CHAPTER 3

RESEARCH ACTIVITIES

"What is research, but a blind date with knowledge?"

Will Henry

3.0 Research Activities

3.1 Introduction

Two main research activities were undertaken during the course of this project and they are discussed throughout this chapter. The two modes used were survey questionnaires and interviews.

3.2 Survey (Questionnaire)

"In terms of methods used in the research in 1989, the quantitative studies far outnumbered the qualitative ones, with questionnaires being the primary method of research" [MacNealy, 1990].

Survey questionnaire was the ideal mode of carrying out this project paper. In fact, the questionnaire was the main data gathering method used for this project. It was used, as many hospitals and clinics could be involved and be picked randomly throughout Malaysia and the time as well as cost (in terms of transportation) could be cut down, too. In short, they are an inexpensive way to gather data from a potentially large number of respondents. Often questionnaires are the only feasible way to reach a number of reviewers large enough to allow statistical analysis of the results [Questionnaire Design, 1997].

3.2.1 Data Gathering

The survey questionnaire method was used to gather information and to draw conclusions based on the responses of health care administrators and physicians in hospitals and clinics.

Thirty-six various hospitals and clinics throughout Malaysia were picked randomly comprising of government hospitals, government clinics, private hospitals and private clinics. A mail-out survey was selected by a considerable margin as the most cost-effective method to satisfy the research needs and the majority of potential users. These questionnaires were sent via electronic mail (email) and snail mail.

3.2.2 Questionnaire Design

As Moore states, "*A properly developed survey is an effective tool in gathering an accurate picture of an organization's requirements*" [Moore, 1994]. In view of that, three types of formats were used for the questionnaire. First, the open-ended questions were those that left all possible response options open to the respondent [Kendall and Kendall, 1995]. Closed format questions took the form of a multiple-choice question. These types of questions were easy for the respondent to give answers. Partially open-ended questions were those that consists of open-ended as well as close-ended types.

The Requirements Gathering Form was prepared and designed to conduct the survey for this project. Table 3.1 presents the title as well as the purpose of the questionnaire.

Table 3.1 : Title and Purpose of the Questionnaire

Title	Purpose
Requirements Gathering Form	To gather requirements and information prior to the development of the system

The Requirements Gathering Form comprises of three sections. Section A, B and C consists of five, eight and ten questions respectively. These twenty-three questions were designed and prepared prior to developing the system. The preliminary queries in section A referred to as "training questions" are intended to be easily answered for the participants. The aim is to impart a favourable first impression so that the remainder of the survey as a whole will not appear too difficult or frustrating to complete [Gates et al., 1995]. In view of that, the initial questions in the survey are simple and it does not take the respondent more than five minutes to answer them.

Meanwhile, section B consists of questions pertaining to the requirements for a system to keep track of medical expertise. Questions on the current practices of keeping track of medical expertise, which are mostly open-ended type of questions, were investigated in section C.

Table 3.2 shows the section name, question type and the total number of questions for the survey form.

Table 3.2 : The Section Name, Question Type and The Total Number of Questions for the Requirements Gathering Form

Section	Description	Question Type			Num. of Questions
		Close-ended	Open-ended	Partially open-ended	
A	General Questions	4	0	1	5
B	Requirement Gathering for A System to Keep Track of Medical Expertise	6	0	2	8
C	Current System Used	3	4	3	10
Total		13	4	6	23

Several guidelines were considered when writing questionnaires which include. choice of words, clarity, consistency, similar questions grouped together and adequate space provided for responses [Kendall and Kendall, 1995]. The questionnaire is included in Appendix A of this report.

3.2.3 Pilot Test

The major hurdle in questionnaire design is making it clear and understandable to all. In view of that, a pilot test was carried out on representatives of the target audience. This is to ensure that the questionnaire prepared was free from problems and not in any way confusing the target participants.

Seven representatives were selected for the pilot test. They were two physicians from a government hospital, one physician from a private hospital, one administrative staff from a private clinic and three students from the university.

The distributed questionnaires were reviewed with the representatives and a discussion was held with them. The questionnaire was redesigned based on their feedback. A new questionnaire was prepared once again to correct the confusing

questions. This is to ensure that the questionnaire produced is of quality and correct responses can be got from the actual participants.

