspective are given in the next Chapter.
5.1 Introduction

The purpose of this Chapter is to present the research methodologies chosen (see Chapter 3) and place them within a systems framework. A distinction is made between ‘hard’ and ‘soft’ problems; this helps to identify the problem investigated in this research study as belonging to the ‘soft’ discipline. The initial methodology used in the study is Checkland’s Soft Systems Methodology (SSM). This is used in situations where aims and objectives are hard to define, decision making is uncertain, measures of performance are at best qualitative, and human behaviour is irrational (Checkland 1981, p.159). As Checkland goes on to say,

The emphasis of SSM is not on finding a solution to a specified problem, it is on understanding the situation in which a perceived problem is thought to lie. The focus is on establishing the purpose, people, constraints and Weltanschauung (world view) of the human-machine system, and on developing conceptual models of that ideal system. (Checkland 1981, p.159)

SSM was therefore adopted in this study as a methodology for improving the problem situation, which itself is defined by information derived from primary and secondary sources that include questionnaire and interview surveys and document analysis. This Chapter also gives an overview of these information sources and the methods used to obtain material that, when combined, defines the 'problem situation unstructured' (i.e. Stage 1 of the SSM, see below for further details). The actions that are identified to improve the problem situation then help to form the input to a further systems-based methodological intervention – Warfield’s Interpretive Structural Model (ISM). This model orders the action elements uncovered into a resulting roadmap for change. It is this roadmap that forms the boundary between work undertaken within the scope of the thesis and recommendations to management of HHSL for effective change.
5.2 An overview of SSM

Flood & Carson (1993, p. 7), Elliott & Stakings (1998, p. 132), Bocij et al. (2003, p. 37) and Checkland (1981, p. 37) defined a 'system' as a set of elements that are connected together in some way that exhibits purposeful behaviour. These elements and relationships form a whole, thus showing properties which are properties of the whole system rather than of its component parts. In systems terms, this holistic description may provide synergistic relationships between elements from which emergent properties of the system itself may arise. Activity within a system is the result of the influence of one element on another. When an action (or set of actions) has an effect on the originating element, the influence is called feedback and can be positive or negative in nature. Positive feedback effects change in the same direction and leads to exponential system behaviour; negative feedback effects change in the opposite direction and leads to stabilising systems behaviour. Systems can also be described as closed or open. Closed systems are autonomous and are independent of what is going on around them; open systems exchange resources (e.g. materials, energy and information) with their environment. The systems of interest in managing change can be characterised as open systems (Iles & Sutherland 2001, p. 17, p. 89).

The systems approach itself is not a single methodology, but involves the use of identified systems methodologies. Jenkins (1969, p. 4) states that systems methodology comprises the stages of systems analysis, systems design, implementation and operation; the formation of the problem or objective is the starting point. These kinds of problems and methodologies in which the objectives are understood and can be defined as a starting point are termed 'hard' systems. They can be viewed as a search for an efficient means of achieving a known end. Checkland (1981, p. 141) argued that there is a fundamental difference between these problems and 'soft' problems because in the latter the endpoint, or what could be achieved, is part of the problem. Checkland (1972, p. 89) devised a methodology which was specifically geared to 'soft' problem solving, which is called Soft Systems Methodology. It explicitly focuses on the concept of human activity systems of purposeful activity and allows for different points of view.

In selecting a methodology for problem solving, a distinction between "hard" and 'soft' problems has to be made. A 'hard', or structured, problem is one which is exclusively concerned with a 'how' type of question. A 'soft', or unstructured problem, is one which...
Chapter 5  System Thinking

is typified by being mixtures of both ‘what’ and ‘how’ questions. This kind of problem manifests itself in a feeling of unease but which cannot be explicitly stated without this appearing to oversimplify the situation.

Clearly, structured problems are what ‘hard’ systems thinking and most operational research are concerned with (Checkland 1981, p. 139; Wilson 1984, p. 22), see Figure 5-1.

![Figure 5-1 Distinction between HSM and SSM](Image)

SSM was originally developed by Checkland and colleagues at Lancaster University to solve problems involving technology, systems processes and people (Checkland, 1981; Checkland & Scholes 1990). The methodology determines the nature of a problem situation and attempts to search for a set of agreed views concerning it. According to Bocij et al. (2003, p. 410), SSM emphasises the human involvement in systems and models their behaviour as part of systems analysis in a way which is understandable by non-technical experts. Given the description of a ‘soft’ problem above, it is argued that soft systems analysts apply their tools and techniques to problems that are not well defined (Avison & Taylor 1997). This view is echoed by Rowley (1998), who stated that SSM focuses, not on finding a solution to a specific problem, but on understanding human
systems. She goes on to say that SSM is valuable both in establishing the purpose, people, constraints and world view of the system, and in developing conceptual models of that ideal system. The SSM was placed in an information systems context by Wilson (1990, p. 25-40) who again values the human activity system elements of the methodology. Pala, Vennix & Mullekom (2003) investigated the validity of the SSM as a learning system and as an assessment of the term, 'action to improve the problem situation'. Whereas the former relies on the fact that on SSM intervention is essentially never-ending (it has no defined end-point), the later goes to the very essence and ideas on which SSM is based.

The methodology contains two kinds of activity. Stages 1, 2, 5, 6 and 7 are real-world activities necessarily involving people in the problem situation. Stages 3, 4, 4a and 4b are systems thinking activities which may or may not involve those in the problem situation, depending upon the individual circumstances of the study (Checkland 1990, p. 158). The seven-step investigative process (now termed 'mode 1') was first described by Checkland in 1981 (Checkland 1981, p. 163). This version of the methodology is described below, followed by an examination of some of the subsequent revisions of and additions that have been made over the past two decades.

The preliminary steps of the SSM (mode 1) approach consists of: 'identifying a problem situation which is considered to be problematic', and 'expressing the situation in plain language'. These steps are rooted in the collection of empirical data. The intermediate steps, called collectively 'systems thinking about the real world', consist of 'developing root definitions' of associated purposeful activity systems, which then give rise to 'conceptual models of potential systems' (i.e. holons). The methodology progresses with a 'comparison stage' whereby those models are held up against the real world situation. Out of this comparison may emerge 'changes that are systemically desirable and culturally feasible'. Ideally, these suggestions result in actions to be taken to improve the problem situation (Checkland & Scholes 1990, p. 27), which defines the end of the systems intervention.

Al-Humaidan & Rossiter (2001) stated that SSM deals with some elements and contains certain aspects of hard systems. SSM supports activities and processes in a real world system by using a conceptual model to represent the content of a root definition. The users are involved in choosing the activities to obtain a consensus for the primary task
model, which is required in order to define information for a system that accommodates the different users' viewpoints. The technique also encourages debate to define the changes that are required to improve the situation.

SSM documents the employees' value in what is termed the 'mode two' version of the methodology which defines roles, norms and values (Checkland & Scholes 1990, p. 30). A role is a 'social position' recognised as significant by people in the problem situation" and is characterised by the expected behaviours of objects, sometimes termed norms. Actual performance in a role will be judged according to the local standards on roles and so, after each interview, discussion or examination of a document, an exchange of experiences needs to be made and the roles, norms and values inferred. Finally, the acceptance of the method depends on the result of a project. If the project fulfils the users' requirements, this will encourage users to make use of the system. The users' involvement throughout the project encourages them to accept the system and to use it.

Modelling relevant systems takes place in terms of human activity systems. A human activity system is a notional system model ('holon') that expresses some purposeful human activity which could, in principle, be found in the real world (Checkland & Scholes 1990, p. 24). These systems are notional in the sense that they are not descriptions of the actual real-world action but are intellectual constructs: ideal types for use in debate about the possible changes which might be introduced into a real-world problem situation (Checkland 1981, p. 218). One of the essential features of SSM is its emphasis on the necessity to create several models of human activity systems. The emphasis on this feature follows from the recognition of multiple stakeholders. As each stakeholder interprets the world in different ways, there will never be only one relevant human activity system when examining real-world situations that is characterised by purposeful action (Checkland & Scholes 1990, p.24). Naughton (1984, p. 36) defined a relevant system as a term for the expression of the problem situation (i.e. the rich picture). According to Avison & Fitzgerald (1995, p. 117), the problem theme is a set of problems or issues associated with each relevant system. A root definition (expressed by Checkland as fulfilling CATWOE criteria) is a concise statement that contains the relevant elements that describe the identified problem themes (see p. 75).
Checkland & Scholes also suggest five 'E's' as criteria for judging the extent of the success of the transformation T:

- efficacy, i.e. whether T or the means chosen work in producing the desired output;
- efficiency, i.e. the amount of output divided by amount of resources used;
- effectiveness, i.e. whether T meets the longer term aim;
- ethicality, i.e. whether the transformation is morally right; and,
- elegance, i.e. whether it is aesthetically pleasing.

Involving stakeholders and negotiating a relationship with them is often crucial to the success of the SSM intervention. Thus, the study might be described as an enquiry process (Dick & Swepson 1994).

SSM seeks to describe the key transformation activities of an organisation, to identify the major groups of participants in the process, and to elicit the world-views or belief-systems under which they operate. These elements are expressed in terms of a basic schema or analytical framework. This framework has remained at the core of the methodology despite subsequent revisions to the original 'seven-step' model, and despite the incorporation of field techniques borrowed from other types of enquiry, such as ethnography.

'Transformations' consist of the conversion of some input to some output by means of a transforming process. Not all of these transformations will have been envisaged by the designers of a system or the managers of an organisation. Quite often, a study may be indebted to non-traditional viewpoints and formulations which evolve during the analysis process. Thus, 'transforming books on library shelves to ones out in the community' might be envisaged as a main activity of libraries (Checkland & Scholes 1990, p. 34).

Checkland & Scholes (1999, p. 36) state that the SSM approach considers the surrounding environment and relationships between systems components in a qualitative way. It can examine factors that may not be apparent when using a hard systems approach. Figure 5-2 shows the process of SSM (Model).
Checkland (1972, p. 97) explains that the human activities used in systems comprise those from which objectives can be originated. They contain purposeful elements, and it is this aspect which justifies the development of the problem-improving methodology; that is, there exists a will to understand and improve the problem situation. The methodology described below can be viewed as a means of using systems ideas to structure problem situations in order that such a will can be exercised. Checkland (1981, p. 115) admits that any method will always be in some way inadequate, but this does not necessarily mean that the method will be without merit. By examining the human activity systems in this approach, vital knowledge about interaction can be obtained. This knowledge will help in understanding and improving these systems. Checkland (1981, p. 163) states the main advantage of the method is that it gives structure to these types of problem situations that can allow them to be dealt with in an organised way. It forces the developer to look for a solution that is more than just a technical one.

Checkland & Scholes (1990, p. 35) modified the original SSM approach. What has become to be known as SSM (Mode 2) is described in Figure 5-3. While the concepts have remained the same, the modification demonstrates 'differences to reflect the importance of the differences between models and the real world'. These differences appeared to be lost in the agenda for change that was represented in Stage 5 of the SSM in Mode 1.
This study employed SSM (mode 1), as this approach better represents the problem scenario in HHSIL. In SSM (mode 1) the 'problem situation unstructured' can be derived from empirical evidence drawn from the questionnaire and interview responses from stakeholders (i.e. HHSIL users and HHSIL management respectively). If SSM (mode 2) were adopted, the methodology requires the use of case study histories – these are not yet available from HHSIL or HMC.

5.2.1 Reasons for the adoption of SSM

Adopting an SSM approach involves recognition that the process of analysis (human interaction) is as important as precision in the data and outcomes. Following and experiencing an SSM approach will itself affect change. When participants change, the organisation may change. This arises because of the very process of exploring views about the problem and of considering possible solutions.
In this study, a complex problem situation is being dealt with, from which different issues evolve such as those that have organisational, cultural and technical dimensions. Furthermore, it is clear from the literature that this approach has been found useful in the study and examination of complex problems in large organisations (Hernando, 1997; Al Hassan, & Meadows, 1994; Le Fevre & Pattison, 1986).

Several studies have indicated that this approach has been found to be both flexible and customisable, as well as being able to accommodate a wide range of study topics. In the past, it has been shown to be effective in the study and examination of complex problems in large organisations, such as the NHS (Iles & Sutherland, 2001; Lehaney & Paul, 1996; Macias-Chapula, 1995; Mathiassen & Nielsen, 1995; Brebber & Leggate, 1985).

The most important reasons for using the approach in this study were as follows:

- SSM is the most appropriate methodology for studying and tackling complex problems that involve human activity systems. For example, in this study, the impact of ICT on HHSL and the co-operation among different departments and units is examined. These issues involve the relationships between stakeholders (librarians, users, computer staff and others), hardware, and information systems.
- ‘Soft’ systems enable the research to take an holistic view of co-operation for the benefit of all stakeholders. This is helpful in exploring a wide range of issues.
- In this study, there are different actors with different interests. SSM is designed to incorporate different perceptions and expectations, and to deal with many problem-owners. It can be employed by an individual or in problem situations involving a number of owners/clients.

Advantages of SSM

The SSM has a number of advantages as indicated in previous studies, including: (Pešl & Hrebiček, 2003; Jackson, 2001, Shaheta & Bowen, 2001; Al-Humaidan & Rossiter, 2001; Kaijun 2000; Checkland & Scholes, 1999; Oh, 1997; Lehaney & Paul, 1996; Brebmer, 1995; Al-Hassan 1992; and Checkland, 1981). From these studies, the following advantages emerge.
SSM allows the quality of information and co-operation to be examined.

The problems which SSM can examine are not structured but are "fuzzy" in nature; they are also subject to change because they involve human activity systems.

SSM is more useful in improving unstructured and poorly delineated systems where goals are not properly defined/debatable.

The methodology can be tailored to fit a particular situation. Customer values are not overshadowed by greater emphasis on technical, financial and other values.

It aims at finding the best possible change to benefit to all those who are involved.

SSM ignores issues of power. It is based on the idea that managers and workers can openly discuss their problems and needs.

Several studies have indicated that this approach has been found to be flexible and customisable, able to accommodate a wide range of study topics.

It is clear from the literature that this approach has been found useful in the past in the study and examination of complex problems in large organisations such as Health systems.

SSM is particularly useful in analysing what people and roles are involved in the system and how they perceive and understand the world around them.

Soft Systems Methodology is a learning tool that is related to the nature of human activity systems. The root definition is an effective way of describing the actual human activity system.

Stakeholders are involved in the debate in order to compare the conceptual models and the real world and specify the differences and perception of the problem by selecting the most relevant set of the perceptions.

SSM deals with all the elements of the soft approach and may therefore be used to improve understanding of ill-structured problems. The rich picture model is used to represent the complexity of human affairs and the problem situation.

Disadvantages of SSM

Certain disadvantages of SSM are also covered in the literature by researchers such as (Al-Humaidan & Rossiter, 2001; Shehata & Bowen 2001; Checkland & Scholes 1999 p. 31-34; Jarvis 1997; Davies & Ledington 1991, p.68-71). From these studies, the disadvantages outlined below have emerged.
• It is an open-ended methodology. Any changes that are suggested could possibly lead to a new problem situation that would need to be tackled. Iterations may be never-ending.
• Problems are not structured but are “fuzzy” and subject to change because people are involved. Improvements to the problem situation emerge from discussion and bargaining processes.
• It produces models of system activity that are largely informal and therefore may be subject to misunderstanding.
• SSM does not support the other elements of the hard approach such as data, events and designing interfaces.
• SSM does not actually instruct the participants how to build the system that is required. Requirements emerge from the discussion and the bargaining process.

It is essential to note that in SSM terminology, there are as many possible interpretations of perceived reality as there are perceivers, while methods of interpretation may be more or less systemic or holistic or conforming to phenomenological logic, and to selected views of perceived reality.

Checkland notes that: "SSM is a systemic process of enquiry which also happens to make use of systems models. Thus, it subsumes the hard approach, which is a special case of it, one arising when there is local agreement on some system to be engineered" (Checkland & Scholes 1990, p.25).

5.2.2 SSM in Action

Checkland and Scholes (1999, p. 89-114) suggested a system to define and organise the delivery of health care programme to people in East Berkshire as the Department of Planning and Information recognised its active role in the Health Authority. It also suggested that the development of such a model would feed the concept of ‘a system to evaluate’ a health care programme. Much attention within the NHS has been directed to the idea of defining performance indicators against which health care provision might be judged. Many people feel particularly satisfied if they can find an indicator which can be expressed quantitatively.
Within this health system, the term ‘whole systems thinking’ was routinely used by managers and clinicians. This widespread usage reflects:

- Increasing awareness of the multifaceted issues that are involved in health care, which mean that complex health and social problems lie beyond the ability of any one practitioner, team or agency to ‘fix’;
- Greater interest in designing, planning and managing organisations as living, interdependent systems committed to providing ‘seamless care’ for patients;
- Recognition of the need to develop shared values, purposes and practices within the organisation and between organisations;
- Use of large group interventions to bring together the perspectives of a wide range of stakeholders across a wider system. (Iles & Sutherland 2001, p. 89)

In terms of system thinking in the field of the NHS, Dawson (1999) suggested that the NHS is characterised by three defining features:

- Range and diversity of stakeholders
- Complex ownership and resourcing arrangements
- Professional autonomy of many of its staff.

The NHS is a large organisation employing people with a wide range of talents, perspectives and passions. It is a complex organisation, with many different cultures and norms, arising from a number of factors including:

- Different socialisation processes of the professions
- Different needs and expectations of different client groups
- The differing histories of different institutions
- Local priorities, resource allocations and performance management.

The complexity is a result of the very specialisation that has produced so many advances in health care. This specialisation also leads to a high degree of interdependence between practitioners, and between practitioners and processes. This interdependence, together with continuing technical and organisational advances, means that services and organisations within the NHS are dynamic as well as complex.
5.3 An Overview of ISM

One of the most distinctive features of ISM is the fact that the method is a generic one that can be applied to various disciplines. It can tackle, explore and invoke general issues and problems. It is a general systems methodology in that its application is not confined to any discipline but rather can be used to explore general issues and problems (Warfield 1987, p. 2575). An example of the generic application of ISM was carried out in India by Mandal & Desmukh (1994), where the ISM method was usefully applied in vendor selection. The outcome of the study showed a model that demonstrated the interrelationships between the identified vendor selection criteria and their levels of resolution.

An application by Janes (1988) deals with an intent structure for postgraduates on a Systems and Management course. This study discusses the nature of ISM as a methodology for dealing with complex issues and also examines the languages for modelling structures. The research is described in the context of working with a group of participants who have access to purposely written ISM software. Finally, the steps of ISM are described in the study as a process taking place within a learning context. However, the methodology is applicable to many situations in which a participant group wishes to gain a better understanding of a complex issue.

Figure 5-4 below indicates the three components of managing a complex issue. Essentially, each member of the participant group has his/her own perceptions regarding the issue to be investigated. A facilitator has competence in the use of the tools available for consensus decision-making via interactive management. The tools comprise: idea-writing, nominal group technique (NGT) and interpretive structural modeling (ISM) (Janes 1988). A tool (or tools) is selected to investigate the issue at hand. In this study both the NGT and ISM tools were used.
The NGT process

The NGT process comprises seven steps and starts with a trigger question and ends with a ranked set of objectives. The traditional process provides a method for clarifying objectives by serial discussion of each response to the trigger question. In this study the serial discussion of objectives was replaced by the five respondents replying in isolation, yet the number of separate objectives achieved was similar to the traditional approach. In fact, 20 objectives (see Appendix I) were elicited which is approximately the square of the number of participants – which according to Janes (1988) is the expected number of objectives when the number of participants is small ($n \leq 7$). In this study, the NGT process end-point was the list of objectives generated. This list formed the input set to the ISM.
The ISM process
One of the main difficulties for those who are seeking to solve a problem is how the available process is documented. Documentation is the key factor in understanding the process and its application. One of the most important features of ISM is the fact that the enquiry process is well documented, as stated by Warfield (1980) and Bocheski (1961; cited in Warfield 1987). ISM is one of the few methods that uses behavioural science in its design, given the method relies on understanding group dynamics and being able to draw upon the emergent property of 'groupthink', perhaps this is not so unusual.

5.3.1 Reasons for the adoption of ISM
The ISM is used to organise and/or prioritise elements of an action plan. It is a group-based, consensus decision-making method that offers the ability to manage complex issues. In this study it is used to structure an action plan of elements that stem from the application of SSM to the problem scenario. The action plan, once formed, provides a way to present findings to the problem owner(s) (in this case the HHSL committee) who have the authority to abolish the system in question.

Advantages of ISM
Warfield (1982, p. 155) asserted that group members gain benefit in the form of the learning that takes place as a consequence of the use of the developed applications. For instance, the participants are able to explain and carry out various actions or take various decisions as a consequence of having taken part in the process of application development.

Furthermore, Warfield (1987, p. 2578) suggested that empirical evidence proves that the productivity of groups dealing with complex issues by applying consensus methodologies can be increased very significantly. This can be achieved further with the guidance of an effective facilitator. In addition, by using consensus methodologies, ISM can be used as an effective strategic planning tool for an organisation, through which all common requirements of an organisation can be achieved. Other than this, ISM is also considered to be an effective tool for research planning. In an educational context, for example, ISM can be used to develop education policy, the curriculum, and to provide a tool for learning
processes in the classroom; such an approach has been adopted effectively in Japan (Warfield 1987, p. 2579).

Thus, ISM is method that can be used for taking decisions within groups and to manage subjects that involve a variety of related factors. Rapid changes defy established certainties and require strategies to be constantly adapted to cope with new conditions since old processes eventually reach their limits. Therefore, it is necessary to develop and learn how to use new approaches.

The benefits that may be accrued from the use of ISM include the following: focused debate; the clarification of thinking among group members; group learning experience; and team building. In addition, there is an emphasis on clarifying terms and clearly specifying relations so that the user-created visual models are easily understood. Furthermore, Janes (1988) suggests that ISM is applicable in many varied situations. It is a particularly meaningful method to use when a participant group wishes to gain a better understanding of a complex issue.

The essential factors in determining the success of the ISM process rely mainly on the skills of the facilitator of the process and the knowledge and attitudes of the participants (Warfield 1982, p. 193). If, however, the process is deemed a failure, Warfield suggests that the primary reason for this often lies in the insensitivity of the person who was attempting to facilitate the process. The true fact is, though, that besides engaging skilful facilitators, the commitment and co-operation of top management is crucial to the success of the outcome of the modelling process.

Disadvantages of ISM

The consensus method will be more effective if all participants can get together in generating ideas. However, more often than not, it is very difficult to achieve active participation, particularly among senior personnel at the helm of policy making (Sharma, Gupta & Sushil 1995). Without the commitment of such figures to the outcomes of the process, progress and development of any project will certainly be affected.

Warfield (1982, p. 193) suggests that most of the limitations of the ISM does not lie in the ISM process itself, rather such limitations are imposed by the nature of the human beings and by the way in which information flows within the process. He adds that the most
effective way of dealing with such limitations is to build into any modelling process a means of compensating for their impact.

5.3.2 ISM in Action

ISM can be applied in four kinds of application. These are: improving quality; strategic planning; research planning; and educational. This section presents and discusses the four applications above within HMC and HHSL.

Improving quality
HMC is a key institute in the State of Qatar in providing patient care and, as such, is a health service symbol of the State. The HHSL has a strategic role to play in increasing the quality of performance and productivity at HMC, in terms of supplying information services and information management. The Qatari authorities and the government are investing in this institute to ensure the provision of high quality services to better serve patients.

Strategic planning
ISM, as a model, simplifies the complexity of the organisation. It provides a better understanding of how various groups within the organisation are related. One of the main problems in strategic planning is to understand the current situation within the organisation. This understanding is the background for planning and without such information, understanding the strategic planning will be impossible and the approach will lack a solid base for withstanding argument. Therefore, ISM can be used as a tool for a strategic planning.

Research planning
Any research aims to solve and/or understand certain phenomena. This reasserts the need for a good background to start with, such as a literature survey and theoretical framework. Researching has become part of most modern organisations. It is a tool to improve research performance and increase productivity. Most large organisations used to use consultant companies to carry out their research but the main problem in using
external consultants is that their position is far from the real world of the organisation and thus it may take time to understand the organisation's behaviour and interrelationships. ISM is an appropriate tool to use as a research tool within an organisation to provide understanding of the elements of the organisation and to provide solutions.

Educational

It is beneficial for individuals within an organisation to understand their role. Understanding individual and group roles, together with their impact on performance and productivity, will help the organisation to raise morale and motivation; these can lead to an increase in the organisation's productivity. ISM can be used by all members of staff as an education tool to understand the organisation and how it is inter-related.

5.4 Summary

This Chapter has provided a more in-depth study of issues related to the use of research methods in this study. The 'soft' nature of the problem surrounding the adoption of ICT in HHSL is encapsulated in its definition as a 'problem situation'. Checkland's SSM (Model) is adopted in Chapter 7 to improve the identified problem situation derived from findings discussed in the next Chapter. The actions to effect change are organised via an ISM to form a coherent action plan.

This study provides a first opportunity to use a multimethodological approach, combining SSM with ISM, in the GCC. Lessons learnt from their application may provide an insight to a systems perspective in other applications.

As in most research studies, the first stage is to collect data from which conclusions can be drawn. This is the purpose of the next Chapter, in which questionnaire surveys, semi-structured interviews and document analysis will be used to generate the data set from which problem issues can be drawn. This data set provides the information on which the 'problem situation unstructured' is based.
Chapter 6
Data Findings

6.1 Introduction

The purpose of this Chapter is to present findings from the questionnaire survey and semi-structured interviews undertaken during the period November 2000 to January 2001. The data form the evidence base for the ‘problem situation unstructured’ in the SSM study that follows in the next Chapter. Further details of how the problem situation is developed will be shown in Chapter 7. This Chapter also presents an analysis of the qualitative data from interviews conducted in HHSL, HIS and HMC in Qatar. The main aim of the interviews was to supplement the findings of the questionnaire survey to establish a more rich description of the problem situation.

Issues that affected the data collection are indicated below:

- The questionnaires were distributed at a time that coincided with the month of Ramadan. According to State policy, employees are allowed to leave their offices earlier than normal during this time. This provided some time constraints during the data collection period.
- Medical professionals spend limited amounts of time in the Library due to the nature of their work, yet they also formed the majority of the respondents. On many occasions, medical staff took the questionnaire away with them in order to respond in their own time. On such occasions, follow-up occurred in their offices. A further problem was that the respondents who were medical consultants insisted that the researcher made an appointment to see them: this was sometimes difficult to achieve.
- In certain cases, convincing the user to complete the questionnaire was a problem because of the short time he/she planned to spend in the library.

Figure 6-1 on page 108 illustrates the method used in this Chapter to analyse the questionnaires and the interviews. The numbers in the parentheses indicate a mapping to the relevant questions in the questionnaire survey (see Appendix B)
Chapter 6 Data Findings

Questionnaire Analysis (200)
- Descriptive Statistics
- Frequency, Histograms (Q1., 17., 18., 24., 25)
- Cross tabulations (Q 17., 18b., 33., 38., 39)
- Hypothesis testing (Q3., 4., 17., 18., 22., 23., 24., 37)

Interview Analysis (13)
- Test Classification
- Attitudes
- Perception of current situation
- Problems and barriers
- Future plans

Stage 1
SSM
Problem Situation Unstructured

Figure 6-1 Analysis Plan
6.2 Questionnaire Response Rate

A structured questionnaire was designed and distributed to 250 subjects via the methods described in Chapter 3. The 200 returns are a response rate of 80%. This high response rate was achieved, in part, by strategic positioning of the desk associated with questionnaire distribution at the entrance of the HHSL. Other ways in which the response rate was enhanced include:

- Sending an official letter from a high level authority to the medical staff emphasizing the importance of this research. This helped to increase the response rate.
- Personal contact helped to convince the users to complete the questionnaires.
- Personal contact with the library staff helped to facilitate the questionnaire's distribution and collection. Some of the completed questionnaires were sent to the UK after the collection period. These responses were included in the analysis.

6.3 Questionnaire Data Analysis

The responses were transferred to a pre-prepared data sheet for coding into the SPSS statistical software package. The data were described by calculating frequencies and preparing cross-tabulations of chosen variables, and visualising the results by producing frequency histograms and Tables of cross-tabulated data. A chi-square test ($\chi^2$) was used to test the significance of the statistical independence of the cross-tabulations.

The analysis of the returned questionnaire showed that the majority of respondents were clinicians ($n=142; 71\%)$. This is shown graphically in a histogram in Figure 6-2. This same Figure shows that the second highest group of respondents were technicians ($n=34; 17\%)$. Thus, clinical and para-clinical staff accounted for 88% ($n=176$) of the respondents. The remaining 12% ($n=24$) of respondents came from backgrounds such as engineering, administration, government employees and clinical teaching staff.
The results of this analysis indicate that there is a clinical bias in the results obtained and on which the soft systems model is developed.

6.3.1 Identifying existing computer skills of respondents

As this study was investigating elements of ICT usage, it was apposite to identify the existing ICT skills base. To identify the existing computer skills of respondents, a number of questions were asked; these varied in the level of detail of response. Respondents were first asked to gauge the level of their own computer-based skills on a five-part scale from 'none' to 'professional'. Outline examples of what was meant by each response were offered to help guide respondents to reply with some level of precision. Figure 6-3 shows the histogram which demonstrates a near normal distribution of responses, with 62.5% of respondents at the 'average' level of computer-based skills. These findings are important for the underlying thesis and form an important contribution to Stage 1 of the SSM. It is important to point out that candidates were assessing their own abilities.
To gauge computer skills at a higher level of resolution, respondents were asked to provide information on their use of ICT. For a meaningful response in the context of the aims and objectives of this research study, five examples of interactions with ICT were chosen (use of MEDLINE, e-mails, the Internet, word-processing, and use of patient records) and respondents were asked to choose from a scale of frequency of use, from 'never used' to 'daily use'. The findings shown in Figure 6-4 indicate that most respondents use electronic communication (e-mail and the Internet) frequently, with 61% (n=120) using e-mail weekly or more often and 61% (n=116) using the Internet weekly or more often. It is interesting to compare these Figures with the frequency of respondents using word-processing: 39% (n=73) use word-processing weekly or more often. This seems to suggest that the use of electronic communication is for searching and retrieving information rather than for creating documents. This result may be expected, since the majority of computing activity within HMC takes place in the library (that is, only senior clinicians can draw upon the individual resources of a computer in their office). Given the para-clinical bias in the respondents to the questionnaire, it is interesting that 96 respondents (56%) had never used an electronic patient record. This information will find its way into the model developed via the use of SSM as it reveals infrastructure needs.
A check was employed in the questionnaire design to investigate further the uses of electronic communication. When asked about their use of the Internet, respondents could reply in one of four ways, as indicated in Figure 6-5. 'Other' refers to some respondents selecting this option for specific web-based activity, such as interacting with subject specific databases. The responses to this question support the technical aspects of Stage 1 of SSM.
Figures 6-6 and 6-7 show similar results for computer skills categorised by Internet use. The first of these two Figures categorise use of the internet. Figure 6-7 present findings that are categorised by e-mail use. These are 'designed in' consistency checks within the questionnaire. As expected, the more proficient computer users made most use of the e-mail and Internet facilities. Both Figures also demonstrate the effect of the 30-minute rule for computer access in HHSIL which will be part of the unstructured problem situation, discussed further in Chapter 7.

![Figure 6-6 Level of computer skills and Internet use](image1)

![Figure 6-7 Level of computer skill and frequency of use of e-mail](image2)
6.3.2 Identification of the current ICT needs

Current ICT needs are gauged by asking respondents about the current infrastructure (for example, the number of computing points, access to electronic communication etc.) and the current ICT services provided by the library, as well as the effect that ICT has on the quality of respondents’ work.

To investigate the need for electronic communication, respondents were asked about their thoughts on the number of computers in the library, their ability to access the Web, and the time allowed on-line. Tables 6.1 to Table 6.3 show the responses to these questions cross-tabulated with the respondents’ reported level of computer skills.

<table>
<thead>
<tr>
<th>Level of Computer Skills</th>
<th>Computer access in the library</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not Sufficient</td>
<td>Sufficient</td>
</tr>
<tr>
<td>Poor</td>
<td>26</td>
<td>9</td>
</tr>
<tr>
<td>Average</td>
<td>119</td>
<td>5</td>
</tr>
<tr>
<td>Advanced</td>
<td>35</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>180</td>
<td>19</td>
</tr>
</tbody>
</table>

Table 6-1 Computer skill v. Computer access

A $\chi^2$ test was performed to test the significance of the relationship between the data in Table 6.1, where $H_0$ states that there is no difference in respondents’ level of computer skills and their opinion on computer access in the library; and where $H_1$ states that there is a difference in the level of computer skills and computer access in the library. The precision of the level of computer skills was decreased to accommodate the needs of the necessary conditions to apply the $\chi^2$ test (i.e., that no individual data cell has less than 5 respondents). The original Table can be seen in Appendix. J. The $\chi^2$ statistic (15.364) exceeds the values in the table of critical values of the $\chi^2$ at 2d.f. Thus, $H_1$ is accepted at the level of confidence greater than 0.01. This demonstrates that as the level of computer skills increases there is a perceived need for more computer access in the library.

A $\chi^2$ test was performed to test the significance between the ability to access the Web and level of computer skills. $H_0$ states that there is no difference in the level of computer skills and ability to access the Web in the library; and $H_1$ states that there is a difference in the
level of computer skills and ability to access the Web. The precision of the level of computer skills was reduced to accommodate the needs of the $\chi^2$ test. The full Table can be seen in Appendix J. The $\chi^2$ statistic (28.703) exceeds the values in the table of critical values of the $\chi^2$ at 2df; therefore $H_1$ is accepted. Thus, as the level of computer skills increases, so does the ability to access the Web.

Table 6.2 also shows that 71.5% (n=143) of the respondents had the ability to access the Web and 79.5% (n=159) of respondents held the view that the present situation, where each person has access to the Internet for a maximum of 30 minutes at a time, was not helpful.

<table>
<thead>
<tr>
<th>Level of Computer Skills</th>
<th>Able to access Web</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Poor</td>
<td>11</td>
</tr>
<tr>
<td>Average</td>
<td>98</td>
</tr>
<tr>
<td>Advanced</td>
<td>34</td>
</tr>
<tr>
<td>Total</td>
<td>143</td>
</tr>
</tbody>
</table>

Table 6-2 Computer skills v. Able to access Web

Table 6.3 shows data to test the relationship between the level of computer skills and whether or not time on-line is sufficient for purpose.

<table>
<thead>
<tr>
<th>Level of Computer Skills</th>
<th>Time on-line</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sufficient</td>
</tr>
<tr>
<td>Poor</td>
<td>7</td>
</tr>
<tr>
<td>Average</td>
<td>21</td>
</tr>
<tr>
<td>Advanced</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
</tr>
</tbody>
</table>

Table 6-3 Computer skill v. Time on-line
A $\chi^2$ test was performed to test the significance of these data where $H_0$ states that there is no difference in the level of computer skills and perception of time on-line in the library; and $H_1$ states that there is a difference in the level of computer skills and the time on-line. Currently, the library has a rule that the period of time that any one user can spend on the Internet is a maximum of 30 minutes. Again, the precision of the level of computer skills is reduced to accommodate the needs of the $\chi^2$ test. The full Table can be seen in Appendix J. The $\chi^2$ statistic (3.294) exceeds the level of significance at 2 d.f, for acceptance at the level of confidence 0.01; hence $H_0$ is accepted. Thus, whatever the level of computer skill, respondents thought that 30 minutes was too short a time for using the Internet.

To probe deeper, respondents were asked about their general satisfaction with the ICT services provided by the library. Results are shown in Table 6.4, where level of ‘satisfaction’ is cross-tabulated with ‘level of computer skill’.

<table>
<thead>
<tr>
<th>Level of Computer Skills</th>
<th>Satisfied with ICT services</th>
<th>Satisfied</th>
<th>Not satisfied</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor</td>
<td></td>
<td>16</td>
<td>18</td>
<td>34</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td>78</td>
<td>46</td>
<td>124</td>
</tr>
<tr>
<td>Advanced</td>
<td></td>
<td>30</td>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>124</td>
<td>74</td>
<td>198</td>
</tr>
</tbody>
</table>

Table 6-4 Computer skill and respondents’ satisfaction

A $\chi^2$ test was performed to test the significance of these data where $H_0$ states that there is no difference in the level of computer skills and satisfaction with ICT services in the library; and $H_1$ states that there is a difference in the level of computer skills and satisfaction with ICT services. The precision of the level of computer skills was decreased to accommodate the needs of the necessary conditions to apply the $\chi^2$ test (i.e., that no individual data cell is less than 5). The original Table can be seen in Appendix J. The $\chi^2$ statistic (6.141) shows a statistical level of significance of 0.046, hence $H_0$ is accepted at
the level of confidence 0.01. Thus, there is no difference between level of computer skills and satisfaction with ICT services.

When gender is cross-tabulated with level of computer skills, (results are shown in Table 6.5) an alternate hypothesis is accepted at the level of confidence of 0.01, \( \chi^2 = 15.18; \) df=2. Thus results show that the level of computer skills of male respondents is higher than of their female counterparts.

<table>
<thead>
<tr>
<th>Level of Computer Skills</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>None/Poor</td>
<td>8</td>
<td>26</td>
<td>34</td>
</tr>
<tr>
<td>Average</td>
<td>65</td>
<td>57</td>
<td>122</td>
</tr>
<tr>
<td>Advanced</td>
<td>20</td>
<td>8</td>
<td>28</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>93</td>
<td>91</td>
<td>184</td>
</tr>
</tbody>
</table>

Table 6-5 Computer skill v. Gender

To gauge the effect of the use of the ICT services that are provided, respondents were asked whether or not ICT aided accuracy and quality of work. These results are cross-tabulated in Table 6.6.

<table>
<thead>
<tr>
<th>Accuracy of the work</th>
<th>Quality of work improved with use of ICT</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>More Accurate</td>
<td>Yes</td>
<td>169</td>
<td>18</td>
<td>187</td>
</tr>
<tr>
<td>Less Accurate</td>
<td>Yes</td>
<td>6</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>175</td>
<td>18</td>
<td>193</td>
</tr>
</tbody>
</table>

Table 6-6 Respondents' views regarding ICT

As can be seen, there is a clear relationship between increasing accuracy of work and its ICT-enhanced quality.
6.3.3 Identification of the skills gap

Having obtained the current 'picture' of ICT skills' levels and satisfaction among respondents, attempting to identify a potential skills gap seems prudent. Table 6.7 below shows those respondents who replied that they had access to the Web and their own training needs. Of the 104 respondents who indicated a training need to access the Internet, 57% already possessed some ability.

<table>
<thead>
<tr>
<th>Access to web</th>
<th>Training needed to access web</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Yes</td>
<td>59</td>
</tr>
<tr>
<td>No</td>
<td>45</td>
</tr>
<tr>
<td>Total</td>
<td>104</td>
</tr>
</tbody>
</table>

Table 6-7 Skills gap analysis

Of the 92 respondents who replied that no further training was necessary, 10% did not have the ability to access the Web, showing some indifference to ICT services; this Figure represents 10% of the whole respondent population. This Table indicates a measure of computer literacy in HHSL.

A $\chi^2$ test was performed. The $\chi^2$ statistic (27.85; df=2; Yates' correction employed) indicates that $H_1$ is accepted at a level of confidence of 0.01. Thus a training need for Web access is established at HHSL.

To provide an indication of the effectiveness of training methods, the responses to quality of work was cross-tabulated with responsibility for teaching the training programmes (see Table 6.8). Of the 64.5% (n=129) of respondents who were self taught, 115 (89%) perceived an increase in the quality of their work.
The corresponding Figures for training by library staff are 29% (n=57) and self-taught 52 (91%). These results indicate that there is no difference between training styles. This result can be tested analytically by using a $\chi^2$ test to check for the level of significance. The null hypothesis ($H_0$) states that there is no difference in the quality of work improvement between training programmes carried out by library staff and self-teaching. The alternative hypothesis ($H_1$) states that there is a difference between quality improvement and training methods. The $\chi^2$ test with Yates’ correction method was used to reveal $\chi^2 = 0.632$; d.f.=1; not significant; thus the null hypothesis is accepted, that there is no difference regarding outcomes between being taught by library staff and being self taught. [Yates’ correction method is designed for use in 2x2 data tables such as seen in Table 6.8. Without its application. Yates suggests that there is a bias in the results obtained (Yates, 1934, cited in Siegel, 1956) in that the $\chi^2$ distribution overestimates the true value when all expected frequencies are small. The Yates’ correction method comprises subtracting 0.5 from the product of observed frequency minus the expected frequency before squaring the difference in the normal way].

When access to training was cross-tabulated with highest qualification achieved, results shown in Table 6.9 the null hypothesis (that there is no difference in qualifications and access to training) is accepted at the level of confidence of 0.01, ($\chi^2 =5.96$; df=1; use of Yates correction method).
## Chapter 6

### Data Findings

<table>
<thead>
<tr>
<th>Highest Qualification Achieved</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diploma/bachelor</td>
<td>61</td>
<td>39</td>
<td>100</td>
</tr>
<tr>
<td>Master / ph. D</td>
<td>28</td>
<td>39</td>
<td>67</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>89</td>
<td>78</td>
<td>167</td>
</tr>
</tbody>
</table>

Table 6-9 Qualification and Training

Quality of work improvement with the use of ICT was cross-tabulated with highest qualification achieved. The data are shown in Table 6.10. \( H_0 \) is accepted, \( \chi^2 = 4.38; df=1; \) (Yates' correction employed) at a level of confidence of 0.01.