3.2.4 Administration and Processing of Questionnaire

A well-designed, relevant questionnaire can help overcome some of the ambiguities of respondents and, thus improves the response rate [Kendall and Kendall, 1995]. A set of guidelines was followed in making sure that the questionnaires were indeed administered properly.

Before the questionnaires were distributed to the respective participants, they were given clear instructions, which were written on the first page of the questionnaire forms. The questionnaires were sent by email and snail mail. Responses via email were fast and any incomplete questionnaire forms were sent back to the respective respondent for further completion. Questionnaires that were sent by snail mail were mailed to the respective hospitals and clinics by supplying a deadline, instructions and return postage. Unfortunately, the response rate for mailing was notably poor.

A complete analysis was performed on each section of the questionnaire forms. Microsoft Excel 97 [Microsoft® Excel 97] was used to tabulate the results for the close-ended types and some of the results are presented graphically in the following sections.

3.2.5 Results Analysis

Thirty-six medical centres throughout Malaysia were selected for the distribution of the forms. Of these, three government hospitals (GH), four private hospitals (PH) and eight private clinics (PC) responded; a total of fifteen respondents (i.e. 41.7%). The following analysis was done based on their responses in all three sections.

Section A : General Questions

In section A, of the 15 respondents, 12 (i.e. 80.0%) of them have stated that computers are used at their medical centers to manage and aid in their daily job. Meanwhile, three (37.5%) of the eight respondents from the private clinics do not use computers at all. Fig. 3.1 shows the computer usage for all of the 15 medical centres in percentage. Fig. 3.2 depicts the computer usage at 3 GHs, 4 PHs and 8 PCs in percentage.

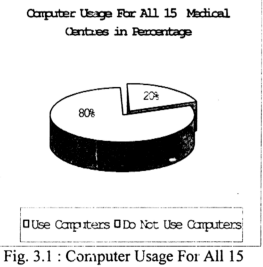
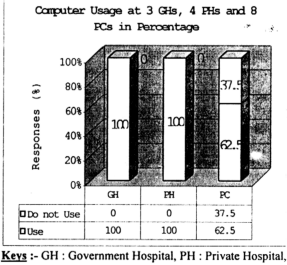


Fig. 3.1 : Computer Usage For All 15 Medical Centres in Percentage



Keys :- GH : Government Hospital, PH : Private Hospital, PC : Private Clinic

Fig. 3.2 : Computer Usage at 3 GHs, 4 PHs and 8 PCs in Percentage

9 (60.0%) of the respondents (i.e. 3 from the GHs, 4 from the PHs and 2 from the PCs) use computerized systems to manage the medical expertise meanwhile 40.0% (i.e. 6 from the PCs) still do it manually (e.g. paper reports). Fig. 3.3 and fig. 3.4 depicts the current practices of keeping track of medical expertise at 15 medical centres and at each medical center, respectively.

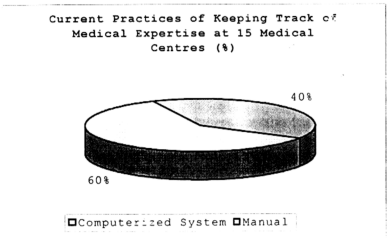


Fig. 3.3 : Current Practices of Keeping Track of Medical Expertise at 15 Medical Centres in Percentage

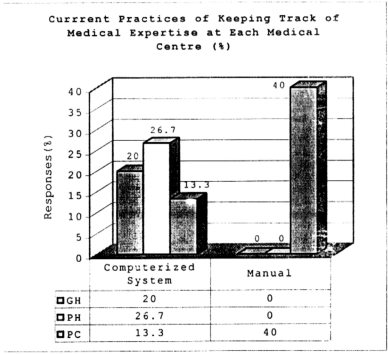


Fig. 3.4 : Current Practices of Keeping Track of Medical Expertise at Each Medical Centre in Percentage

A total of fourteen or 93.3% of the respondents have agreed that the medical expertise in general, are not distributed equally especially to rural areas. This is due to the fact that medical expertise themselves do not prefer working at rural areas as it lacks basic amenities and technologies.