<table>
<thead>
<tr>
<th>Highest Qualification Achieved</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diploma/bachelor</td>
<td>87</td>
<td>14</td>
<td>101</td>
</tr>
<tr>
<td>Master / ph. D</td>
<td>64</td>
<td>3</td>
<td>67</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>151</td>
<td>17</td>
<td>168</td>
</tr>
</tbody>
</table>

Table 6-10 Qualification and Quality of Work improved

### 6.4 Interview Analysis

The interviewees were first made aware of the importance of the interviews as part of this research as it was felt to be important that respondents appreciated the nature of the project. It was made plain that the work could improve ICT facilities for both themselves and the work of their staff. The interviews were also conducted in a friendly yet frank atmosphere and in a place specifically chosen to be without interruption from anyone such as a secretary; this enabled the interviews to be conducted without interference. The interviewees were found to be willing for questions to be probing; their corresponding responses also had a rich content. There were, however, certain obstacles regarding the interviews and these can be summarized in the following points. It was difficult to...
organise a convenient time and place for the interviewees as the respondents daily schedules were very busy and most of the meeting rooms were booked. Also, the vast majority of the interviewees were high-ranking officials who had many commitments and so the interview was not a priority within their time schedule. As a result, it was difficult for some of the interviewees to prioritise the interview. Also, although the interviews were recorded, two interviewees refused permission for their interviews to be recorded. An initial contact with the interviewees was made with the help and support of their administration. At this initial contact the researcher introduced herself and briefed the interviewees on the aims and objectives of the research programme. A total of 13 interviews were carried out with two groups of people, (internal and external). Internally, the director of the HHSL, HIS, and 10 Heads of Medical Departments in HMC were interviewed and an external interview was undertaken with the EMRO director of WHO. Table 6.11 shows both the internal and external responses.

Two semi-structured interview protocols were designed to meet the aims and objectives of the research study (see Appendix E and F) The first was prepared for the Library Director and the second was designed for the Heads of Medical Departments in the HMC organisation. Although the questions were similar, the context within which the questions were asked was different. In order to structure the interview responses to reflect the research aims and objectives, four main categories were used to examine both the current situation and problems generated.

<table>
<thead>
<tr>
<th>Type of Interview</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal:</td>
<td></td>
</tr>
<tr>
<td>HHSL Director</td>
<td>1</td>
</tr>
<tr>
<td>HIS Director</td>
<td>1</td>
</tr>
<tr>
<td>Heads of Medical Departments</td>
<td>10</td>
</tr>
<tr>
<td>External:</td>
<td></td>
</tr>
<tr>
<td>EMRO (WHO) Director</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
</tr>
</tbody>
</table>

Table 6-11 Total Interview Responses
Chapter 6

Data Findings

The information obtained via the interviews was a rich source of data used to formulate the systems models, as will be shown in Chapter 7.

6.4.1 Attitude toward ICTs

Qatar has seen rapid growth in electronic communication usage. E-mailing, satellite communications and automated offices and industry are no longer unusual in the State. This growth has created both opportunities and challenges for Qatari citizens. The healthcare sector in the State has responded to this change. Because of the dramatic changes in the use of ICT in most parts of the healthcare sector, the use of ICT has become part of the daily routine.

However, many users come to HHSL with little of experience of ICT use. Although there are many CD-ROM and Internet services in the HHSL, many visitors do not know how to use these systems. As one respondent remarked, “If the user is not ICT literate, he/she cannot get the information he/she wants anyway”.

The impact of ICT was positively felt on all aspects of library use, and several respondents mentioned that the attitude of the authority is not as strong as was expected. One of the interviewees stated:

The attitude of those in authority must be improved before talking about ICT changes.

A second interviewee said:

The attitude of the authorities is still far from convincing in recognising the importance of ICT.

He also mentioned:

The experiences of those in authority have played a major role in their attitude towards ICT.

Clearly, an opinion has been expressed that there is an issue with the vision that those in authority have regarding the development of ICT. The perception is that those in authority (i.e., the effective decision-makers) do not have the relevant skills, competencies or experience to champion ICT development. This view was compounded by the knowledge that some of these people also control the financial planning process. These
issues increase the extent of the managerial complexity for which a way forward must be found. A solution would enable HHSL to be fully functional and take its place as a leader within the GCC community of medical libraries.

Awareness of ICT among the staff is an important element in optimizing the use of resources and in taking advantage of the new era of ICT. This issue was raised during the interviews. As one of the Directors stated:

\[
\text{Also, a lack of awareness on the part of staff about the latest computer and ICT technologies makes the task difficult.}
\]

\[
\text{We still have staff who are illiterate with respect to ICT.}
\]

Offering better services was a theme that was echoed by many interviewees, including all the officials who participated in the study. One of the Directors, whose department had a low level of automation, expressed feelings of disappointment regarding the lack of ICT. The Director, quoted below, felt that this obstacle derived from a weakness in the whole health community.

\[
\text{We need more PC and network connections with GCC medical libraries in the region.}
\]

\[
\text{It is hard to believe there are not enough PCs to support the needs of staff.}
\]

\[
\text{I still cannot believe that a medical doctor has to wait in a queue to get a PC to access information he needs in the library.}
\]

The lack of PCs to support the users’ needs and the need for connection with other GCC medical libraries were common themes throughout the interviews. These two issues need to be identified and will be addressed further by this research study.

A respondent from a different department in HMC claimed that HHSL did not provide information on search strategies, downloading material from CD-ROM, or surfing the Internet for users.
Attitudes towards automation is an important element. Office automation in the healthcare services is an essential target and so it would be a productive sign to see office automation introduced into institutes involved in the State’s planning. This would help in the control and monitoring of health service activities, patient recording and documentation. This might also save time and effort, as well as facilitating improvements in patient care. The interviewees indicated that the whole of HMC is moving towards office automation to reduce paperwork to the minimum. They hope that this will be achieved within the next five years and further hope that the change will include the establishment of a centralized database for the provision of information to the whole HMC community. One respondent noted:

We are seeing less paper and more electronic resources…

This awareness of the importance of office automation in health care and the positive attitude towards automation is a good sign that both the heads of medical departments and the directors share the same opinion; this will undoubtedly help in the monitoring and control of health service facilities.

**ICT issues**

The library plays an active role in the development and provision of educational and training programmes. These provide clients with the necessary skills to effectively access, manage and evaluate the knowledge-based information they require.

Librarians are the bridges to help library users to reach the information they require. The librarian needs to be well trained to ensure the delivery of a high standard of service to the users but often this is not the case. Two directors expressed concern that librarians’ training is not sufficient to perform the duties necessary to meet the needs of users and that they did not utilize ICT. A well-trained librarian will raise the awareness of users. As one of the directors stated, a good librarian should:

...keep the users aware of new technologies and how to make use of them; upgrade databases and files according to updates in software.

He added:

...from our experience, the librarians are struggling to provide help to the users due to the lack of experience on the system they have.
Therefore, librarian training is an important issue that needs to be identified and this will be addressed in this research study. Without well-trained librarians, the library will fail to meet the users’ needs. One of the external director interviewees repeated this word three times: “training, training, and training.”

**Lack of ICT policy**

ICT policy has become an important part of the ICT community and helps in the planning, control and monitoring of ICT. However, policy needs support in order to be implemented since policy without implementation could be described as a ‘beautiful but empty vessel’. In short, policy that is not implemented has no practical consequence. ICT policy in Qatar is lacking in detail and is both very limited and brief; it also lacks financial support.

ICT policy needs the support of the Qatari authorities if any advance is to be made. It is also important that both staff and users are familiar with such policies as it is evident that there are still people who are unaware of the existence of any policies at all, let alone being concerned about their implementation: One of the interviewees stated:

> I have not seen an ICT policy. I don’t believe there is one anyway.

One of the directors interviewed explained that some of the policies have been established as a reaction to emergent problems for action rather than as well-planned strategies. He stated:

> It seems ICT policy is a reaction to circumstance rather than a well established policy. They wait till a policy issue is raised and then they think to make one.

The lack of manpower in ICT led to one of the interviewed directors stating:

> There are no personnel qualified to write ICT policy.

Several respondents felt that ICT policy, which is an essential tool for introducing and implementing ICT, should be coupled with generous financial support for ICT activities.
Such support would help in implementing ICT strategy, while creating a clear policy would help in developing the ICT strategic plan for the institute’s functions.

One of the directors indicated:

They don’t have a planned policy for the purchase of ICT equipment of all kinds. Therefore, the lack of policy and financial support are problems that need to be identified and addressed by this research. It is clear that a well-planned policy is essential to develop a healthy ICT system in the State.

Manpower is also a key issue in implementing ICT in healthcare. It is well recognized that the country lacks qualified manpower in general and therefore it is not surprising that the interviewees pointed out the lack of professional staff in ICT services in HHSI, and a lack of awareness of and familiarity with an ICT environment.

**User training**

To obtain specific information, users need appropriate skills to access an information system with reasonable time and effort. Since obtaining user satisfaction is a principal aim of medical libraries, for these libraries to work efficiently and effectively they must give priority to user training. User training still needs to be improved and addressed in the field of ICT rather than in the traditional functions of the library.

According to one of the directors:

There is not enough training in search engines through medical websites.

To make the library more efficient, resources must be used more effectively. Although there are a great many medical databases, there is, unfortunately, no user training on these databases. The fact of the matter is that some of the users do not even know that these databases exist. One of the interviewees mentioned during his explanation:

...In one of my tours of the library, I found very important medical databases relevant to my department’s work. The next day, I asked my staff about the database. I discovered that none of my staff were aware
of it. It is the library's job, with our help and support, to make the staff aware of and to train them in the use of such an important database.

According to the interviewees, different types of professionals need to know how to use the system in order to be able to help and support the user. However, while HHSL provides its services to all kinds of health sector user, it does not have time to train all of the users in HMC. The HMC organization has to have a plan to train its own users and to make effective use of the ICT system. One respondent noted:

None of the departments in HMC can buy their equipment separately. We are setting up a new training centre for the Corporation which will be utilized to educated staff according to department needs. Presently computer literacy training is going on for the Corporation staff which may take more than two years to complete. Medicom is another project which is being implemented in the Corporation and is in turn computerizing of all departments. Train the Trainers is being arranged to use the new system introduced in relation to the Medicom Project.

HHSL requests for the acquisition of ICT equipment are investigated and approved by the Material Management Department and the HIS provides all ICT equipment to all departments within the HMC organisation.

Most HHSL staff are not technically qualified to control workstations and lack the skill to compose policy reports regarding the needs of HHSL. This repeats the issue of the lack of qualified manpower and the lack of staff training.

6.4.2 Current situation of ICT in the HHSL

The purpose of HHSL is to provide HMC staff and the health community in Qatar with access to the world of medical and biomedical knowledge, and to provide information, services and ICT to improve patient care, education and research.

Information Services via ICT

ICT has a lot to offer users but the usefulness of this offer depends largely on the library and its staff. The library needs to be in contact with users and their departments to determine their needs and to assess their satisfaction. Users' needs can be fulfilled by
increasing library resources while the library staff's role is to train users how to use ICT resources and make them aware of the availability of such resources. According to the interviews, there is still a lack of communication between the library and its users which has led to a lack of ICT services.

One of the interviewees remarked:

… There is a serious lack of medical databases in the library. There are many newly released medical databases which we mentioned to the librarian that we need but without any outcome.

A PC terminal is the tool employed by library users to search for information. Unfortunately, the number of PCs in the library is insufficient to meet the needs of users; furthermore, some of the PCs that are available need to be upgraded in terms of speed and memory to cope with rapid changes in the handling of information. A respondent remarked:

… the library needs to increase the number of PCs. The waiting time to get a free PC is unacceptable.

As mentioned above, speed and memory are important features of a PC in terms of handling and accessing information. Most of the new software is designed using new PC features of high speed and large memory. The current state of the library PCs is summarised by one of the interviewees as follows:

Some of the library PCs are slow with limited memory; this has led to difficulties in handling and accessing information. The library should upgrade the PCs as needed.

**Network Connection**

Access to information has become an important tool for every professional in any profession and medical professionals and their support staff are in urgent need of this facility. They need easy and fast access to their information source. According to the interviewees, access time is limited and unacceptable. Several interviewees also perceived the system to be complicated and slow.

One of the directors said that:
... time for accessing the network is limited.

Another of the interviewees also stated:

... the current network access time is unacceptable.

A departmental manager, reflecting the views of his staff, said:

My staff can't perform any reasonable search with the current level of
time available for accessing the network.

One of the directors summed up the unsatisfactory state of affairs regarding the current
limited of time available to access the network by stating:

The library must increase the amount of time available to access the
network to satisfy us.

6.4.3 Problems and Barriers

The main problems and obstacles in introducing ICT revolve around the decision makers' attitudes towards ICT because decision-making regarding medical care in the State is centralized. At the top level, decisions are final and are not negotiable. Strategic planning and budget allocation are the prerogatives solely of the decision makers and therefore their awareness of ICT impacts on the library services in the medical profession in general and on patient care in particular. Their attitudes and background in relation to ICT will determine, to a significant extent, final decisions concerning budget allocations, and the introduction of and improvements in current ICT services. A further problem is that the users have no influence on decisions with the result that decisions do not reflect their needs. One of the interviewees stated:

We have no hand in the decision-making process regarding the
introduction of ICT.

Decision makers may not be able to make effective decisions with regard to ICT. This problem will be more complicated if the decision makers have no ICT background and
there are no competent persons available to provide the necessary advice. This problem was explained by one of the interviewees:

Unfortunately most of the decision makers haven't a good enough background in ICT to decide in favour of ICT.

**The ICT Funding**

Because the funding is centralized, no departments can help in providing financial support for ICT, as mentioned by one of the interviewees:

My department has no ICT funding.

The ICT plan is funded through a budget committee of the HMC. There is no ICT policy, as mentioned previously. However, the HHSL can purchase new ICT equipment, subject to a request from the administrative authority of HHSL to the HIS department of HMC and with the approval of the Material Management Department.

Respondents were asked about funding decisions and the procedure for purchasing ICT equipment. In all cases, they said that corporate management decides the funding for each department in HMC through the budget committee for each financial year. A respondent noted:

Financial constraints are the main obstacle in introducing rapid changes and updating ICTs.

The changing nature of HHSL, which is commonly blamed on budgetary constraints, was of great concern to many respondents. ICT was a new budget line that was frequently increasing, and they pointed out that this was very difficult to absorb within any library budget. One of the problems identified was the number and variety of print and electronic tools, many with different user interfaces.

**The ICT infrastructure**

Most of interviewees noted that there are weaknesses in the information infrastructure. Many countries in the Gulf region lack a basic ICT infrastructure. Furthermore, a lack of national information policies, the absence of an information culture, as well as a lack of
qualified personnel, have lead to low levels of adoption of ICT in the healthcare sector. The leaders of health care professions have little ICT background experience and this has contributed to the lack of ICT infrastructure within the State: As stated by one of the Directors:

Most healthcare leaders are more healthcare professionals who have little knowledge of computers.

The infrastructure needs to be modified to cope with new features, mainly in aspects of communication, of ICT. Communication lines and the required spaces for ICT hardware need to be improved. This problem was mentioned by one of the interviewees:

We need to improve the current ICT infrastructure.

### 6.4.4 Future Plans

Success in any profession depends mainly on the suitability of future plans. Any profession that does not plan for the future cannot convince and/or satisfy its clients/customers.

Medical libraries should have a well thought-out future plan for their activities for two reasons: firstly, obtaining relevant and up-to-date information is and will be an important service of the library and therefore, the library must plan carefully to cope with future user demand; secondly, changes and developments in software and hardware requirements as tools to obtain such information must be monitored and investigated.

**Improving access to network connections**

Remarks from the Directors indicated that the lack of workstations and network connections was a major barrier for ICT in the HHSL. In order to encourage a greater use of electronic network sources and a corresponding willingness to access networks, each medical library in the GCC must find means of providing a networked workstation at the desk of each member of the medical staff. The main library in each hospital or medical institution should co-operate with each other in order to find the best model of networked workstations for medical users. An interviewee commented:
The Web section of HIS has developed Web pages for the hospital, which gives information such as medical news, information on the latest medical inventions, HMC tenders, job vacancies etc. We are in the process of introducing a new page called “Ask the Doctor”, which will assist people who send in their medical related queries and specialists within a particular field will answer these questions. Telemedicine is another advanced technology we are planning to introduce in the near future which will enable doctors to monitor patients from abroad and give advice to medical staff here.

**Hardware and Software**

The lack of CD-ROM workstations and OPAC terminals is another problem which was mentioned by one of the interviewees at HMC. The first problem is the lack of skilled librarians to assist the growing numbers of users of CD-ROM workstations. Also, the library is not able to meet the increased demand for OPAC terminals. Lack of space was another factor that affected the expansion of CD-ROM workstations and OPAC terminals.

Two Directors expressed concern that most librarians were lacking in the ability to use ICT effectively. One of them mentioned that librarians need to:

> Keep the users aware of new technologies and of how to make use of them; they also need to upgrade databases and files according to updates in software.

**Unqualified librarians**

The interviewees indicated that there was shortage of qualified librarians and information staff. They stated that a significant number of existing GCC library staff are not qualified librarians, whereas many foreign workers are employed in middle-management positions in Health Libraries as they do possess the qualifications for continued career development. This lack of skills and experience in new technology among GCC Health Library staff was seen as one of the limitations affecting the development of effective information management skills.

**The ICT Training for Librarians**

The lack of skilled library staff at HHSIL was noted by the Director of EMRO (WHO) as the main problem that discouraged the establishment of an ICT programme. The interviewees at HMC and HHSIL also remarked on the lack of attendance on the part of
medical staff at training seminars. Most of the Heads of Medical Departments in HMC were only interested in one-to-one training methods which involved hands-on practice in their own area of interest. One of the Directors pointed out that a one-to-one training approach cannot be offered to medical staff in HMC in the HHSLE effectively because of time constraints and the insufficient number of qualified librarians to undertake the training.

One of Directors remarked that there is no budget for training and that library services should have an allocation of funding for relevant training. This allocation should be made to the library services, taking into account the number of full-time library staff, or the number of full-time equivalents, as well as specific details relating to how the library service is structured.

According to one of the Directors, the HMC training programme caters for HMC staff only, and most of the training is provided locally. He noted:

> We are setting up a new training centre for the Corporation which will be utilized to educated staff according to their department's needs. Presently, computer literacy training is ongoing for Corporation staff which may take more than two years to complete. Medicom is another project which is being implemented in the Corporation as, in turn, is computerization of all departments.

Two of the Directors devised staff development activities around designed changes; others encouraged librarians to learn particular skills in anticipation of the introduction of new ICTs. For the large majority, however, the continuing professional development of staff was mainly reactive. For example, ICT skills were mentioned in most cases as desirable areas for training.

**The ICT professionals**

Four Heads of Medical Departments in HMC remarked that libraries should have additional trained staff to render improved services to users. It is therefore very strongly recommended that every medical library be headed by a professional who should be provided with a certain number of professional staff to ensure the smooth and efficient operation of the library.
Internal and External ICT resources

There are a number of problems associated with the provision of ICT resources for HMC staff in the HHSL. These problems can be categorised as those relating to internal or external ICT resource provision. From an internal perspective, the interviewees stated that HHSL has plans to convert to an electronic library format, as well as subscribing to more CD-ROM databases. However, a limitation that affects progress of this goal is that, at present, there are no reliable computer network connections for accessing the communications infrastructure. From an external point of view, the interviewees indicated that a number of national ICT resources and services could be accessed and utilised via co-operation of the GCC. Examples of these ICT resources and services are: the sending and receiving of ILL; accessing Arabian Gulf Region OPAC; and searching on-line databases. However, all of the interviewees confirmed that these ICT resources and services are not fully exploited and utilised in the medical libraries in GCC countries.

The interviewees reported that many of the librarians in their libraries lacked ICT literacy and, consequently, were not aware of the national ICT resources and services that are available through GCC health libraries. One of the interviewees believed that, if a trained librarian were available in each health library for resource-sharing, he/she could pass his/her experiences on to other colleagues.

The ICT Training for Users

Heads from Departments in HMC indicated that a fairly common complaint was that there was simply not enough time to spend on electronic information retrieval because of the time taken up with clinical duties. There was also a plea for more training courses so that staff could be aware of the latest developments and techniques in their fields. To this end, greater encouragement was sought for conference attendance and the writing of papers for external publication.

Undoubtedly, ICT issues have changed the work agendas of health libraries, making them markedly different from a decade ago.

Several respondents highlighted another effect of the integration of ICT, specifically in relation to the professional skills of librarians. It was generally believed that HHSL collections would consist of a wider variety of formats and a multitude of information
resources, and that librarians would have to be aware of new ICT developments and would therefore need to update all their skills. An interviewee commented on this as follows:

It is an excellent opportunity for the yesteryear librarians to turn their profession into a more proactive service-oriented one. ICTs offer opportunities to collaborate, interact and integrate information services aimed at target audiences in an efficient way.

The goal of this programme, as a Director mentioned, is to promote awareness and equip medical staff and researchers with the information skills needed to use ICT resources and services in their research activities, especially in automated ICT retrieval services.

All Heads of Department in HMC stated that, overall, ICTs have greatly improved library services and resources.

Towards the digital library, a respondent of this interview study noted:

The medical library should plan to be a digital library; digital libraries will help and support our profession and definitely will reflect on the quality of our service.

Some interviewees remarked that they wished that the HHSL would be similar to advanced libraries, such as National Library of Medicine (NLM) or British Library (BL). GCC medical libraries should move towards digitisation since the GCC has the financial resources to initiate such change. The only missing piece in the jigsaw is the high-level policy decision-making to move in this direction. One of the interviewees stated:

The Gulf States are able financially to introduce digital medical libraries. This can’t be achieved without a decision from high ranks within the GCC.

Communication and co-operation between GCC countries regarding the creation of digital libraries should be established. This cannot be achieved without changing the attitudes of some of the health library staff, as well as the enactment of relevant policy decisions taken by high ranking decisions-makers.

The digital library cannot be achieved without changes in both the manpower requirements and the library infrastructure.
With many changes taking place in the health science libraries in GCC countries over the last ten years, the future of libraries and librarians has become a significant source of speculation and concern. It is certainly true that many of the specific activities carried out by librarians have not changed in the health science libraries in the GCC.

6.5 Summary

This Chapter has indicated the findings of the questionnaires and semi-structured interview analyses. The data that were collected and analysed will form the basis of Stage 1 (the problem situation unstructured) of the Soft System Methodology (explained in detail in Chapter 7). A number of potential themes related to ICT were identified and explored. These include: access, use, existing skills, training needs, added value and strategic issues. These themes will reappear in later stages of the Soft Systems model from which change statements can be drawn.

To place the HHSL within the context of its systems environment, there is an acknowledgement made within this Chapter to the importance of health libraries, but also to the lack of co-operation and co-ordination among health libraries in the GCC States.
Chapter 7
Systems Intervention

7.1 Introduction

The findings in Chapter 5 introduced the definitions of the hard and soft systems approaches to problem solving. The hard systems approach involves the analysis of quantitative data using such methods as operational research to find, for example, the optimum number of librarians that must be working to satisfy customer demands at any specific time. While undoubtedly this may be an important fact to discover, it is just one element of a 'bigger picture' for which a holistic approach should be taken. So, obtaining the systemic description desired for this study involves the use of the soft systems approach. This methodology can be described as a seven-stage process of analysis which uses the concept of a human activity system as a means of getting from 'finding out' about the problem situation to 'taking action' to improve it. Figure 5-2 in Chapter 5 shows the logical sequence of application of SSM. The application of the methodology will be presented in its logical sequence from Stage 1 to Stage 7 in the following sections.

An interpretive structural model (ISM) will then be developed to investigate the ordered sequence of change required to deliver high quality content for the provision of evidence-based medicine, which in turn provides a main driver to improve patient care. The ISM will take as its input ideas generated from experts in the field, and through application of the seven step method will yield a model for change that can be applied directly by HHSL and HMC management, as appropriate.

Following this systems intervention (using SSM and ISM), a HHSL system model will be constructed that places the change suggested within a framework of a management and decision-making structure. This model can be used to illustrate the management processes involved in the multidimensional change suggested.

7.2 SSM Stage One: The Problem Situation (unstructured)

Stages 1 of the SSM combines the evidence in what Checkland calls a 'problem situation' and what Ackoff terms a 'mess'. It provides unstructured knowledge about the system in focus. In this study, the problem situation is described in terms of the analysis undertaken
in Chapter 6: the results of the questionnaire survey, interviews and document analysis – these findings indicate a set of problem issues.

These problem issues can each be traced back via an audit trail to either a specific finding or set of findings in the analysis. To investigate the unstructured problem situation in detail, three perspectives are taken: from the decision-makers (that is, people in such a position of ‘power’ that they can influence the management of the system); the librarians themselves; and the perception of the users of the HHSL. Figure 7-1 shows a road map of the issues brought to light during the data collection phase. These issues are now discussed in more detail.

7.2.1 Decision-Makers’ perspective

After analysing the evidence from the perspective of decision-makers, the problems relating to the following issues can be drawn from the systems intervention: financial issues, ICT related issues, and the state of current awareness.

- Financial Issues

**Financial resources for ICT**
The analysis of the interviews indicated that financial support to improve ICT in the HHSL is lacking. Funding requests for ICT development is non-existent in strategic planning and policy development. The current budget is still far smaller than is required to meet the users’ needs and satisfaction, and the actual budget for the HHSL is still below that in any other GCC country. This may be due to lack of awareness on the part of decision-makers.

**Financial resources for staff development and training**
Primary and secondary evidence (semi-structural interviews and document analysis respectively) suggest a perception that HHSL does not provide sufficient financial support for staff development and training. On-site activities are severely limited and restricted to services offered by library and medical personnel. Relatively few staff are able to take advantage of the HMC scheme to send library staff abroad for appropriate training.
Figure 7-1 Research Problem Situation (Stage 1)
Chapter 7  
Systems Intervention

- ICT Issues

Lack of ICT awareness
Issues concerning ICT have not been addressed adequately in the past due to the fact that most decision-makers do not fully appreciate the impact of ICT on the health services, neither do they appreciate the gravity of lagging behind generally in the field of ICT. By analysing HHSL documentation, it was found that none of the library committee members have any background in ICT matters. This may lead to the narrowing of dimensions in any discussions concerning ICT at this level.

Attitude towards ICT
One of the important issues regarding the decision-makers’ attitudes towards ICT is how they value scientific and technical information resources, the tools used to obtain this information, and its impact on the level of health services. Resistance to change is the main factor for the decision-makers’ attitude. They consider a traditional process to be more trustworthy and workable. Therefore, they do not see the need to change and sometimes it is difficult to convince them, for example, that e-mail constitutes a more efficient way of getting in contact with other employees than the traditional methods of communication through letters and memoranda.

ICT has a low priority in the strategic plan
From the analysis of documents, it appears that ICT is not regarded as a high priority issue. In fact, in the HHSL strategic plan, ICT provision does not appear in the strategic priority list. No arguments for ICT provision were provided in any of the strategic plans investigated. From a critical analysis of the interview documents, it is clear that HHSL also lacks a detailed and up-to-date policy document on how to deal with technological change. The most telling evidence of this fact is that the last policy that was introduced that dealt with technology change is dated 1982 (HHSL document). This is unacceptable in the light of the fast-moving changes in ICT provision.

ICT Infrastructure
HHSL lacks the infrastructure required for implementing ICT. The spaces required to increase the number of PCs has not been established and the communication infrastructure (cabling, etc.) needs to be put in place.
• Current Awareness

Lack of current awareness
A culture has been established by medical staff to carry out their own research independently and this includes searching for information and its retrieval. For the past few years, health care professionals, including physicians and paramedical staff, have been encouraged to perform their own literature searches. This is partly due to the lack of qualified medical librarians as well as a lack of awareness on the part of medical staff of what library staff can provide. Therefore, it may take some time for them to accept searches carried out by medical librarians or information professionals in health care teams. Since some users are busy with their clinics and other duties, they cannot find time to use library resources for searching and retrieving information for their research. In such instances, clinicians do accept searches carried out by medical librarians. Anwar & Al-Ansari (2002) noted that the importance of Continuing Professional Development (CPD) is increasing so much that all the concerned parties have started to take steps to improve the situation. They thought it an encouraging sign that many academic institutions have become more active in offering workshops, seminars and special credit-based courses for working professionals.

7.2.2 Librarians’ perspective

Many of the professional sectors in Qatar lack qualified manpower and librarians are no exception. The questionnaire analysis indicated that 91.5% (n= 183) of the users are benefiting from the use of services at the HHSIL, yet it also indicates that most of their experiences have been gained through self-learning. The questionnaire responses show that only 29.5% (n= 59) have ever asked librarians for help. This fact could be due to the fact that there are no qualified medical librarians to meet the needs and satisfaction of the users. There is a general lack of value for Librarians in HHSIL and what they can offer. Librarians also move very slowly up the promotion scale and career progression and opportunities for librarians in HHSIL are limited.

One of the main problems for the librarians is the lack of training and the absence of meaningful staff development. With rapid developments in ICT and increasing high
demands from users for more satisfactory services, librarians must be trained to meet these demands.

7.2.3 Library Users’ perspective

The issues from the library users’ perspective can be divided between the availability of facilities, co-operation between medical libraries in the GCC, and their own training needs.

- Availability of Facilities

There is evidence from the questionnaire that the HHSL lacks the following facilities: computers, computer networks, Internet access and access to other electronic resources.

Insufficient computers in the library

90% (n= 180) of respondents from the questionnaire survey said that the number of computers in the library is not sufficient. It is essential to provide a sufficient number of computers to meet the needs and satisfaction of clinical professionals.

Networking activities

The healthcare sector in Qatar functions within a networked environment with global vision and access. However, HHSL cannot function at this level due to a lack of computer networking. This holds back progress on work towards a digital library, an important factor in a setting that sees less paper and more electronic resources.

Lack of Internet access

Access to the Internet has become part of professional daily work. It helps medical professionals to communicate with their administrators regarding their daily schedules, to communicate with senior professionals for advice and decision-making, and is used as a source of information. 79.5% (n= 159) of users who participated in the field research responded that access on-line for only thirty minutes is not enough to interact with the Internet, bearing in mind that loading and communication can be factors that can contribute to loss in Internet-time. This is situation not acceptable for any library user.
Electronic resources (CD-ROM)
From the questionnaire analysis, 61.0% (n=122) of respondents indicated that multiple databases could be created to serve the customised needs of individuals or clinical specialisations.

Co-operation and Co-ordination with Medical Libraries in the GCC region
GCC countries have signed various treaties of mutual co-operation. The library and information sector forms part of these agreements. In practice, co-operation is still at an early stage but, at an individual level, a union periodical list has been achieved. This list supports medical libraries in GCC countries. The method of co-operation using the list is via ILL but evidence from the questionnaire indicates that only 11.5% (n=23) of HHSL staff were benefiting from these arrangements.

Attitude toward co-operation and co-ordination
Most of the librarians prefer to work locally and they do not show any enthusiasm for serious co-operation with other GCC libraries. This may be due to a lack of awareness of the importance of such co-operation, a lack of experience of international co-operation, unclear regulatory issues, a lack of encouragement, and the absence of strategic planning for the implementation of such co-operative arrangements.

Problems in administration and management
An analysis of the interviews carried out with relevant authorities suggests that the countries of the GCC lack organisational and institutional frameworks for creating strategic plans for training and co-operation.

Training Needs
Training in the use of the library and its ICT is the main tool for ensuring that users are aware of and know how to use these facilities. As part of a well-developed strategic plan, users must be trained in the use of the library and its facilities as soon as they join HMC. This can be achieved through induction, short courses, seminars and well-presented leaflets and documents. A little more than half of the users agreed that ICT training is needed (52.5%; n=105). The majority of the users’ library education has come via the self-taught route - 64.5% (n=129) of the users are self-taught. This Figure is high as a result of lack of a training plan in the library. The interviews showed that the main aim of
medical libraries is to provide quality services to ensure users’ satisfaction. To achieve this objective, they have to provide proper and adequate training for their staff.

**Induction**
Organising induction days for library users is an excellent way of raising the new library users’ awareness of library facilities. The library should have a well-planned induction day for new users. A review of library documents and the analysis of interviews showed that libraries lack planning for induction days.

**Training programmes**
It is important that HHSL introduces a strategic training programme for the users to ensure the efficient use of library facilities. The programmes should indicate the facilities that are available and the help/advice the library provides. Inspection of the documents and the interviews revealed that the HHSL has no strategic training programmes for their users. User training must take into consideration the unprecedented rate of social, political and economic changes that medical library users are experiencing in the health care environment.

**Documents/leaflets**
Pamphlets and leaflets that provide users with a synopsis of essential guidelines on how to use the library should be made available to the users. These documents can be used as a reference. The interviews and the document analysis indicate that the HHSL lacks these essential items.

**Seminars**
The HHSL documents indicate that, for example, there is a lack of seminars for library users in the use of new library systems and specific facilities. The objective of any library instruction programme is to enable users to use the various resources at HHSL and in ICT effectively and efficiently. Seminars and workshops would aim to provide such information.
7.3 SSM Stage Two: The Problem Situation Expressed (Structured)

This is the analysis stage where the rich picture (RP) of the problem situation is built up. The RP enables the selection of a particular viewpoint or viewpoints and allows the identification of a relevant system(s) for the next stage. When carrying out the analysis, it is helpful to think in terms of the ‘problem content’ and the ‘problem improving’ systems. The choice of relevant systems effects a transition from the real world into the conceptual world. Checkland (1981, p. 165) produced guidelines for the RP content. He suggested that the RP should include elements of structure, processes, issues (complaints, criticisms, feelings, etc.), and should give an overall indication of climate. The other important feature of the RP is that it should include all the important hard and soft ‘facts’ of the organisational situation. This is an important technique in that, according to Lewis (1994, p. 56-72), it often presents facts in an insightful way and can be used to generate discussions among concerned individuals to a degree that is rarely possible by using only written text or Tables or Figures.

According to Elliott and Starkings (1998, p. 132), a RP should explicitly highlight issues and conflicts of interest which matter and are of concern in the development of an efficient and effective information system. The RP pictorially represents a snapshot of any organisation under investigation and this in itself allows wide thinking about itself and its problems (Skelton 2000, p. 322). Thus, a RP is a good way of capturing the interests and responsibilities expressed by the people who seem to be involved in the system. It is also useful for promoting discussion about areas for which responsibility seems unclear or contested. In some cases, a person or group may legitimately assume more than one role: for example, ‘actor’ and ‘customer’ are often the same, especially if the study is of a process the effect of which is limited to one part of an organisation (Underwood 1996, p. 113).

During the research process, problems characterizing these situations become expressed (structured). The starting point is to think about ‘problem content’ systems and to identify the elements in these systems which are relevant to the problem situation. The problem improving system defines the ‘problem-content’ system and then Checkland’s SSM is used to recommend action to structure the problem for and with the client to
improve the problem situation. The general relationship between the ‘problem-improving’ and ‘problem-content’ systems is shown in Figure 7-2.

7.3.1 The Problem Improving System

According to Checkland (1981, p. 162), in every problem situation, no matter what particular perception or mix of perceptions seem obvious to particular individuals or groups, a fixed element will be the existence of the role of ‘problem-owners’, occupied by those who perceive the problem. A second fixed element will be the role of the would-be ‘problem-solvers’; those who wish to tackle the perceived problem.

The problem improving systems bring together the evidence base and the method by which the evidence can be integrated, allowing a holistic perspective of the system of interest to be taken. The evidence base, as discussed in Chapter 5 (Systems Thinking), involves a comparison of data and information taken from primary and secondary sources. The primary sources are the outcomes from the questionnaire and interview surveys with a cross-section of stakeholders. Secondary sources are the document analyses and the critical literature review. The methodology used constitutes Mode 1 of Checkland’s Soft Systems Analysis. This is an appropriate methodology as it allows a systemic appraisal of the problem situation and is suited to applications whose objectives are problematic.
Chapter / Systems Intervention

Problem-Improving System
Role: Problem solving: 
Author as part of an action research intervention

- Evidence-base:
  Primary evidence-
  questionnaires
  semi-structured interviews
  brainstorming

- Secondary evidence-
  Documents

- Constraints
  Ethical approach
  Legal constraints

Checkland’s Methodology

Define problem content system and uses

Problem Content System
Role: Problem Owner
i- Librarian
ii- Clinical practitioners, medical
  researchers, Biomedical engineer
  and technicians

Structure
- HHSL, HMC, Ministry of Health,
  Library collection and Clinical, Medical
  and professions allied to medicine

Process
- To acquire the collection
- To maintain the collection
- To preserve the collection
- To store information
- To retrieve information
- To disseminate information
- To inform users
- To train users
- To provide staff development for
  librarians

Climate
- HHSL situated in women’s hospital but
  serving all healthcare facilities in Qatar.
- Professional (medicine, library staff)
- Library services users

To recommend action, learn about or redefine

Figure 7-2: Elements in the problem-solving and problem-content systems Adapted from: Bremer, 1985, Figure 3, p. 64
7.3.2 The problem content system

The problem content system is presented here in order to obtain an RP of the ‘problem situation’ without imposing a particular picture on it. According to Checkland (1981, p.164), the problem-content system has three elements: structure, process and climate. There is a ‘problem-content’ system, containing the role of problem-owner, and there is also a ‘problem-solving’ system. Questions can be drawn up based on the determination of these elements. These questions can be used as examples:

**Problem Owner**

i- Librarian

ii- Clinical practitioners

Medical researchers

Biomedical engineer and technicians.

The elements of the structure

- HHSL
- HMC
- Ministry of Health
- Library collection
- Clinical, Medical and professions allied to medicine.

The elements of the process

- To acquire the collection
- To maintain the collection
- To preserve the collection
- To store information
- To retrieve information
- To disseminate information
- To inform users
- To train users
- To provide staff development for librarians.
The elements of the climate

- HHSL is situated in the women’s hospital but is serving all healthcare facilities in Qatar
- Professional (medicine, library and staff)
- Library services users
- Information is an important resource.

7.3.3 The RP Expressed

The RP is expressed here in pictorial form (see Figure 7-3). The simple picture in this representation provides an illustration of the holistic view taken of the system of interest.

The key actors in this system are represented by a set of human Figures of various depictions to represent the different actors. They surround the missing jigsaw piece, as this is made up of the problem issues that are found in the centre of the diagram. Crucially, the system in focus lacks the following: an ICT infrastructure for adequate electronic communication; ICT specialists on major decision-making committees; strategic policy documents that could determine progress and direction; financial support for training and collection management; co-operation and co-ordination with GCC medical libraries; there is also a lack of qualified medical librarians. Scissors indicate some form of conflict and ‘think-bubbles’ indicate the major concerns. The brick wall indicated in the RP indicates the barrier between elements of the system. The brick wall is an appropriate metaphor to represent obstacles/barriers between issues.

The RP uses ‘big eyes’ to indicate parts of the environment that affect the problem situation, such as the influence of external perspectives. These include the World Health Organization, EMRO, the Special Library Association, the Ministry of Health, and Qatar University.

The RP shows how the librarians see HHSL users facing a dilemma between the limited time given to access the Internet and the availability of computers to use for accessing the Internet. The users are also frustrated by the lack of training in the use of the library
We need a clear ICT policy
How to give administrative support and what are they spending their money on?
We can't wait in a queue to use Internet
We need network terminals
We need co-operation with medical library world-wide
Communicate with each other electronically
I need a training in ICT
How can we deal with ICT don't have any training?
How much time should spend on asking co-operation between GCC?

Figure 7-3 Rich Picture: holistic view
facilities. On the other hand, librarians are equally frustrated due to their own inadequate training. As a consequence, they are not able to help users effectively.

### 7.4 SSM Stage Three: Root Definitions of Relevant System

The root definition (RD) is the crux of the methodology. The main aim of this stage is to define notional systems by looking at the situation from different points of view that are relevant to the problem situation. According to Checkland & Tsouvalis (1996), there are two different kinds of RD. The first kind, called the primary task, more closely resembles the kind of systems defined by hard systems methods and is defined as: a root definition of a system which carries out some major task manifested in the real world (Checkland 1981, p. 317). The second kind, called an issue based RD, defines the existence of a permanent issue. Checkland & Wilson (1980) defined it as a concise, tightly constructed description of a human activity system which states what the system is.

#### 7.4.1 Problem Themes

The initial step in Stage Three is to identify problem themes in the situation to be analysed, allowing relevant systems to be discriminated for the situation. In the HHSL, the problem themes from the RP can be identified as:

- ICT facilities
- ICT awareness
- ICT training
- Resource-base for ICT development
- ICT infrastructure
- Perception of the value of information
- Perception of the value of library staff
- Co-operation among medical libraries in the GCC.

The eight relevant systems identified above can be aggregated into three problem themes, outlined in more detail below, for further analysis using SSM.
Technical issues problem theme:

This combines:
- ICT facilities,
- ICT awareness,
- ICT training,
- Resource-base for ICT development,
- ICT infrastructure.

Value system issues problem theme:

This combines:
- Perception of the value of information,
- Perception of the value of library staff.

Co-operation issues problem theme:

- Lack of co-operation among medical libraries in the GCC

From these problem themes, appropriate root definitions (RDs) can be constructed.

7.4.2 Root definitions

Technical system issues root definition

Any library technical system must provide adaptable and flexible services to meet the users’ needs and satisfaction in this new age of ICT-led developments. The issue-based root definition of the technical system can be identified in the following statement.

A system owned by the Library Administration Committee to improve the ICT capability by means of increasing awareness, library staff training, infrastructure, facilities and the resource base in order to achieve improved access to health information.
A CATWOE analysis of the technical system reveals the following:

C: Librarians, medical staff
A: Librarians, medical staff and administration staff
T: Moving from poor ICT capability to good ICT capability
W: ICT is helpful in gaining information for better access to health information
O: Library Administration Committee
E: Infrastructure, awareness, facilities, training and resource base.

Thus, the technical system issues root definition can be seen to be well constructed.

Value system issues root definition

In order to enhance the value system of decision-makers and librarians, they need to be both empowered and proactive in strategic planning. To this end, the issue-based root definition of the value problem theme can be summarised as:

An HHSL strategic planning committee owned value-system to enhance the awareness and attitudes of the decision-makers and librarians towards ICT-led developments by means of increasing awareness of ICT in order to improve strategic planning, decision-making for ICT, and a better perception of the skills of information professionals.

A CATWOE analysis of the information value system reveals the following:

C: Decision-makers and librarians
A: Decision-makers, librarians and the strategic planning committee
T: From poor awareness of ICT of the actors to their good awareness of ICT
W: Decision-makers and librarians’ values towards ICT are helpful in strategic planning, decision-making for ICT, and in changing perceptions.

O: HHSL strategic planning committee

E: Changes in awareness, attitudes, society, culture, tradition, religion, technology and in the organisation.

Thus, the value system issues root definition can be seen to be well constructed.

Co-operation system issues root definition

Co-operation among GCC medical libraries is essential for the sharing of information. There are 19 such libraries in the Gulf Council region, of which at present only five operate a full co-operation policy (in Qatar, Bahrain, Kuwait, Oman, and Abu Dhabi). The issue-based root definition of the co-operation theme can be summarised in the following need for the system to be:

A GCC medical library Directors owned system to improve co-operation among themselves by means of efficient and effective sharing of information resources in order to achieve an integrated library system that satisfies the demands of all users of health care systems within the Gulf Council region.