All of the respondents have unanimously agreed that they would prefer a computerized system to maintain as well as to analyze information pertaining to the medical expertise, hence, hoping it would reduce their workload.

Currently, all the 15 medical centres (i.e. 3 GHs, 4 PHs and 8 PCs) have stated that there are no computers for the use of patients to get information on a particular medical expertise. It can be concluded, that there is yet a computer at any of the medical centres to cater for the use of patients seeking information on a certain medical expertise.

Table 3.3 and 3.4 show the overall and detailed responses from the 15 participants of section A of the Requirements Gathering Form, respectively.

Table 3.3 : Overall Responses from 15 Participants of Section A of the Requirements Gathering Form

Q.	Description	Responses from 15 Participants (%)		Total
		Yes	No	
1.	Usage of computers at the medical centre	80.0	20.0	100
2.	Equal distribution of medical expertise in rural and urban areas	6.7	93.3	100
3.	Prefer to have a computerized system for medical expertise	100	0.0	100
4.	Computers used by patients at medical centre	0.0	100	100

Key :- Q. : Question

Table 3.4 : Detailed Responses from Each Medical Centre of Section A of the Requirements Gathering Form

Q.	Description	Responses (%)					
		GH (3)		PH (4)		PC (8)	
		Y	N	Y	N	Y	N
1.	Usage of computers at the medical centre	100	0.0	100	0.0	62.5	37.5
2.	Equal distribution of medical expertise in rural/urban areas	0.0	100	0.0	100	12.5	87.5
3.	Prefer to have a computerized system for medical expertise	100	0.0	100	0.0	100	0.0
4.	Computers used by patients at medical centre	0.0	100	0.0	100	0.0	100

Keys :- Q. : Question, GH (3) : 3 Respondents from Government Hospitals , PH (4) : 4 Respondents from Private Hospitals, PC (8) : 8 Respondents from Private Clinics, Y : Yes, N : No

Section B : Requirements Gathering for A System to Keep Track of Medical Expertise

Table 3.5 : Overall Responses from 15 Participants of Section B of the Requirements Gathering Form

Q.	Description	Responses from 15 Participants (%)		Total
		Yes	No	
1.	Computerized system is in need	100	0.0	100
2.	Would like to have a statistical package incorporated in the system	80.0	20.0	100
3.	Would like to use such a system at the medical centre	100	0.0	100
4.	Benefits will be gained by using the system	86.7	13.3	100
5.	Would like the system to be accessed by patients in finding information on a medical expertise	73.3	26.7	100
6.	The system will be a useful and a practical system	100	0.0	100

Key :- Q. : Question

From the above table, it can be concluded that all of the 15 respondents agreed that they need a computerized system to manage the medical expertise. Of

these. 80% or 12 respondents would like a statistical package incorporated in the system to perform some analysis. Meanwhile 3 respondents; 1 from a PH and 2 from PCs would not want a statistical package incorporated in it. This could be due to the lack of familiarity in various statistical analyses of the administrative staff.

All of the 15 respondents (100%) indicated that they would use such a system at their respective medical centres. But only 13 respondents (86.7) have pointed that they would benefit from such a system, as it will increase job efficiency as well as reduce paper volume reports. However, 2 respondents from the PC (6.7%) have stated that the hospital/clinic would not gain much benefit but a big loss will incur in terms of cost. This is because, an investment has to be made to purchase computers and maintenance of the system has to be done every now and then. This is quite acceptable, as private clinics are not big medical centres.

Of the 15 respondents, only 4 (26.7%) do not prefer to have such a system for public use at their medical centres. Of the 3 respondents from the government hospital, 2 do not prefer to have patients accessing information on a computer. They would prefer patients seeking clarification on a medical expertise to consult their physicians rather than "consulting" a computer. Another reason could be due to the fact that, many people inclusive of children would be in and out of a hospital/clinic, and they may be "playing" with the terminals. Moreover, some of them do fear that, this "dummy box" would take the role of a general physician. And, therefore, patients would have less contact with them.

However, more than 70.0% of the respondents would like the system to be accessed by patients in finding information of their desired medical expertise. All of

the respondents, a total of 15 medical centres, agreed that it would be a useful and a practical system in time to come.