A CATWOE analysis of the co-operation system reveals the following:

C: Library staff and their users within the Gulf Council Region

A: Library staff, users and administrations within the Gulf Council Region

T: To move from poor co-operation among GCC medical libraries to good co-operation

W: Efficient and effective co-operation leads to the integration of information resources that allows the demands of the health service users to be satisfied

O: GCC medical library directors
E: Changes in the political, social, religious, cultural and traditional environments, speed of technology change, speed of organisational change, security and confidentiality.

Thus, the co-operation system issues root definition is well constructed.

7.5 SSM Stage Four: Building Conceptual Models

When root definitions are well-formed the conceptual models can be constructed. In this context, the conceptual model is a diagram of the activities showing the system described by the root definition, Checkland & Scholes (1990, p. 40). This stage in the methodology is about model building, but the model is meant to describe something relevant to the problem situation; it is not meant to be a model of the situation itself (Avison & Fitzgerald 1995, p. 248). A conceptual model for the systems described in the root definitions was constructed by extracting the main activities necessary for the system to function. These were then placed in a diagrammatic framework showing logical dependencies. Usually there is a conceptual model drawn for each root definition and the drawing up of three root definitions and conceptual models becomes an iterative process of debate and modification that moves towards agreed conceptual models (see Figures 7-4 –7-6).

The basic activities selected for each root definition in this study are as follows:

A. Technology system to manage resources
   - To manage the ICT resource base
   - To increase ICT awareness
   - To improve ICT training
   - To create the ICT infrastructure
   - To improve ICT capability
   - To use technology-based intervention in information access
   - To improve access to health information.
B. Value system

- To increase the skills base of information professionals in HHSL
- To increase the value of information professionals within HHSL
- To increase the awareness of what ICT has to offer
- To raise the awareness of library decision-makers towards ICT
- To review the attitudes of library decision-maker towards ICT
- To develop a sustainable ICT policy for the library.

C. Co-operation System

- To improve the efficiency of sharing information resources
- To improve the effectiveness of sharing information resources
- To improve co-operation among GCC medical libraries
- To develop an integrated library system in the GCC region
- To satisfy library end-user demand.
Figure 7-4 Conceptual model of the technology system
Chapter 7

To increase the skills base of information professionals in HHSL

To increase awareness of what ICT has to offer

To raise awareness of library decision-makers towards ICT

To review attitudes of library decision-makers towards ICT

To deliver a strategy for a 21st century health library

To increase the value of information professionals within HHSL

To use technology-based intervention in information access

To determine measures of performance

To monitor

To control

Figure 7-5 Conceptual model of the value system
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Figure 7-6 Conceptual model of the co-operation system
7.6 SSM Stage Five: Comparison of the conceptual models and the real world

In this stage, the conceptual model (Stage 4) is compared with the real world (Stage 2) to find out if it reflects the real situation and if current systems are effective. The purpose of the comparison stage is to set up a debate concerning the problem situation. For that, an agenda is needed, and therefore, the final output of this stage is the creation of an agenda for change. The following Tables (7.1 to 7.3) show how drawing up an agenda at the end of this stage is based on the structured way of making the comparisons. There is a system-by-system comparison of each component of the conceptual models with real world systems. The accepted agenda (marked by ‘yes’ in the Tables) provides a series of topics for discussion in the next stage. What is not necessary or acceptable as part of the agenda is indicated by ‘no’, and was not subjected to further elaboration.
<table>
<thead>
<tr>
<th>Activity in conceptual models (Stage 4)</th>
<th>Present in real world situation (Stage 2)</th>
<th>Comments on real world situation (Stage 2)</th>
<th>Add to Agenda?</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1. To manage the ICT resource base</td>
<td>Currently ICT resources <strong>partially</strong> meet the needs and satisfaction of the library.</td>
<td>ICT resources are the main tools to improve the library services to meet the needs and satisfaction of the users and to improve the health services in general.</td>
<td>Yes</td>
</tr>
<tr>
<td>A2. To increase ICT awareness</td>
<td>There is <strong>partial</strong> awareness of the role of ICT in meeting users’ needs.</td>
<td>Decision-makers’ awareness is important in locating the necessary budget for ICT hardware and software, for training programmes and the strategic planning of the library.</td>
<td>Yes</td>
</tr>
<tr>
<td>A3. To improve ICT training</td>
<td>Training in the medical library is <strong>partially</strong> recognised. There are two main elements in information transfer: knowing the information and transferring the information from one subject to another. Knowing and transferring information are key elements in successful information exchange. Library users and librarians are the keys in the above two elements.</td>
<td>There is a need for a well-formulated strategic plan that includes short and long term planning to meet the fast expanding changes in ICT. As a consequence of changes in ICT provision, a designed training programme needs to be implemented.</td>
<td>Yes</td>
</tr>
<tr>
<td>Activity in conceptual models (Stage 4)</td>
<td>Present in real world situation (Stage 2)</td>
<td>Comments on real world situation (Stage 2)</td>
<td>Add to Agenda?</td>
</tr>
<tr>
<td>----------------------------------------</td>
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</tr>
<tr>
<td>A4. To create an ICT infrastructure</td>
<td>There is a partial infrastructure for the implementation of ICTs such as computers and networks within HMC.</td>
<td>Infrastructure must be a priority for the decision-making authorities. Infrastructure must be in place before ICTs can be implemented.</td>
<td>Yes</td>
</tr>
<tr>
<td>A5. To improve ICT capability</td>
<td>Partially recognised by the library.</td>
<td>Increasing ICT awareness, and ICT training, and managing the ICT infrastructure will improve ICT capabilities.</td>
<td>Yes</td>
</tr>
<tr>
<td>A6. To use technology-based interventions in information access</td>
<td>Partially recognised and considered by library users.</td>
<td>Using ICT based applications requires a change in the mindsets of all staff.</td>
<td>Yes</td>
</tr>
<tr>
<td>A7. To improve access to health information</td>
<td>Partially considered and recognised by library staff and users.</td>
<td>Gaining access to health information will aid evidence-based healthcare</td>
<td>Yes</td>
</tr>
<tr>
<td>Activity in conceptual models (Stage 4)</td>
<td>Present in real world situation (Stage 2)</td>
<td>Comments on real world situation (Stage 2)</td>
<td>Add to Agenda?</td>
</tr>
<tr>
<td>----------------------------------------</td>
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<td>---------------</td>
</tr>
<tr>
<td><strong>B1.</strong> To increase the skills base of information professionals in HHSL.</td>
<td>Partially recognised and considered in planning.</td>
<td>Skills base of information professionals is a key element of transferring the information to the users</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>B2.</strong> To increase the value of information professionals within HHSL</td>
<td>There is No value-system to increase the value of information professionals.</td>
<td>Value system is needed to improve both attitudes and the awareness of the main subjects of the library. These will have an important impact on the planning, resources and performance of the library. Health information access will benefit from this performance.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>B3.</strong> To increase awareness of what ICT has to offer.</td>
<td>There is partial awareness of what ICT has to offer. There is still a large gap to fill.</td>
<td>Librarians and users should be aware of what ICT has to offer to improve their professional skills; this has a final effect on patient care.</td>
<td>Yes</td>
</tr>
<tr>
<td>Activity in conceptual models (Stage 4)</td>
<td>Present in real world situation (Stage 2)</td>
<td>Comments on real world situation (Stage 2)</td>
<td>Add to Agenda?</td>
</tr>
<tr>
<td>----------------------------------------</td>
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<td>---------------</td>
</tr>
<tr>
<td><strong>B4.</strong> To raise awareness of library decision-makers towards ICT.</td>
<td>Decision-makers are partially aware of ICT. This is shown by their priorities and strategic planning.</td>
<td>HHSL planning and budgeting stem from decision-makers. Therefore, their awareness of ICT will have an impact on the two crucial elements above to improve ICT resources.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>B5.</strong> To review attitudes of library decision-makers towards ICT.</td>
<td>As most of the decision-makers are not ICT literate, they cannot cope with sharp changes towards ICT (fear of change). There is a partially positive attitude towards ICT.</td>
<td>A more positive attitude towards ICT will help planning and budgeting for ICT deployment.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>B6.</strong> To develop a sustainable ICT policy for the library.</td>
<td>There is a partially sustainable ICT policy. This policy falls short in meeting the requirements for the new ICT era.</td>
<td>ICT policy is essential. It is important to improve the ICT understanding of all stakeholders and to comply with national and international laws.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>B7.</strong> To deliver a strategy for a 21st century medical library.</td>
<td>There is No strategic planning to meet the fast developments in ICT for the 21st century.</td>
<td>ICT changes rapidly, therefore, library authorities must have a strategic plan to meet the users’ needs for the new millennium.</td>
<td>Yes</td>
</tr>
</tbody>
</table>
### Table 7-3 Agenda for Change: Co-operation System Theme

<table>
<thead>
<tr>
<th>Activity in conceptual models (Stage 4)</th>
<th>Present in real world situation (Stage 2)</th>
<th>Comments on real world situation (Stage 2)</th>
<th>Add to Agenda?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C1.</strong> To improve the efficiency of sharing information resources.</td>
<td>There is <strong>No</strong> strategy for sharing information to use the available resources efficiently.</td>
<td>Sharing information has become part of the strategy of most modern, successful libraries. Sharing information can save time, effort and inconvenience.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>C2.</strong> To improve the effectiveness of sharing information resources.</td>
<td>There is <strong>No</strong> strategy for sharing information to use the available resources effectively.</td>
<td>Sharing information effectively can help the library to get better value for money.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>C3.</strong> To improve co-operation among GCC medical libraries.</td>
<td>There is <strong>No</strong> effective or official co-operation among GCC medical libraries.</td>
<td>The GCC should use its resources efficiently and effectively through well planned and managed co-operation to improve GCC medical libraries.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>C4.</strong> To develop an integrated library system in the GCC region.</td>
<td>There is <strong>No</strong> integrated library system in the GCC region.</td>
<td>An integrated library system will improve users’ needs and satisfaction and this will be reflected in the access to healthcare information.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>C5.</strong> To satisfy library end-users’ demands</td>
<td><strong>Partially</strong> recognised and considered.</td>
<td>Efficient and effective sharing among the GCC will help in meeting the end-users’ demands and satisfaction.</td>
<td>Yes</td>
</tr>
</tbody>
</table>
7.7 SSM Stage Six: Change identified

Stage 5 provided an insight into the comparison between real world activities (Stage 2) and a conceptual model representation (Stage 4). This comparison, termed the 'agenda for change', leads to the identification of elements that can be gained in terms of their systemic desirability and cultural feasibility. According to Checkland (1981, p. 181), the former relates to the insight gained from the selection of root definitions and the building of the conceptual model; the latter refers to the given cultural characteristics of the problem situation, the people within it, their shared experiences, and their prejudices.

The Tables below (Tables 7.4 to 7.6) show the activities on the agenda for change and indicate whether each activity is systemically desirable and/or culturally feasible.

**Technology System Changes: Culturally feasible**

Qatar is small and rich country. Therefore, it is understandable that there is no budget problem. This statement is becoming clearer as the new era of HH Sheikh Hamad, the State's ruler, has adopted a policy of supporting and encouraging the modernisation of the country. The problems seem to lie in the planning and with the personnel who appreciate the needs and value of ICT. As a result, providing budget resources for ICT is a problem. The lack of trained information professionals to give an educated opinion of what is needed is another issue. As there is no high-level champion for allocating resources to ICT, this exposes an underlying root cause, which is the lack of value given to the use of information. Consequently, there is no one to raise user expectation by developing materials to show what information is available and how it can benefit patient care.

**Technology System Changes: Systemically desirable**

The most important systemically desirable changes are to improve ICT capability and to manage the ICT infrastructure to provide the technological backdrop necessary to build successful, up-to-date ICT applications in healthcare and to take maximum advantage of the ICT infrastructure. All users must be trained to use the technological systems efficiently, effectively, and with efficacy.
Value System Changes: Culturally feasible

The main obstacle in the value system change is the issue with strategy/policy decision-makers. They have no ICT knowledge among themselves as a group, therefore there is no ICT champion at a high level. As a result, they are unaware of how ICT can affect a system. The other important issue is the 'fear of change' among the decision-makers who are unaware of what is happening in the library information sector, for example, they are not aware of the upsurge of professional information.

Value System Changes: Systemically desirable

Table 7.5 shows the value system theme. The main goal is to achieve a sustainable 21st century library and information service provision. The need for information service provision must be recognised by all stakeholders. The value of information professionals in their interventions with clinical users should be acknowledged. Finally, it is important to increase the utility of the library staff in HHS; they should be encouraged to make full use of any staff training and development that is available.
Activities in conceptual models that are included in the agenda for change

<table>
<thead>
<tr>
<th>Activities</th>
<th>Systemically desirable</th>
<th>Culturally feasible</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1. To increase the skills base of information professionals in HHSL</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>B2. To increase the value of information professionals within HHSL</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>B3. To increase awareness of what ICT has to offer</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>B4. To raise the awareness of library decision-makers towards ICT</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>B5. To review the attitudes of library decision-makers towards ICT</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>B6. To develop a sustainable ICT policy for the library</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>B7. To deliver a strategy for a 21st century medical library</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Table 7-5 Value System Theme

Co-operation System Changes: Culturally feasible

Qatar is a member of the GCC council. These countries have different levels of cooperation that militate against a uniform approach to an all-encompassing catalogue. Although co-operation may be successful at an institutional level, the outputs generated may not always be useful. For example, paper formats may be offered instead of electronic versions.

Co-operation System Changes: Systemically desirable

Table 7.6 shows the Co-operation system theme. Co-operation is systemically desirable as it provides cost effective services and adds value to stakeholder interactions. Co-operation also allows a more effective and efficient use of scarce resources. Co-operation among GCC countries is highly desirable as GCC co-operation crosses political and geographic boundaries for the benefit of all; to compile a union catalogue is possible, but some information is not forthcoming.
Activities in conceptual models that are included in the agenda for change

<table>
<thead>
<tr>
<th><strong>Activities</strong></th>
<th><strong>Systemically desirable</strong></th>
<th><strong>Culturally feasible</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>C1. To improve the efficiency of sharing information resources</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>C2. To improve the effectiveness of sharing information resource</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>C3. To improve co-operation among GCC medical libraries</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>C4. To develop an integrated library system in the GCC region</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>C5. To satisfy library end-users’ demands</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Table 7-6 Co-operation System Theme

7.8 SSM Stage Seven: Action to improve the problem situation

Finally, action is recommended to improve the problem situation. This stage involves taking action based on the changes recommended to improve the problem situation outlined in Stage 6. A plan of action to improve the problem situation is one of the results of this research. An action plan to overcome the problem situation was thus designed. This includes three main themes:

1- Technology Systems change
2- Value Systems change
3- Co-operation Systems change

Any attitudinal and cultural changes that emerge from the three main themes can be gauged at the operational level of detail.

7.8.1 Change in structure

HHSL structure should be modified in order to add ICT and library professionals to the main management structure. This will help to encourage those in authority to understand the new era of ICT, thereby increasing their awareness of the importance of the resources needed in this area. The structure should allow library and ICT professionals to be
represented at budget meetings, strategic planning and the allocation of resources. These changes can be achieved by convincing the hospital administration of their usefulness, and explaining the short and long-term benefits of the above changes, together with their impact on the welfare of the patient.

### 7.8.2 Change in Procedures

The allocation of resources needs to be performed in accordance with the ‘existing needs’ of the library users, rather than to prescriptive norms. One way of achieving this, is to give to professional librarians the authority to determine their ICT requirements. In this situation, the hospital administrator’s role in purchasing ICT equipment will be limited to the actual buying and delivery to the HHSL. The hospital administration needs to be convinced of these changes. This can be achieved by ensuring user satisfaction and presenting a written report to the library committee.

HHSL needs to have active participation in research through structured participation. There is also a need to change certain procedures within HHSL. These include training on how to use information sources which needs to be provided to HHSL as the act of training will automatically increase ICT awareness and will ensure that the ICT resource base is effectively managed. There is also a need for HHSL to enter into a collaborative relationship with other GCC medical libraries. Effective management and more training programmes are needed to exploit computer and related technologies effectively.

### 7.8.3 Changes in Attitude

Attitudes represent an important element in any change, especially with regard to decision-makers’ attitudes. For HHSL, there is a need to change the decision-making attitude towards ICT. This can be achieved by encouraging users to attend ICT seminars, lectures and training courses. Personal meetings with ICT professionals may also be advisable. The other attitudinal change that needs to take place is to convince HHSL staff to use the ICT resources. This can be achieved by changing the attitudes of HHSL staff towards ICT.
Giving staff an opportunity to share their perceptions and experiences of their system problems is another important issue that needs to be achieved. Finally, HHSL ought to be aware of the impact of information on the quality of healthcare.

### 7.8.4 Changes in Culture

There is a need to effect changes in culture towards ICT. This may include perceptions of the value of information as an asset to the organisation; valuing the capabilities and skills of information professionals; a 're-branding' exercise to demonstrate the utility of HHSL as a valuable resource; updating systems to provide a 21st century ICT application; and valuing the library as a resource for the provision of evidence to support evidence-based medicine.

### 7.9 Interpretive Structural Modelling

Modelling is an important tool to represent a real-world situation. It may help in understanding the real world and provide insights on system behaviour. In this research study the real-world is the current ICT situation within HHSL organisation. Currently there are no previous models that identify the issues and provide solutions. This section describes an interpretive structural modelling approach to structure the actions identified from the trigger question formulated on the basis of changes identified in stage 7 of the SSM, (Section 7.8 refers).

#### 7.9.1 Interpretive Structural Modelling Choice

The ISM is a seven-step method to organise and/or prioritise elements in an action plan. Step 4 involves the generation of an element set which was derived from data gathered in a phone survey with five experts. An intent structure was used, in which all relationships between elements have the meaning "would help to achieve". Furthermore, the relationships are transitive. This can be illustrated as below:

If B follows from A,  
And if C follows from B,  
Then it can be inferred that C follows from A.
7.9.2 Application of ISM to HHSL

An interpretive structured model was used to describe the solution space of integrating ICT into HHSL. The method, as outlined in chapters 2 and 5, followed the steps as indicated below:

- **Step 1: Identifying the issue**
  The issue investigated was the integration of ICT into the HHSL.

- **Step 2: Deciding on which type of ISM to use**
  An intent structure was used so that the dependencies between elements of the model could be clearly structured. The intent structure used the transitive relationship “would help to achieve”.

- **Step 3: Selecting the group and facilitator**
  The individual elements were generated by phone polling and e-mail with a mixture of HHSL users and ICT experts in Qatar. The facilitator of the ISM was the author; the participating group, (with date of interviews) was:
  
  - Dr. Najeeb Al-Shorbaji, The Regional Information Officer of EMRO (WHO) Officer, 14.02.03
  - Dr. Mohamed El-Helyal, Head of Immunology, 16.02.03
  - Dr. Ismail Helmi, Medical Education, 17.02.03
  - Mr. Mohamed Al-Noiemi, Head of HISD, 18.02.03
  - Dr. Azzam Ibrahim, HMC Projects Manager, HISD, 20.02.2003

  This group had the requisite collective understanding of the problem areas.

- **Step 4: Generate the Element Set**
  A trigger question was generated in order to achieve a consensus on the issue. The trigger question used in this study was,
What are the issues associated with introducing ICT into the HHSL over the next three years?

Respondents reacted to the trigger question to generate a set of elements (objectives). The full element set can be seen in (Appendix I). From the resulting element set generated, a typical matrix interaction could be:

"Would

Element 3 "To co-operate with local telecommunication company, QTEL. help to achieve

Element 4 "To improve ICT infrastructure ".
over the next three years?

A three year time horizon was used because this refers to the strategic time horizon and 'life' of a computing resource in Qatar.

An innovation was introduced in this step - the element set was generated by phone-polling and e-mails, which is a departure from the traditional method of having the participant group in one location. This innovation came about due to the fact that the facilitator and several members of the participate group were geographically dispersed at the time of the proposed meeting.

• Step 5: Completing a matrix of element interactions

The matrix of element interactions was completed by hand. Each element (objective) was written on a separate card for ease of handling, and the logical dependencies identified.

• Step 6: Displaying the ISM

The initial structure of ISM was ascertained by linking the dependencies of the element interactions.
Step 7: Editing the ISM

The structure was edited in order to achieve a better understanding of the objectives, and is shown in Figure 7-7. After the map was determined, it can be seen that ‘identification of users needs’ helps to achieve all other elements in the model except element 3 - as there is deemed to be no link between user needs and the association of the (Qatar Telecommunications Limited) QTEL telecommunications company. All elements help to achieve the top objective, which in this model is element 1, ‘to improve patient care’.

From the structure of the ISM, it seems that element 4, ‘To improve ICT infrastructure’, is crucial to future development of the HHSL service as it is defined as a key element in that it may be the rate limiting step.

7.9.3 ISM Interpretation

To use the ISM output (Figure 7-7) for strategic purposes, managers of the HHSL should first identify the needs of users, but at the same time open dialogue with Qatari telecom. Both of these elements are ‘root nodes’, and whereas the former leads to identification of competency base before improving ICT infrastructure, the latter is directly responsible for it. Once the ICT infrastructure is in place, it leads to improved information resources that allow enhancement of patient care.

The time scale for achieving these changes are not indicated, so it remains within the remit of the HHSL managers themselves to drive the process forward at a pace that can be managed.

7.10 HHSL System Model: Systematic Appreciation

One of the aims of this research is to bring about systemic improvements in HHSL delivery of high quality content for the provision of evidence-based medicine. Two of the three objectives have been achieved in that the problem scenario has been expressed (Rich Picture, Figure 7-3) and SSM has identified elements to improve the problem situation. The third objective applies directly to the ICT model component of the HHSL system model. This model plays a facilitating management role to the ISM in organising the ICT operations in HHSL.
Figure 7-7 ISM intent structures for introducing ICT into the HHSL

Would to help achieve

Goal

Information resources

ICT infrastructure

Competency base

Users’ needs

1. To improve patient care

12. To improve the quality of the HHSL services.

19. To be used as centre of excellence for national and international health conferences.

20. To increase information resources to medical staff

9. To create ICT environment to encourage and attract external users

7. To co-ordinate with GCC health libraries

18. To improve contact with local communities by encouraging them to use the HHSL resources.

17. To establish e-learning.

4. To improve ICT infrastructure

13. To define ICT policies to comply with local and international policies

10. To streamline HHSL information and communication activities

5. To increase the authorities awareness of the importance of ICT

3. To co-operate with local tel-communications companies, QTEL

16. To change users attitudes towards ICT

15. To increase the skills of manpower within HHSL staff

14. To review the current ICT and the future needs

6. To develop training program to meet ICT training need of HHSL staff at all levels.

11. To ensure high standard of services to learners

2. To identify users needs.

8. To establish ICT learning resources for learners, users.
To place the identified work to be done in context, a HHSL system model is developed, its components being:

- The organisational model
- The ICT model
- The decision-making process model

These components have interdependencies which will emerge from the following sections.

**Organisation Model**

Empirical evidence from the SSM analysis indicated that there is an organisational problem within HHSL. This is illustrated by lack of communication, responsibility management identification of problems and obstacles and an absence of ICT within the organisation. One of the main barriers and obstacles in any organisation today is relationship conflict. This appears to occur within HHSL. This conflict is represented in the form of a lack of understanding and negative attitudes among potential users, compared with the identified needs of ICT in the organisation. There are no ICT ‘champions’ within the senior committees within HMC. There is also evidence of a lack of awareness within departments in HMC towards ICT. These lead to relationship conflict and a power struggle within the organisation. Political and social backgrounds are also added factors to exacerbate the conflict. HHSL managers, to move forward, needs to identify these conflicts within the organisation and provide an alternative strategy to improve these relationships. This alternative strategy may be achieved by further systems intervention, for example combing the three methods employed in consensus decision-making (ideawriting, NGT and ISM)

The mission statement of the HMC organisation is not well defined, but could include the following statement that relates to HHSL in particular:

**To provide information and current awareness on healthcare, providing evidence for best practice and supporting users information needs to enhance patient care and expectations.**
Figure 7-8 shows elements of the organisational model that need to be implemented in HHSL to improve organisational performance in general, and in ICT performance specifically.

![Organisation Change Component Model](image)

**Figure 7-8 Organisation Change Component Model**

To improve the provision of evidence-based medicine to enhance patient care and thereby reduce mortality and morbidity, is the core of the HHSL organisational change model. All other model elements contribute to this central tenet.

Organisational leadership has a major impact on the HMC, its development, and strategic direction. Applied specifically to HHSL, leadership will have its main impact in the short-
term on developing and introducing ICT. However, the main issue in the current situation is that HHSI leaders lack vital awareness of ICT, and the added value it can provide.

Current communication links within HHSI are weak. There is no clear structure or procedures to introduce effective and efficient communication systems (telephones, faxes, computer networks) etc. This finding may be due to various factors, such as communication links the lack of awareness of the role of in its contribution to improve the performance of HHSI. Staff are not used to their full potential to improve organisational performance. Therefore, the proposed model has given serious attention to the role of communication within the HHSI. The proposed communication links should facilitate and identify connections in both horizontal and vertical communication flows.

ICT plays an important role in any modern organisation as it becomes integrated within workflow activities. This change is likely to have a large impact on the efficiency and effectiveness daily activities within HHSI. The implementation of a workload model should be taken in serious consideration. There will be an element of personal development and training to enhance the competency base of HHSI.

Managing conflict is a further issue that has a leadership component which needs to be addressed. In a large institute which has many departments, and groups or teams may have different interests and objectives that need to be managed. It is possible this will create conflict. A good manager needs to be aware of these conflicts and deal with them as appropriate.

Qatari society has a strong Arabic and Bedouin culture and tradition. Therefore, political, social and cultural aspects play a major influence on the personality (physiologically and attitude) on all elements within the organisational model.

The ICT Model
This section presents a model which is used to identify potential ICT activities in HHSI. The first three activities in the model depicted in Figure 7-9 are termed physical activities, they are essential as they present a structured view on the drivers for the model. The first step in the physical activities section of the model is identifying ICT needs within HHSI. The HMC organisation should not purchase ICT equipment without identifying its actual
need within the organisation. They must also guard against buying equipment for which they have no expertise.

The main benefits of introducing ICT are to make the mission more effective and efficient. User's opinions and attitudes towards ICT should be taken into consideration. This can be investigated in various ways, including questionnaires and focus group discussions. This may be followed by identifying ICT objectives from their analysis. It is important to understand what ICT will bring and add to the organisation that will lead to improve the organisational performance (step 3 in Figure 7-9).
Chapter 7

Systems Intervention

Today's market is an open market and it is competitive and large. There is a need for expert advice to deal with purchasing of ICT. As this ICT expertise does not exist in HHSL, there is a need for liaison with the purchasing department of HMC. Presently, HHSL lacks a link with the purchasing department, in fact this department is weak, and needs to be improved to take an essential role within the organisation. Therefore, the proposed model tries to identify these important

other Institutes using similar systems is important and must be taken into consideration (step 6 of Figure 7-9) carefully. Unfortunately, current HHSL practice is not to draw upon the experiences of others, which point towards a cultural change issue.

The last three steps of the model are the discussion steps. Step 7 represents discussions with the authorities. Authorities in Qatari societies are the decision-makers in introducing and updating ICT. Authorities can block or refuse any suggestions to improve or introduce ICT. Therefore, involving the authorities within the process is crucial. Thus there is a need to engage with the authorities in the decision-making processes, educate them in the use of ICT, and make them feel part of the plan. In HHSL the authorities are isolated and there is no discussion with any of them. In fact, the authorities only receive the final document to sign; this creates a problem within the organisation, hence the need to encourage discussion with the authorities.

Library staff represents the chain between the library users and the ICT facilities. In order to make the use of ICT effective and efficient this chain must be strong to ensure that users use the full potential of ICT. Therefore, library staff need to be involved in the planning and actions towards ICT procurement. A thorough discussion with the library staff is important and essential.

The final step, step 9 (Figure 7-9), is the negotiation of training and service support to the system. One of the main problems in Qatar is the lack of qualified manpower. Training for the library users and library staff need to be negotiated thoroughly in any ICT purchasing contract. System maintenance is crucial. This is one of the main problems in many of the Qatars' Institutes. There is a large amount of hardware available within HHSL that lack servicing agreements. This is due to lack of skilled or semi-skilled
manpower within the country. Therefore maintenance and system service must be negotiated as part of any contract before purchasing the system.

**Decision Making Process Models**

Fieldwork and documentation analysis shows that there is a large gap between decision makers and organisation elements, especially with ICT personnel. Therefore, the voice of the need and satisfaction of ICT personnel in the decision makers’ corridor do not exist. This problem is worsening in the case of lack of awareness and negative attitude towards ICT. There is a need for better communication between the authorities and the ICT personnel. In order to improve this communication link, better information infrastructure is needed to develop procedures for this communication. In HHSL there is a lack of communication links due to structured problems within the organisation. This may also explain the lack of awareness and attitudes of the authorities towards ICT. Communication with ICT personnel in form of meetings will help in increasing the awareness and change of attitudes of the decision makers towards ICT. The proposed model attempts to reduce the gap between ICT personnel and the decision makers and interact more with various HHSL departments. Figure 7-10 shows the proposed model. The model tries to identify the procedure to make the communication with the authorities effective. Involvement of the authorities will help with the process to educate and disseminate changes in the decision-making model.

One of the important outcomes of this research is the demonstration of a lack of awareness of ICT among the authorities. This should be considered seriously, as the authorities are the key players in introducing and improving current ICT facilities. Better communication with the authorities will help to increase their awareness. Education of members of the senior authority on committees will play an important role in increasing the awareness of the authorities. This can be achieved by inviting the authorities to national and international seminars in ICT. These seminars will demonstrate the potential of ICT and their impact on the performance of the organisation. Involving ICT experts in committees is another way of educating the authorities. Unfortunately, currently, there is no ICT specialist on any committee within HHSL.
7.11 HHSL System Model: Holistic Appreciation

The HHSL system model is a composite of the three sub-models already presented (see Figure 7-11). They are integrated to ensure provision of effective and efficient use of library services that will ultimately contribute to the practice of evidence-based medicine and the enhancement of patient care.
The HHSL organisation model provide the resource infrastructure on which the ICT model and decision-making model depend. Both of the later models are required in order to provide an efficient and effective library service (the Decision-making model gives the
capital resource; the ICT model provides the hardware and software as well as processes for the required information).

Taking a systemic view of the HHSL system model and identifying the provision of library services as the system of interest, it becomes crucial for emergent behaviours to evolve. Such behaviours are likely to embrace social trends of human activity systems. It is anticipated that attitudes towards ICT and morale of staff and users will have a positive benefit on the system as a whole. This will enable the library with in HMC to prosper and take its rightful place at the heart of the system for health information provision.

7.12 Summary

This Chapter has applied a soft systems approach to examine data collected via questionnaires, interviews and written documents in order to obtain a rich picture. Major issues in HHSL have been identified and represented using SSM. For each relevant system, a root definition of the proposed system was formulated and its elements were checked via CATWOE analysis. Conceptual models for each of the relevant systems were drawn, and an agenda for change devised, identified from those actions that are systemically desirable and culturally feasible. These actions include change to the organisation of HHSL, technological change to improve ICT provision, and cultural change to improve decision-making in HHSL. Responses to each of these actions constitute the HHSL system model which is discussed in the next Chapter.

This Chapter has introduced the HHSL system model that comprises three components: the organisation model, the ICT model and the decision-making model. The HHSL system was conceived in response to the outcome of the systems intervention using SSM, which indicated a marked deficiency in each of the three components. To investigate the ICT component in more detail, (to address the aims and objective of the research study) an interpretive structural model (ISM) was developed. Innovation in the ISM method was provided by a distributed methods for generating the element set, ie. by telephone-polling of five key players in ICT in GCC. An intent structure was employed to distinguish those elements that contributed to user needs, the competency base, the ICT infrastructure and information resources. The key objective (ie. the element placed at the bottom of Figure
Chapter 7 Systems Intervention

7-7, which 'helps to achieve' all others) is "To identify users' needs"; and the overall aim (ie the element placed at the top of Figure 7-7) is "To improve patient care".

These threads are picked up once more in the next Chapter, where they are discussed in context with wider findings.
This Chapter discusses the results of the systems intervention in light of the literature. The problem issues arise from stage one of the SSM, itself based on results from the analysis of a questionnaire and interview survey. This Chapter demonstrates the multidimensional nature of the problem situation by taking different viewpoints, as indicated in Figure 8-1, the roadmap of issues discussed. From these stakeholder perspectives, a holistic understanding of the HHSL and its place in the wider health setting can be determined. Hernando (1997) identified issues that are similar to those of the present study, such as funding, access to internet time, number of non-qualified librarians and demand for up-to-date information in the medical domain. Bremer & Leggate (1985) and Bremer (1985) provided the motivation to consider SSM as a candidate methodology for this research study. They summarised in their survey findings that the characteristics that influence the behaviour of the user depends on his/her clinical practice.

The multimethodology employed (principally SSM and ISM) gave rise to an understanding of the change processes that enriched the intervention. Issues that emerged are related to the process of change. This Chapter is therefore organised in a way to synthesise knowledge associated with change management initiatives (organisational, technical and cultural); and the staff development required to make the suggested change more effective. Finally, a section on ‘contribution to methodology’ highlights the novelty in the multimethodological approach adopted in this study.
**Discussion**

- Organisation Change
  - Internal: Organisation Structure
  - External: Co-operation and Co-ordination with GCC and beyond.

- Technology Change
- Cultural Change
- Staff and User Training
- Contribution to the systems methods

**Conclusions**

- ICT in health Libraries
- ICT in HHSL
- Systemic improvement
- Recommendations
- Suggestions for Further Research

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**Figure 8-1 Roadmap of Issues Discussed**

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8.2 Organisation Change

- Internal: Organisation Structure

As is evident from the document analysis and description of the problem content system in SSM stage 1, HHSL is currently located in the Women’s Hospital although its remit is HMC-wide. A tension exists between the administration of HHSL via the Woman’s Hospital and clinical users from other hospitals in HMC. The issue relates to the different priorities given to library services by both parties. It is clear from the questionnaire survey that clinical users seek electronic resources to update their knowledge of clinical decision-making, however from the interview with the HHSL Director, it is evident that the Women’s Hospital does not wish to provide the ongoing costs for electronic services. To resolve this situation, it is recommended that HHSL be responsible for its own budgets, and to be a separate entity as viewed on the HMC organisation chart (Figure 4-4 refers, p. 87).

As shown in Figure 7-8 (p. 177), five factors related to organisational change are associated with improving the evidence-base on which clinical decisions are taken. All five factors are internal to the organisation and relate to both technological change (ICT infrastructure and communication networks) and human activity systems (leadership, conflict management, and workload issues). The factors related to technological change are discussed in the next section; the factors related to the human activity system stem from the interviews and SSM analysis and can be summarised as:

- Lack of ICT experts throughout HMC,
- No champion to represent ICT issues in the current HHSL committee structure,
- Lack of technical support in HHSL, and
- Large ‘hierarchy’ between existing ICT staff and senior management (decision-makers).

Thus, results from this study suggest that more weight is given to ICT issues in HMC, and HHSL in particular. These findings are consistent with results from other studies in the GCC region (Al-Shorbaji, 2000a; Al-Ansari and Al-Enezi, 2001). The main role of ICT within HHSL is in the future to provide the information infrastructure and resources required for evidence-based medicine. Clinical users of HHSL should be able to access...
and retrieve high quality information on which their medical decision-making can be based. This process mirrors current best practice in the developed countries (see section 2.2.4, p. 24), and has led to reductions in patient morbidity and mortality (Sackett et al. 1999). If this can be achieved, then the ‘top-element’ in the ISM (“to enhance patient care”) would also be accomplished, suggesting that clinical user acceptance of HHSL services would increase.

- **External: Co-operation and Co-ordination with GCC and beyond**

Libraries in most developing countries suffer from inadequate funding. This has affected the level of services offered to users both in terms of quality of collections and the degree of staff support provided (Khalid 2000). Therefore, sharing resources offers the potential for libraries in developing countries to reduce the cost and improve performance in meeting users’ needs and expectations. Co-ordination and co-operation between the HMC departments, the HHSL and other national Institutes within Qatar can save time, cost and effort. For example, links between the HHSL and the Qatar University Library could allow shared training programmes, and in the future the cost of speakers from developed countries can be shared, saving valuable resources in all institutions involved.

Co-ordination and co-operation among health libraries in the GCC region is also very important, particularly given the current limited financial capabilities of such establishments, as well as the clear downturn in their recent budgets (Aljan, 1999) and the growth in the volume of information published around the world. It is not cost-effective to duplicate information resources within GCC. Resource sharing or networking between health libraries in the GCC region seems to be the only solution to the lack of resources available locally. However, as indicated from the interviews, the lack of both a policy and a development plan for HHSL has an incapacitating effect on sharing resources with GCC health libraries.

The SSM analysis contains a problem theme associated with co-operation that originates from the primary evidence collected in the interviews. The root definition states concisely the attributes of the ‘co-operation system’. Although the owner of the system is ‘GCC Medical Libraries’, HHSL could take a more proactive role in facilitating information exchange. The conceptual model (Figure 7-6 refers, see p. 159) indicates that the integrated union catalogue (for example) leads to the satisfaction of library end-user
demands. The proactive role is needed because that although the development of an integrated library in the GCC region is systemically desirable, at present it is not culturally feasible as indicated in Stage 6 of the SSM intervention (see, p. 165). Even if there was a coherent development plan for co-operation, the HHSL still lacks the required infrastructure in order to interact with other GCC health libraries to share resources. Siddiqui, (2000) and Alian, (1999) carried out research to identify the main reasons for the lack of co-operation and co-ordination among the GCC. They identified the following issues which mirror the findings of this study:

- Lack of co-operation and co-ordination in collection development;
- Lack of effective follow up;
- Absence of organisational body to initiate cooperative activities;
- Poor organisation support for co-operation systems among health libraries in GCC countries; and,
- Lack of professional manpower.

Primary data sources (questionnaire survey and interviews) also reveal a lack of awareness of the benefits of GCC co-operation (Mumtaz & Al-Jasem 2001), a lack of suitably qualified information professionals who can lead the resource sharing activity (Qari, 1999) and a lack of awareness in the user population of the benefits of information resources held elsewhere in the GCC which leads to poor co-ordination of user demands for these services (Al-Shorbaji & Nour, 2001). As an indicator of the poor co-operation within the GCC, only 8 out of 19 health libraries contribute to the union list of periodical holdings (HHSL statistics, 2002).

As was discussed in Chapter 2, many authors (for example, Moahi, 2002; Mumtaz & Al-Jasem 2001, Khalid, 2000; and Arief, Sibai & Sulaiman 1998) agree that there is a lack of co-operation and co-ordination in resource-sharing among the GCC libraries, even though this has been proven to be an effective way to deal with cost-cutting. The questionnaire survey shows that only a small percentage of the HHSL staff (11.5%) were benefiting from sharing resources within the GCC.

The SSM demonstrates the absence of co-operation between GCC libraries, whereas co-operation is a prominent element in the ISM intent structure (Figure 7-7 refers, see p.
175). The ISM element ‘To coordinate with GCC health libraries’ is placed at the lowest point in the ‘information resources’ category. This means that the elements related to users’ needs, competency base and ICT infrastructure need to be in place before co-ordination with GCC libraries can be effective (remember, the relationship ‘helps to achieve’ is transitive, see p. 175). Once this has been achieved, co-ordination with GCC libraries helps to achieve an improvement in quality of HHSL service provision, a recognition as a health library of international standing, and to increase the information resources available to clinical staff. All of these elements help to achieve an improvement in patient care.

8.3 Technology Change

The use of ICTs in Qatar is still a relatively new phenomenon, though they have rapidly diffused through both private and public organisations. Many Qatari institutions have already introduced ICT in some form or another, to support and improve the efficiency and effectiveness of their functions. Plaice (2000), Tu & Zimmerman (2000), Al-Ansari (1999), and Martine (1998), have demonstrated that ICT has an impact on health library performance and can lead to an improvement in the quality of other organisations related to the health library. In this study, the HHSL user survey shows that the vast majority of users (88%) agreed that ICT has made an overall impact on HHSL and HMC productivity and quality of work. It is likely that introduction of further ICTs in HHSL will aid the management and dissemination of health related data and information which has increased rapidly in the last few years. Health information remains valuable, to medical professionals in particular, and the public in general. The main issue is to keep this valuable information and use it for the potential benefit of society. Fortunately, ICT can also provide tools for handling information, for instance to access relevant digitised content both quickly and easily via web interfaces.

The technology issues problem theme that emerged from the rich picture eventually led to a conceptual model (Figure 7-4 refers, see p. 157) that represents ICT activities that led to an improved access to health information. Some of these ICT activities also are captured within the ISM model. However, at present the use of ICT as the main tool for communication among clinical staff, and for national and international communication, is
still far from complete in HHSL. For example, at present there is no tele-consultation with experts (clinical specialists) from developed countries. ICT offers important ways to enter and manipulate data and to retrieve information. The Health Librarian can be a major change catalyst to achieve effective and efficient communication. (Itayem, 2001)

It is clear that for technological change to succeed, a human-centred approach is required that provides recognition of users' needs and the development of ICT competencies in staff and users. This is shown in the order of elements in the ISM intent structure (Figure 7-7 refers, see p. 175). These findings are accentuated by those from the 'technical issues' problem theme of the soft systems intervention, and the ICT component of the HHSL system model (Figure 7-9 refers, see p. 179). All three stages of the HHSL system model combine to form an action plan for ICT service provision in HHSL.

Local and international authorities provide legislation, rules and guidelines with which the medical profession must comply. Therefore, the medical information needed must originate from verified, high quality, sources for decision-makers to be confident in decisions taken. Another important factor in the medical profession is time. Clinicians cannot wait for the delivery of the information/consultation and the sharing of advice. In many cases, time is crucial to reduce patient morbidity and mortality. For the above two reasons, ICT-enabled technological change in HHSL can make a telling impact on the improvement of health outcomes in HMC.