From the above requirements gathering information, it can be concluded that the government hospitals, private hospitals and private clinics are supportive of implementing a system such as that in the near future.

Table 3.6 depicts the detailed responses from each medical centre of section B of the Requirements Gathering Form followed by a few graphical representations.

Table 3.6 : Detailed Responses from Each Medical Centre of Section B of the Requirements Gathering Form

Q.	Description	Responses (%)					
		GH (3)		PH (4)		PC (8)	
		Y	N	Y	N	Y	N
1.	Computerized system is in need	100	0.0	100	0.0	100	0.0
2.	Would like to have a statistical package incorporated in the system	100	0	75.0	25.0	75.0	25.0
3.	Would like to use such a system at the medical centre	100	0.0	100	0.0	100	0.0
4.	Benefits will be gained by using the system	100	0.0	100	0.0	75.0	25.0
5.	Would like the system to be accessed by patients in finding information on a medical expertise	33.3	66.7	100	0.0	75.0	12.5
6.	The system will be a useful and a practical system	100	0.0	100	0.0	100	0.0

Keys :- Q. : Question. GH (3) : 3 Respondents from Government Hospitals , PH (4) : 4 Respondents from Private Hospitals, PC (8) : 8 Respondents from Private Clinics, Y : Yes, N : No

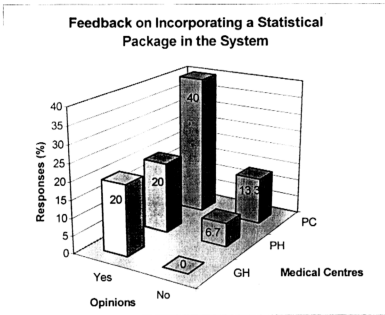


Fig. 3.5 : Feedback on Incorporating A Statistical Package in the System

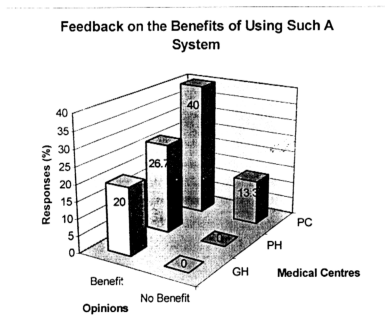


Fig. 3.6 : Feedback on the Benefits of Using Such A System

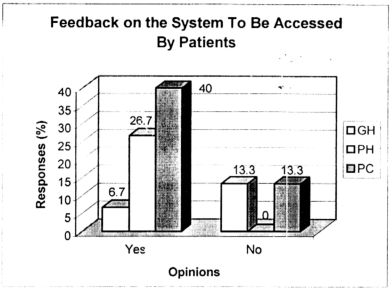


Fig. 3.7 : Feedback on the System to be Accessed By Patients

Section C : Current System Used

The questions designed in section C were mostly open-ended type of questions. Responses from section C were notably poor. Participants only answered the general questions. Due to that, the current system used at their medical centres could not be compared with the new one that is to be developed. All of the medical centres, which use a computerized system, did not give the name, version and the year of implementation.

However, the following information pertaining to the current system were given:

- administrative staff, health care managers and physicians use the computerized system
- the system has basic features such as listing out the medical expertise in various departments and adding the medical expertise's record to the database. But this is only for their respective medical centre.

- the system is not incorporated with a statistical package to perform any kind of statistical analysis. as the management does not require it. If some kind of basic analysis need to be performed, then they are tabulated using the Microsoft Excel.
- the system is of some beneficial as it decreases their time in printing out reports.
- security measures such as user identification and password are provided. This is to ensure that only verified administrators access the data so the integrity of the data is upheld at all times.
- computers are not allocated at the medical centres for patients to have access to information on the current medical expertise/specialist.
- the current system used has many significant weaknesses and limitations. Among these include, analysis on specialists' record could not be performed, the current system is not integrated with any other health care information system and any forms of graphical representations of the data are not provided.
- many of the respondents have indicated that in future they would like to have an easy to use interface to perform statistical analysis as currently they need to export the raw data to Microsoft Excel which is a tedious task.