The key element of establishing a health library in HMC is to meet users' information needs. The results of the questionnaire survey indicated that the majority of the users (62%) are not satisfied with the ICT service provided. This view is supported by the interviewees' opinions of library services. Interviewees expressed their views strongly, and sometimes with anger, towards the current ICT services provided in the library. The main reasons for the dissatisfaction are the lack of PCs available in HHSL, restricted time for accessing the internet (30 minutes), and a lack of networking within GCC health libraries in the region. This response is due to the fact that the HHSL users believe that ICT will increase their productivity and effectiveness. Findings from the questionnaire demonstrate that 80% of the users say that the current access time is insufficient for their needs. This represents an obstacle towards user satisfaction as illustrated by the rich picture of the SSM study (Figure 7-3 refers, see p. 151).
Chapter 8  Discussion

ICT infrastructure is essential to create a productive and effective working environment. Results from the both the survey and SSM study indicated that the current ICT infrastructure does not cope well with the user needs expressed. Therefore, ICT infrastructure requirements should be included in any HHSL strategic plan. To achieve efficient communication networks with HHSL also requires an acknowledgement at the appropriate place in the HMC strategic plan. At present, the survey indicated that the existing communication infrastructure lacks speed (bandwidth) and physical space in HHSL for ICT equipment.

Executive managers within HMC have a major role to play in updating and introducing new ICTs to the HHSL. They are the decision-makers for the ICT budget, ICT purchasing, and ICT personnel employment. Although the HHSL has a budget within the HMC there is no cost centre for ICT-activities. This lack of ICT budget is due to two factors: the lack of an ICT champion on committees within HMC and HHSL; and the budget is controlled centrally which needs permission from the appropriate authority within HMC to provide resource. The State of Qatar is relatively small and rich; therefore, there is no excuse for not establishing a communication system nationally and regionally to facilitate the sharing of information access.

8.4 Cultural Change

The HMC is a governmental organisation, controlled centrally. The authorities are governmental employees; their appointment and promotions are also controlled centrally. The main issue is that the vast majority of those in the authority have a lack of awareness of the importance of ICT. This may be due to lack of experience and education in ICT. A slow cultural change is likely as the more ICT knowledgeable younger generation take up senior positions.

The HHSL is at a lower level than the HMC in the current organisational management structure (see Figure 4-4, p. 87) with several layers of management before reaching the highest decision-making level. This hierarchy means that many suggestions and recommendations for ICT fail to reach the appropriate management level for effective decision-making. Opinions and attitudes towards ICT among middle-level managers may block progress. Negative opinions and attitudes are due to i) fear of change; ii) lack of
familiarity with ICT practice and iii) lack of communication among the various departments of HMC. The negative attitudes towards ICT progress were illustrated in statements in the interview with the Heads of Medical Departments. They have argued that a change of attitude is a priority before talking and discussing any change in ICT. It is understandable that a negative attitude has a serious impact on introducing and improving ICT as the decision-makers in the high levels of HMC management structure are controlling both budgets and the policies. There is also a social factor, in that it is not the norm in Qatar to criticise authority. Another factor which may contribute to a negative attitude is that some managers are placed in a position not related to their experience and qualification. This problem is indicated in the GCC health libraries; Al-Oqla (1998) noted that four directors of health libraries in GCC countries have neither formal qualifications in library studies nor any other university qualifications. As a consequence, high level management understanding of library users needs is absent.

One of the problem themes in the SSM was related to the value of information and the value of HHSL staff. With the onset of evidence-based healthcare in the USA and UK, together with the use of electronic health libraries in both countries (NLM in USA; NeLH in the UK), the value of health information is clearly recognised by clinical personnel. To instil this value system in HHSL (and GCC) requires activities that are indicated in (Figure 7-5 refers, see p. 158). Increasing the skills base of HHSL staff will help provide the library service that will enable the transfer of technology and knowledge from the USA and UK to Qatar and the GCC region. D’Alessandro et al. (1998) indicated how a ‘traditional library’ can be transformed into an ‘e-library’. Bailey et al. (2000) provided a list of recommendations (see section 2.2, p. 11) that will add value to the evidence-base collected, thus enhancing the role of both information in the clinical decision making process and library staff in providing the right information at the right time in the designated place.

**Decision Makers**

Decision makers within HMC have failed to introduce ICT policies and guidelines. Documentation analysis shows that there are no written policies and procedures for ICT within HHSL, and it lacks an up-to-date policy document on how to deal with technological change (Section 6.4.1). This lack of documentation is also highlighted by the
interviewees, where all respondents agreed that there is a need to introduce ICT policies to establish procurement cycles, training programmes, and so on.

As was evident in results of interview survey, the main reasons for the lack of ICT policies and guidelines in HHSL are due to:

- Lack of qualified manpower to write ICT policies according to national and international guidelines.
- Library staff lack awareness and any proper training programme in ICT policies, guidelines and compliance.
- Lack of strategic planning towards ICT at all levels within HMC.
- Lack of the national policies towards ICT.

To indicate the link between decision-making on ICT and organisational learning, the decision making component of the HHSL system model (Figure 7-10 refers, see p. 182) is useful. Here, the decision makers become aware of ICT issues for a particular technological change solution. If the issues are not well known, organisational learning strategies are employed. However, if they are known, then better communication links are employed to aid further sets of decisions on procurement of ICT.

8.5 Staff and User Training

Staff training in HHSL

Training is generally acknowledged to be essential in introducing successful change in the workplace. It is a tool to improve individual performance that will reflect in an overall organisational performance improvement. Furthermore, it is a key strategy in training planning that training should meet workplace needs.

Training has become part of any training system due to the fact that it has become part of our daily life. However, ICT education within HHSI is vague, unclear and not well established. This finding comes out most clearly in the ISM intent structure (Figure 7-7 refers, see p. 175). Here, once the users' needs have been identified, a set of elements that have been classified as 'competency base' is one of the next provisions. The 'competency base' includes the need to establish ICT learning resources, develop training programme,
and increase skills set in order to streamline the HHSL ICT activities. Therefore, there is a need for policy to be established within HHSL to establish strategic planning for ICT education. This is very important due to the fact that ICT hardware and software is changing with time very rapidly and users need to be trained on state of the art hardware and software. This is needed in order that the clinical staff can cope with modern technology and the high rates of data input and information retrieval.

As was evident in this study, for HHSL to increase its effectiveness for clinical users and to deliver evidence-based medicine, procurement of ICT facilities is essential. At the same time, library staff need to receive training on how to use the technology and how it fits in within clinical practice. However, this need raises a number of issues, identified in the SSM, ISM, interviews and document analysis, that need to be addressed urgently.

It is essential that staff training is well recognised by senior management, although evidence from the SSM and interviews suggest a contrary view (see p. 151). This perspective from senior management stems from the value system that all stakeholders place on training. To break the negative value cycle requires staff training to become an important element to be discussed in the existing development appraisal framework. As with most appraisal systems, resources can be identified to fund their outcome. A further impediment to progress is found from the evidence of the HHSL Director who stated that there was no specific identified monies for staff training within the HHSL budget. Thus, HHSL management need to establish staff training as a 'line item' in the budget.

Within the current environment of HHSL, there are no incentives for staff to undertake training. The interview with the HHSL Director in HMC indicated that some staff (especially female staff) actually refuse training opportunities as a consequence of being away from their family. Finding resources to reward training undertaken could become part of the strategy to encourage staff to attend appropriate training programmes. One of the issues that illustrate current thinking is the 'job is safe' attitude among library staff. This attitude impacts on the perception of these who plan and deliver the training programmes, as they are aware of the high level of absenteeism of library staff on their courses (see p. 133). To compound matters further, this attitude is also apparent in HHSL senior management who believe it is wiser and more efficient to keep staff in the library at
all times. Clearly, these attitudes are not acceptable. To achieve progress, a multiperspective appreciation of the value that training brings to an organisation is needed. This view is expanded in the value system identified as part of the SSM study. Both questionnaire and interview surveys revealed a set of information-based skills that library staff should attain as a minimum requirement. These skills include:

- Be able to search a range of bibliographic databases to support information retrieval for all formats and media;
- Be able to identify sources of information disseminations between Internet, and CD-ROM;
- Be able to collect and structure data, storing it for later retrieval, interpretation and correction;
- To design a simple database, to which records can be added, edited and deleted, and ability to search, select and sort fields on given criteria;
- To provide internet searching;
- To provide health related internet resources including evidence-based material;
- To provide criteria to evaluate the quality of the content of internet resources used;
- To be able to provide information network services- ability to use and understand the functions of electronic mail, and to exploit the full potential of the Internet as an information resource; and,
- To use ICT for professional medical discussions and consultancy.

The Continuing Professional Development (CPD) of library and information professionals has become more important than ever in today’s ICT environment, partly due to continuous changing of hardware and software. Anwar and Ansari (1999) stated that training programmes for librarians and information specialists should not merely focus on new developments but should also stress how to keep up with the latest technologies. HHSL has neither CPD system nor policies, rather it reacts to identified needs. The same issues occur at other GCC countries (Itaym, 2001; Khalid, 2000; Shorbaji, 2000). They reported that library training in GCC is very traditional, typified by lack of practical training, an absence of skilled library and information system graduate staff that can deal with ICT, and a lack of adequate training facilities.
Evidence from the interviews suggests that the HMC can achieve in-house training in ICT by encouraging, supporting and instructing the co-operation and co-ordination of the HIS department. This collaboration has both the potential and the manpower to support and deliver some ICT training to staff.

The technology system change suggested by the SSM in Chapter 7 indicated that the HHSL should run seminars in library and information studies for HMC staff, and workshops to use ICT to improve their own professional efficiency. Library staff would gain knowledge of, and organise, ICT resources to enable users to use library resources to their full potential. It is also important that the HHSL should invite speakers from developed health libraries to deliver seminars on various topics of interest.

**User Training**

Both users and staff training are crucial issues for the development and performance of the library (Al-Shorbaji 2000; Khalid 2000). The main aim of any health library is to meet the needs of their users. Indeed the element ‘To identify users needs’ is the root element of the ISM intent structure, (Figure 7-7 refers, see p. 175) indicating that this topic must be addressed before others in the figure. Therefore, the library strategic plan should provide training to enable users to use the various resources at the library and internet facilities effectively and efficiently. Unfortunately, this research study shows that the HHSL still falls short of achieving this target, even though it is a relatively new and modern health library. Currently, users are mainly self taught due to lack of training support. Table 6.8 shows that the majority of the respondents (91.2%) were self taught.

The other issue in user training is its philosophy. User training still uses a traditional system of teaching and learning, i.e. providing the users with steps of information, treating the users as an ‘empty vessel’. This philosophy needs to be reconsidered, especially as the main users of HHSL are medical professionals. The philosophy should be based on invoking the users’ intelligence to explore medical resources. This can be achieved by providing general science information education and for the resources to be available regionally, nationally, and internationally. It is not surprising that training has been studied by various researchers.
Library training plays in users' awareness of the available resources and how to use the library facilities efficiently and effectively. However, from the questionnaire survey 89% of those who were self-taught and 91% of those who received training from library staff thought that their quality of work improved with the use of ICT. There seems to be little difference between the type of training given.

8.6 Contribution to the systems methods

This research study provided the first systems intervention within HMC in Qatar. It draws on similar studies applied to health information provision in other parts of the world (for example Shapiro & Shapiro 2003; Lehaney & Paul 1996). The uniqueness of health information systems in Qatar, and to a large extent in the GCC region, is the value that their cultural systems place on healthcare. To investigate the systemic change processes necessary to invoke change requires the novel use of a multimethodology. These were Checkland's Soft Systems Methodology, Warfield's Interpretive Structural model, and a self constructed organisational model. This type of study has been used in several sectors (Mingers & Gill, 1997; Munro & Mingers 2002), including health. Mingers & Gill (1997) provided the initial impetus on multimethodological thinking whose result was the emergence of what Jackson calls “creative holism” (Jackson, 2003). A subjective evaluation of the impact of multimethodology was performed as part of the Munro & Mingers study. From the 78 responses obtained to elicit a satisfaction rating, both the respondents and their clients indicated a median score of ‘6’ out of a maximum satisfaction rating of ‘7’. This rating proved to be equal to the best of the scores for the application of single methods. Thus, the Munro & Mingers study of 2002 demonstrated the popularity of the pluralist approach and brought further success stories of the use of multimethodologies into the public domain.

A perceived lack of co-operation between the various stakeholders and a lack of awareness of users' needs were the starting points for this study. As the research objectives themselves were considered to be problematic (i.e., open-ended at the start of the study), conventional research methods in which the objectives and end-points can be identified were ignored. The research study also incorporated the human ‘element’ such as politics and culture that are difficult to capture in hard systems methods. All of these factors pointed to the use of Checkland's SSM as an integral component. The use of SSM
in conjunction with more generic systems approaches has been discussed at length in the literature as evidenced in Chapter 2 (Checkland 1981; Wilson 1984; Checkland & Scholes 1990 and Davis & Ledington 1991).

The choice of SSM allowed not only an understanding of the issues, but also led to a plan of action to improve the existing 'problem situation'. The information gathered during the fieldwork was represented as stage one of the SSM, a set of problem issues. Three perspectives were taken, the HMC senior management decision-makers, librarians and library users. These perspectives cover the aims and objectives of the research study and reflect the real life situation. The rich picture (SSM stage two) reflected the real situation within HHSI in pictorial form. This aided the recognition of relevant systems. Eight relevant systems were originally identified (Chapter 7), but were re-classified into three: the technical issues relevant system; the value system issues relevant system; and the cooperation issues relevant system. SSM helped to identify and simplify the problem situation to well-defined ICT-related issues. The conceptual models helped to identify the activities of the model and in which sequence they have to occur. The important part of the SSM is the comparison process between the conceptual models and real world (as expressed in the rich picture). This comparison helped to explore the debates concerning the problem situation. The main outcome of the SSM is related to the improvement of the problem situation and change identified through the implementation of an action plan, both within the context of HHSI. This plan of action comprised changes in structure, procedures, attitudes and culture.

The ISM study provided a structured approach to change. From the SSM, the changes were known to be systemically desirable and culturally feasible and can be organised into a change ontology. The components of interactive management (NGT and ISM) combine to form a set of ordered objectives. From the intent structure obtained, which uses the relationship 'would help to achieve', the root node objective is likely to be the first item in any agenda for change. In comparison, the top node is the objective to strive for. Thus, in the context of this study, the ISM intent structure comprised 20 elements categorised into five classes. The root node, "To identify users’ needs", helped to achieve all elements, including the goal of improving patient care. In outline, elements related to users’ needs helped to achieve an improvement in the competency base (for users and HHSL staff). Both an understanding and implementation of elements related to users’ needs and
improving the competency base helped to achieve elements related to ICT infrastructure provision. These elements, in turn, helped to achieve an increase in information resources, that led ultimately to an improvement in patient care.

Changes recognised in structure and procedures were brought together in a proposed HHSL organisational system model. These three sub-models interact in a way shown in Figure 7-4 to yield an impact on HHSL service provision (in terms of efficiency and effectiveness), that provide the evidence base that allows enhancements in patient care. This model has three interacting sub-models (organisational change component model, ICT component model, and decision making component model) of which the ICT model component delivers a solution required for the third objective of this research study.

Why use a multimethodology? No one method(ology) was rich enough to capture the multiperspective nature of the stakeholders' value systems. The SSM (a soft, interpretive approach) captured the 'human issues' and identified the problem themes. The ISM (also a soft, interpretive approach) was used to develop a plan that was especially useful for technology change management. In contrast, the organisational approach (soft and functionalist) provided a model that integrated decision-making, ICT issues and change management.

Figure 8-2 shows a conceptual map that indicates how the threads of the research in this thesis come together, and from the basic from which the earlier discussion was synthesised. Further research streams have been identified (see recommendations in the next Chapter) and provide ideas for future studies in the use of multimethodology or applications related to health information provision.
Chapter 8

Research

- Generates new research question

Uses

- SSM to identify problem themes and change management issues
- ISM structure the change management processes
- Organisation model to understand the roles of people

and produces

- Insights into human/ICT activities with respect to change

leads to

- Production of systemic improvement in HHSI
- Results that can be used to understand and learn how for organisational learning

yields

- Allows
- Facilitates

and produces

- Improved quality of health information

Figure 8-2 Conceptual model of this research study
Chapter 9
Conclusions and Recommendations

9.1 Introduction

This Chapter presents conclusions and recommendations and suggestions for future work that are derived from the study. The recommendations can be used as part of an action plan for implementation of ICT within HHSL. The conclusions reflect upon the aim and objectives of the study.

9.2 Conclusions

This research represents the first comprehensive research study that investigates ICT in combination with health information in State of Qatar. It also represents the first time Checkland’s SSM has been used in any study based on a Qatari application. The multimethodology holds promise for similar applications in the State. SSM allowed not only an opportunity to ‘understand’ and ‘learn’ about the problem scenario, but also produced a plan of action to improve the existing situation.

9.2.1 ICT in Health Libraries

The first objective of this study was to examine the role, impact and use of ICTs in Health Libraries throughout the world. The principal source of information used to achieve this objective was the literature. This review revealed the similarities and differences in the role and use of ICTs in Health Libraries between developed countries (for example, USA, UK) and developing countries (for example, Middle-Eastern countries, GCC). Although a general aim to strive for health information to be made available at the point of care, there are striking differences in the path of progress. In many GCC countries, obstacles to progress include the relative inexperience of decision-makers in ICT procurement, lack of staff development opportunities, and a resource base that does not meet the needs of library managers. These issues were discussed in this study, mainly in Chapter 2.
9.2.2 ICT in HHSL

The second objective of this study was to investigate the role, impact and use of ICT in HHSL. The principal sources of information used to achieve this objective were the questionnaire survey and interviews with senior management. Document analysis provided contextual background information that aided the interpretation of some of the results. It is surprising that respondents did not use computers for patient information retrieval or used them irregularly for this purpose (see Figure 6-4, p. 112). However, upon further investigation, this result reflects the lack of appropriate electronic patient record facilities at present, rather than the role of ICTs within HHSL. On the other hand, respondents did seem to possess the skills required to access electronic information. Drilling down to particular information seeking behaviour revealed that respondents use the MEDLINE bibliography service either daily or weekly. Training needs in word processing are perhaps revealed, as only 40% use this facility either daily or weekly. Whereas the results above provide an indication of the impact of ICTs, a more direct question in the research instrument uncovers a level of satisfaction with ICTs in the HHSL. Of the respondents who possessed either average or advanced level of computer skills, the vast majority thought that there was insufficient access to computers in the HHSL, (see Table 6.1, p. 114). The lack of ICT systems in place for users in HHSL means that use is restricted to 30 minute ‘slots’ and there was insufficient internet access. Given the drive towards evidence-based medicine, described elsewhere in this thesis (for example, see p. 204), these results are clearly an unsatisfactory conclusion.

The results from the interviews reveal policy issues that must be rectified. These policy issues included value placed on information and attitudes towards library staff, training of staff and users, lack of ICT policy, policy issues related to ICT infrastructure, and ICT funding issues. From the document analysis, most of the staff employed by HHSL do not possess appropriate information or library based qualifications. The poor state of ICT provision currently in HHSL is not surprising given that policy decision-makers are oblivious to the needs of modern information provision. From the evidence presented above, objective 2 was achieved in full.
9.2.3 Systemic improvement

The third and final objective of this research study related to identifying the change processes required to bring about systemic improvements in HHSL. This was achieved by establishing the problem scenario through a set of research methods that provided a rich vein of data and information. The systems intervention to improve the problem situation used a multimethodology approach (Mingers, 2002) and (Mingers & Gill 1997). This approach allowed the user findings that established the problem scenario to be its starting point. To encompass the richness of the information contained in the problem scenario, the human element within the system under study, and the emphasis an understanding change processes, all pointed to the use of SSM as the first element of the multimethodology. Changes identified to improve the problem situation formed the statements that were presented to five ‘experts’ in both ICT and its procurement, development and application in Arab states. Using an ISM analysis, the second element of the multimethodology, provided an intent structure that is useful to identify the logical order of ICT developments within HHSL. The third element of the multimethodology, the HHSL system model, allowed the uncovering of change that linked HMC, HHSL and patient care.

The process of implementing the SSM ensured a deeper understanding of the issues that correspond to the identified problem themes: technical issues; value system issues; and issues associated with co-operation. Thus, the aim of the study which relates to role, impact and use of ICT, is placed within a wider context of issues that relate to the value users place on information and library staff, and co-operation within Qatar and within the GCC area. In this respect, the role of SSM moved towards providing content for organisational learning. The change identified were at three levels of management: strategic, policy and operational.

The use of ISM was instructional and allowed the identification of users’ needs (root node) to be linked to improvement in patient care (top node). The intent structure allowed for the identification of elements that aggregate into four categories: users’ needs, competency base, ICT infrastructure, and information resources. The ISM ‘map’ may allow the HMC/HHSL budget holders to distribute resource in a more effective way so reducing the time taken to implement change.
The use of the HHSL system model allowed the change processes, identified by the use of SSM and ISM, to be instantiated to HMC and HHSL specifically. It also provided the emphasis on adoption of evidence-based medicine.

The results of the study have already been disseminated to senior management in HMC and HHSL. As a direct result of the findings from the systems intervention, a strategy has been formulated to adopt electronic journals in place of their paper equivalents. This change allows the delivery of up-to-date medical information to be delivered to users at their preferred location, including point of care. This change facilitates the widespread practice of evidence-based medicine.

9.3 Recommendations and Suggestions for Further Research

9.3.1 Recommendations

The main recommendations that follows from the study can be seen in Table 9.1. Three different management levels are indicated - HHSL, HMC, and Executive management - that map onto the three types of management - operational, policy setting, and strategic perspective respectively. At the operational level it is recommended that only qualified librarians/information workers be appointed to any open positions within HHSL. This will provide a starting point for the cultural change indicated in the discussion. By identifying staff training needs and creating a staff development programme all HHSL employees will be able to contribute to health information service provision. To make best effect of the information provided, a user’s training programme should also be developed. Indeed, information service provision should be reviewed (such as the number of networked computers available in HHSL) and services advertised on HHSL web pages.

To develop evidence-based services at the point of care requires the evidence to be in an appropriate electronic format. It is recommended that HHSL move towards the acquisition of e-journals and other e-content information sources. When achieved, the HHSL may be in a position to take the lead on the integration of electronic information provision throughout the GCC. The electronic resources offered through international links would add to the information services provided to HHSL users, users from other libraries in Qatar, and those libraries within the GCC co-operation agreement.
To achieve the recommendations at the operational level requires the HMC to create appropriate policy statements. Policy regarding ICT adoption within the State of Qatar is essential, and should cover integration of activities between HMC and the University of Qatar as a basic tenet. Similarly, a policy document is needed to guide the interaction of HHSL activity with health libraries from its GCC neighbours. This policy may be facilitated by organisations such as WHO-EMRO. Similarly, policies for co-operation further afield (international links) are required.
All of this requires a clear ICT strategy, championed by the HMC Executive management body. The need for resources such as bandwidth and adherence to international standards are essential components of the strategy. To provide an effective roll out of ICT infrastructure and adoption of ICT applications requires a ‘champion’ to be identified on committees at all management levels. The champion will be able to guide application requests and critically evaluate proposals. It is essential that a budget is made available for ICT procurement and activities, and for staff development and user training. It is unclear if this proposed budget will emerge from prioritising the current business plan in a different way, or if new monies are to be made available for investing in information infrastructure, staff development and user training.

9.3.2 Suggestions for Further Research

The empirical findings from this systems study suggests that there are a number of avenues that can be explored in the future. Further studies on the transition from ‘traditional’ library, in which the majority of resources are paper-based, to electronic provision of information at the point of need, are required to further understand the infrastructure for evidence-based medicine. These studies will allow HHSL to take a lead in the co-ordination and co-operation of library resources within the GCC. Research which furthers the linkages between HHSL, GCC libraries and WHO-EMRO will also facilitate the delivery of the required information in the right place at a time to be effective in patient diagnosis, treatment and ongoing care.

Given the obstacles to the effective use of ICT in HHSL discussed in this study, it is clear that more work needs to be done on establishing the value of information and information workers. Although the cultural change required for the value of information to be recognised will be relatively slow, studies that identify ‘quick wins’ are likely to be important. To effect this ‘quick win’, it is suggested that specific clinical domains are chosen (e.g., cardiovascular or renal) that can demonstrate the benefits of evidence-based medicine, with results being rolled out to other clinical specialties (Sackett et al. 1999). In any dissemination, the role of information and the information workers can be highlighted to show the central position they play in the clinical process.
From a methodological perspective, the way that ISM can be used to reach consensus decisions and SSM can be used to investigate human activity systems, both 'fit' within an interpretative paradigm accepted by Arabic culture. Improvements in identified problems can be accepted without criticism due to the intensely human participation of the methods used and the way that they interact to achieve a way forward. It is clear that a pluralist approach brings many benefits to real-world applications. Extending the application base to test the applicability of the SSM – ISM combination is one avenue to explore in further detail, as is extending the methodological base to combine different research methods to best effect.
Bibliography


Bibliographies


<http://www.icml.org/Monday/strategic/alshorbaji.htm>, [accessed 2.01.01].

Al-Shorbaji, N., 2000b. *Developing an electronic health science library network has been one of the prime objectives of the regional office.*
<http://www.icml.org/monday/strategic/alshorbaji.htm>, [accessed 2.01.01].


Bibliographies

Bergvall-Kareborn, B., 1999. Information, systems, and information systems. [reviewed]. 
Cybernetics & Human Knowing, 6(3), 91-95.

Bishawi, H., 2001. Has your hospital library ever been evaluated? Proceeding medical librarians 
regional conference & training course on health libraries in medical colleges: Beirut, 
Lebanon, 4-8 February, pp.1-11.

Emirates. Management for change: issues for digital libraries in the Arabian Gulf region, Proceedings 
9th Special Library Association Arabian Gulf Chapter: Qatar, 2-4 April, pp. 1-10.

technology, development and management for the e-business. 2nd ed, pp. 410-416.

Boumarafi, B. M., 1996. Libraries and information services in the United Arab Emirates 

Brember, V. L., 1985. Linking a medical user survey to management for Library 

Brember, V.L. & P. Leggate, 1985. Linking a medical user survey to management for 

Health Information and Libraries Journal, 21(2), 81-83.

Athenacum.

Cahoon, J. & R. Marriott, 1999. Delivery of Medline over the Internet with full text 

needed for effective digital library management. 7th annual conference & exhibit, towards a
network of electronic libraries: a gulf perspective proceedings 27-29 October, Muscat, Sultanate of Oman, pp.18-23.


<http://sem.ucalgary.ca/courses/seng/613/F97/grp4/ssmfinal.html>, [accessed 15.03.01].


<http://www.eia.doe.gov/emen/labs/qatar.html>, [accessed 17.04.03].


<http://www.scu.edu.au/schools/gcm/ar/arp/sofsys2.html>, [accessed 24.01.03].


Bibliographies


<http://www.nwpho.org.uk/reports/ICT.pdf>, [accessed 02.08.03].


<http://www.sdo.lshtm.ac.uk.PDF/changemanagementreview.pdf> [accessed 22.07.02].


Bibliographies


Bibliographies


Bibiliographies


Pathan, A. M., 1986. The Hamad Health Sciences Library. Middle-East Journal of Anesthesiology, 8(6), 541-548.

Bibliographies


Bibliographies


<http://www.ucalgary.ca/~agers/seng613/ssm.htm>, [accessed 19.01.03].


Appendices
Appendix A Supervisor Letter
This note confirms the need for Rabab Abdulla to distribute 250 questionnaires directed at all levels of hospital staff. The completed questionnaires will be returned to Rabab via the Health Science Library. This work forms an integral part of the primary data collection exercise, allowing successful completion of her PhD studies. The evidence, once analysed, will have the potential to identify best practice and save scarce resources.

If you wish to receive further details, please do not hesitate to contact me personally.

Yours sincerely,

Ron Summers
Professor of Information Science
And Head of Department
Appendix B Questionnaire
Dear participant:

We feel privileged to enclose a questionnaire that concerns the impact of Information and Communication Technology among the users of Hamad Health Sciences Library. As you may already know, we have undertaken to investigate the ICT-related needs of the users in order to strengthen and improve the service standards of the library.

We believe that investigating the patterns of communication with Hamad health library users, especially at this time of rapidly changing environment, will help to assess to what extent available information and communication technologies are used. The result of the study, therefore, will help in designing an enhanced ICT-led information service to the health community. Further, we believe, that this study will lead to the introduction of a number of new services and resources that will help the users in rendering high quality health services to patients.

While looking forward to receiving the filled questionnaire at your earliest convenience, I take this opportunity to thank you for your co-operation in this project.

Yours sincerely

Rabab Abdulla
Toward understanding of ICT in Health Science Library in State of Qatar

We take immense pleasure in seeking your esteemed views on issues relating to ICT in the Health Library Service. The purpose of this study is to assess the value and impact of information services in the Hamad Health Sciences Library.

All responses will be treated in strictest confidence.

**Part A: Personal Information**

1. Which of the following categories do you belong to? (please tick one)
   - 1. Doctor
   - 2. Engineer
   - 3. Administrator
   - 4. Nurse
   - 5. Technician
   - 6. Others, please specify

2. What is your grade?
   - 1. Consultant
   - 2. Specialist
   - 3. Resident
   - 4. Others, please specify

3. Gender?
   - 1. Male
   - 2. Female

4. What is your highest academic qualification?
   - 1. Diploma
   - 2. Bachelor
   - 3. Masters
   - 4. Ph.D
   - 5. Others, please specify

**Part B: Library Services**

5. Are you currently a member of the library?
   - 1. Yes
   - 2. No

6. How often do you use the Library?
   - 1. First time
   - 2. Once a month
   - 3. 2-3 times a month
   - 4. 4-8 times a month

7. Are the books that you need usually available?
   - 1. Yes
   - 2. No

8. Are the library staff helpful?
   - 1. Yes
   - 2. No

9. Do you feel that you get your information on time?
   - 1. Yes
   - 2. No

10. Have you had better service in another library?
    - 1. Yes
    - 2. No

    If yes, What was better.................

11. How often do you spent time an information searching?
    - 1. Daily
    - 2. Weekly
    - 3. Occasionally
Appendices

4. □ Never

12. What is the purpose of your search?
   1. □ Patient care  2. □ Presentation  3. □ Clinical research

13. Do you need assistance from library staff to locate what you are searching for?

14. Which methods do you use to obtain information sources?

15. What services of the library help you the most?
   1. □ Interlibrary Loan  2. □ MEDLINE  3. □ Circulation
   4. □ Internet

16. Which methods do you use to obtain copies of journal articles?
   1. □ A personal journal subscription  2. □ Photocopy library owned journal
   3. □ Interlibrary Loan (ILL)

Part C: Computer skills

17. What level of computer skills do you possess?
   1. □ None  2. □ Poor  3. □ Average
   4. □ Advanced  5. □ Professional

18. Which of the following computer skills do you have?

<table>
<thead>
<tr>
<th>Computer skill</th>
<th>Daily</th>
<th>Weekly</th>
<th>Monthly</th>
<th>Irregular</th>
<th>Never</th>
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<tbody>
<tr>
<td>Medline searching</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sending/receiving e-mail</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Internet navigation</td>
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<td></td>
</tr>
<tr>
<td>Word processing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enter and retrieve patient</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>records</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

19. Should the library develop individual profiles for physicians in order to forward the most recent information of their interest electronically?
   1. □ Yes  2. □ No

20. Do you feel the pace at which new technology is introduced in to your work area is:
   1. □ Too fast  2. □ Too slow  3. □ Just right

21. Do you think the number of computers in the library is enough?
   1. □ Not enough  2. □ Enough

22. Do you think the allocated time of "30 minutes" for using the Internet is enough?
   1. □ Yes  2. □ No
Appendices

23. Computers make my work production:
   1. More accurate  2. Less accurate  3. Other, Please specify

24. Do you currently have the ability to access World Wide Web (WWW)?
   1. Yes  2. No

25. Do you need any training input in accessing the WWW?
   1. Yes  2. No

26. What other training requirement you foresee in future?
   1. ICT training  2. Keeping up-to-date

Part D: Medline Services

27. Do you prefer searching MEDLINE yourself?
   1. Yes  2. No

28. How often do you search the MEDLINE database?
   1. Less than once a month  2. 1-3 times each month
   3. 4-10 times each month  4. More than 10 times each month

29. Which form(s) of MEDLINE do you prefer? Tick all that apply
   1. CD-ROM  2. MEDLINE  3. Grateful Med via Internet
   4. Grateful Med on home computer  5. Others, please specify

30. Which of the following features of CD-ROM database of MEDLINE do you like the most?
   1. Easy to use  2. Prompt search response
   3. Citations  4. Abstracts

31. Do you feel satisfied with the searching results from MEDLINE?
   1. Yes  2. No

32. Should the library provide access to databases other than MEDLINE?
   1. Yes  2. No

   If Yes please list below the databases of your interest...
Part E: Information and Communication technologies

33. Are you presently aware that ICT is used in the library?
   1. Yes   2. No

34. Are you satisfied with ICT provided in the library?
   1. Yes   2. No

35. With which of the following did you find any difficulties when implementing or using ICT?
   1. Lack of computer skills   2. Lack of funds
   3. Less powerful PCs   4. Lack of HIS (Health Information System) staff

36. Which of the following resource services are accessible from ICT?
   1. Internet   2. Intranet   3. CD-ROM databases

37. Has the productivity and quality of work improved with the use of the ICT?
   1. Yes   2. No

38. Who trains users on how to access the ICT?
   1. Library staff   2. Self-taught   3. Others, please specify

39. So far, are you satisfied with what the ICT services offers?
   1. Very satisfied   2. Moderately satisfied
   3. Moderately dissatisfied   4. Very dissatisfied
   5. No opinion

40. Please indicate the reasons you use ICT services?
   1. Easy to use   2. Cost-effective   3. Convenient
   4. Best option available

41. What is your impression about services provided by ICT?
   1. Save time   2. Consistent   3. Complete
   4. Accurate

42. What services on the Internet have you actually used in the past year at any time?
   1. E-mail   2. Medical discussion group
   3. WWW   4. Others

Thank you for completing this survey. Please attach any additional comments or suggestions you think would be helpful in Hamad Health Sciences Library continuous efforts to improve Information and Communication Technologies (ICT) service.
Appendix C Questionnaire Response
Dear Sir/,

I am aware of and highly appreciate your time and commitments to your profession. Please may, I would like to remind you that I have not received your response to the questionnaire submitted to you during your visit to the library. Your response is highly valued and is very important to our research and for our institutions. I would like re-emphasis that your response will be dealt with confidentially and the final outcome of the research will be made available to you.

I look forward to receiving your response. If you need another copy of the questionnaire please contact me. I can be contacted either by e-mail r.mohmed@lboro.ac.uk. Or at my workstation in the library.

Rabab Abdulla
PhD Candidate
Loughborough University
Department of Information Science

P.O. Box: 3050-DOHA-QATAR-Tel.: 4392222-4393333-Fax: 4411133
Appendix D Thanks to HHS Staff
Dear Colleagues,

I would like to express my sincere thanks and appreciation for your help, support and advice during my research fieldwork in the library, specially the setting of the station within the library for distributing and collecting the questionnaires. Your tireless effort and patience remains the key for the survey success. I promise you I will inform you of the main outcome of the field work, in order that it may be used for future improvements.

I look forward to seeing you soon.

Rabab Abdulla
PhD Candidate
Loughborough University
Department of Information Science
Appendix E Interview Director
Interview Opinions and Attitudes of Library Director

Opinions and Attitudes towards ICTs

Q1: What does ICTs mean for you?
Q2: How do you value ICTs in your library?
Q3: Do you believe that most health libraries should move into new areas of ICTs?
Q4: Do you believe ICTs should have priorities in any plan?
Q5: Do you think that the ICTs facilities available in your library meets the users need and satisfaction?
Q6: What is your opinions about establishing ICTs center in your organisation?

Current Situation of ICTs in the Library?

Q7: Are you satisfied with the current situation of ICTs in your library? And how would you rate your library’s progression towards ICTs?
Q8: What is the level of co-ordination among the departments?
Q9: Who is responsible for the design, development, implementing and maintenance of the ICTs?
Q10: Do you think that information sources on the library meet your users needs and satisfaction?

Problems and Obstacles

Q11: what are the main barriers and obstacles to meet the rapid changes in introducing and updating ICTs?
Q12: How is the library ICTs funding decided? What are the routes of the decision making?
Q13: Do you believe that your library users and the librarians are ready to cope with introducing and updating in ICTs?
Q14: Do you believe that ICTs added more responsibilities to your job and can add pressure and stress to the staff?
**Future Plan**

Q15: What is your future plan priorities?

Q16: Do you have support from health authority in supporting ICTs in your library?

Q17: What is your plan for staff and users training?

Q18: What are the topics covered in the training?

Q19: What is your plan to encourage users to use ICTs for teaching/learning/research?

Q20: What is your suggestion towards improving the current ICTs?

Q21: Do you like to add any points regarding ICTs?

Q22: How do you procure new ICT equipment?

Q23: How do you decide a ICT requirements?

Q24: How is the change process managed?
Appendix F Interview Head of Department
Interview Opinions and Attitudes of Head of Department

Opinions and Attitudes towards ICTs

Q1: What does ICTs mean for you?
Q2: How do you value ICTs in your Department?
Q3: What gives you the impression that a certain ICTs or a device is outdated?
Q4: What is the main impact of ICTs on library Administration-information provision?
Q5: Do you think that the ICTs facilities available in your library meets the users need and satisfaction?
Q6: What is your opinion about establishing ICTs center in your organization?

Current Situation of ICTs in the Library?

Q7: Are you satisfied with the current situation of ICTs in your Department?
Q8: To what extend do ICTs contribute to the success of your department and why?
Q9: Who is responsible for the design, development, implementing and maintenance of the ICTs
Q10: Do you think that information sources on the library meet your users needs and satisfaction?

Problems and Obstacles

Q11: what are the main barriers and obstacles to meet the rapid changes in introducing and updating ICTs?
Q12: How is the library ICTs funding decided? What are the routes of the decision making?
Q13: Do you believe that your department users and the staff are ready to cope with introducing and updating in ICTs?
Appendices

**Future Plan**

Q14: What is your future plan priorities?

Q15: What is your plan and envisage of for provision of Information services via ICTs?

Q16: What is your plan for staff and users training?

Q17: What are the topics covered in the training?

Q18: What is your plan to encourage users to use ICTs for teaching/learning/research?

Q19: What are the main challenges that Hamad health science library experiencing now and in the near future that could be assisted by ICTs.

Q20: Do you like to add any points regarding ICTs?

Q21: How do you procure new ICT equipment?

Q22: How do you decide a ICT requirements?

Q23: How is the change process managed?
Appendix G Arrangement for Interview Appointment
Date : 10th December 2000
Subject : Arrangements for interview appointment

Dear Sir, Madam,

I am a PhD. Research student at Loughborough University, United Kingdom. The research is sponsored by HMC. I am currently carrying out a survey on the impact, role, and importance of ICT within HHSL. Your contribution to the research is valuable and important to the outcome of the research. Therefore, I would like to arrange an interview with you at a time and place which is convenient to you. Your contribution will be greatly appreciated and will support my research.

All your comments, responses and criticism will be treated confidentially. There is no way that you could be identified. If you need further information, please contact me via e-mail r.mohmed@lboro.ac.uk and I have a research station in the library.

I will be contacting you in the near future to arrange an appointment.

Rabab Abdulla
Ph.D Candidate
Loughborough University
Department of Information Science

P.O. Box: 3050-DOHA-QATAR-Tel.: 4392222-4393333-Fax: 4411133
Appendix H Thanks for attending interview
Dear Sir,

I would like to express my sincere thanks and appreciation for your time, valuable comments, and frank opinions during my interview. Your comments and views will be treated with complete confidentiality. I promise you I will inform you of the main outcome of the field work.

I look forward to seeing you soon.

Rabab Abdulla
PhD Candidate
Loughborough University
Department of Information Science
Appendix I Nominal Group Technique
Appendix: Nominal Group Technique (17 February, 2003)

“What are the issues associated with introducing ICT into the HHSL over the next three years?”

1. To improve patient care
2. To identify users needs.
3. To co-operate with local telecommunications companies, QTEL
4. To improve ICT infrastructure
5. To increase the authorities awareness of the importance of ICT
6. To develop training programs to meet ICT training need of HHSL staff at all levels.
7. To co-ordinate with GCC health libraries
8. To establish ICT learning resources for learners, users.
9. To create ICT environment to encourage and attract external users.
10. To streamline HHSL information and communication activities
11. To ensure high standard of services to learners
12. To improve the quality of the HHSL services.
13. To define ICT polices to comply with local and international polices
14. To review the current ICT and the future needs
15. To increase the skills of manpower within HHSL staff.
16. To change users attitudes towards ICT.
17. To establish e-learning.
18. To improve contact with local communities by encouraging them to use the HHSL resources.
19. To be used as centre of excellences for national and international health conferences.
20. To increase resource to medical staff.
Appendix J Tables
## Appendix C

### Computers in the Ability to access the Library

<table>
<thead>
<tr>
<th>Level of Computer Skills</th>
<th>Computers in the library is enough</th>
<th>Ability to access web</th>
<th>30 minutes to access web</th>
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</thead>
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<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>None</td>
<td>0</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Poor</td>
<td>9</td>
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<td>25</td>
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<tr>
<td>Professional</td>
<td>1</td>
<td>10</td>
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</tbody>
</table>

Table 6.1: Current ICT needs

### Respondents Satisfaction

<table>
<thead>
<tr>
<th>Level of Computer Skills</th>
<th>Satisfied with ICT services</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>very satisfied</td>
</tr>
<tr>
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<tr>
<td>Advanced</td>
<td>6</td>
</tr>
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<td>Professional</td>
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Table 6.2: Respondents Satisfaction
### Table 6.3: Respondents views towards ICT

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<th>Accuracy of the work</th>
<th>Quality of work improved with use of ICT</th>
</tr>
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<td></td>
<td>Yes</td>
</tr>
<tr>
<td>More Accurate</td>
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<tr>
<td>Less Accurate</td>
<td>6</td>
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</table>

### Table 6.4: Skills gap analysis

<table>
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<th>Ability to access web</th>
<th>Training access web</th>
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</tr>
<tr>
<td>Yes</td>
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<td>45</td>
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### Table 6.5: Training effectiveness

<table>
<thead>
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<th>Quality of work improved with use of ICT</th>
<th>Access the ICT</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Library Staff</td>
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<td>52</td>
</tr>
<tr>
<td>No</td>
<td>5</td>
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Table 6.5: Training effectiveness