3.2.6 Summary of Findings

From the Requirements Gathering Form, it can be concluded that 80.0% of the medical centres use computers in their daily job. But only, 60% of the medical centres use computerized system to manage their medical expertise. All of the medical centres are in support of having a system that can maintain records of expertise, specialties and hospitals/clinics, report printing, display of graphical

reports and statistical computing. More than 70.0% of the respondents would like the system to be accessed by patients in finding information of their desired medical expertise. All of the 15 medical centres that participated have agreed that it will be a useful and a practical system in time to come.

3.3 Interview: Face to face

Besides the questionnaire method, interview was the second mode used for information gathering. Interview is a directed conversation with a specific purpose that uses a question-answer-format. By listening to the users, useful pieces of information could be captured and recorded. Interviews were conducted at selected hospitals and clinics. Three hospitals in the Klang Valley and one in Ipoh gave their consent to participate. Of these, two are government hospitals, one a private hospital and the other is a private clinic.

3.3.1 Steps Taken for the Interview

Five steps were undertaken before interviewing the person concerned. First and foremost, a letter was written to the hospital concerned seeking permission for the interview to take place. Once getting the clearance from the hospital concerned, an extensive research was done (e.g. reading the background materials so that general questions would not be asked, thus saves time) on the hospital. Next, the person to be interviewed had to be decided. This is to ensure that the users need is addressed, too. Next, the person to be interviewed was prepared by calling ahead to

remind him/her of the scheduled time. Finally, question types and structure was decided so as to cover the key areas of the objectives.

Three types of question formats were used: the open questions are general and allow the interviewee great freedom in determining the amount and kind of information to give, while closed questions restrict responses and limit the options available to an interviewee [Kendall and Kendall, 1995]. A highly closed question force the interviewee to select an answer from those provided.

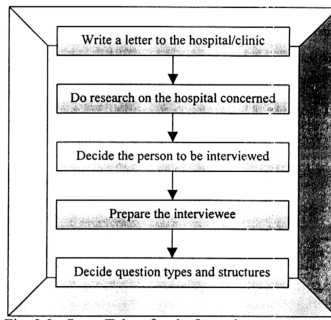


Fig. 3.8 : Steps Taken for the Interview

3.3.2 Results from the Interview

The findings from the in-depth interviews from the medical centres are summarized below.

Each of the medical centre in the study commented on the critical shortage of IT professionals as a major human resource challenge. Given plans to increase

expenditures, this is a problem of growing significance. It is being addressed, in part, through outside contracting as it is done in one of the medical centres in the Klang Valley.

One interviewee also described IT's overarching goal as moving information systems to support the seamless interfacing of departments. But, the lack of knowledge in IT by medical personnel as well as administrative staff may not reach the goal in a short period of time. The interviewee did mention too that, developing a more seamless information system in hospitals and clinics requires a shift from flat files and "islands of information" to integrated databases and an enterprise wide view of information needs [Koch and Kim, 1998].

Apart from that, most of the interviewee indicated that younger doctors are especially eager to have access to advanced information systems. In a similar vein, one interviewee commented that it is extremely difficult to recruit top IT people unless a medical centre is committed to a cutting edge vision for IT.

Many of the interviewees have indicated that there is still a lack of system to manage and keep track of medical expertise. Currently, there is yet a system that incorporates a statistical package to perform analysis on the medical expertise. It is obvious from the information gathering that a system is needed to keep track as well as to analyze medical expertise in the country. Generally, all the interviewees indicated that patients would benefit from access to added information by having such a system.

3.4 Summary

Questionnaire design is a long process that demands careful attention. A questionnaire is a powerful evaluation tool and should not be taken lightly. The design of a questionnaire begins with an understanding of the capabilities, objectives and how they can help in the research. There are many guidelines that must be met before the questionnaire can be considered a sound research tool. A pilot test or a pre-test is necessary to weed out minor mistakes that can cause great changes in meaning and interpretation. If these guidelines are followed, the questionnaire becomes a powerful and economic evaluation tool.

Conducting an interview is a time consuming process and demands a lot of patience. Interviews should not be taken lightly as it provides a better perception of the research. Steps that were listed in fig. 3.8 were undertaken to ensure that the interview was done in a proper manner.

Findings during the survey questionnaires and interviews provided that systems, which can generate reports, analyze medical expertise as well as maintain the expertise records are still lacking.