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Using Electronic Information Resources: a study of end-user training needs and methods in selected public university libraries in Malaysia

by

Basri B. Hassan

A Doctoral Thesis

Submitted in partial fulfilment of the requirements for the award of Doctor of Philosophy of Loughborough University

May 2002

Supervisor: Dr. J. Eric Davies
Department of Information Science

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ABSTRACT

This research investigated the library end-users’ perceptions of their training needs in relation to using the electronic information resources in selected public universities in Malaysia. It also investigated the training methods preferred by end-users in learning how to use electronic information resources. The subjects of the study were university students and academic staff from three selected public universities in Malaysia. They comprised 433 students and 223 academic staff.

This study employed both quantitative and qualitative methods. The main data was gathered through self-administered questionnaires, while the supplementary data was gathered through face-to-face semi-structured interviews. Opinions from the librarians responsible for end-user training at the three university libraries were also sought through face-to-face semi-structured interviews.

Comparisons were made between the two groups of end-users, namely, students and academic staff in areas related to the problems of the study. Appropriate non-parametric statistical techniques such as cross-tabulation, chi-square test, Mann-Whitney U test and Spearman correlation test were applied in analysing the data measured at both nominal and ordinal scales.

Among the major findings were: (1) a statistically significant differences were found between students and academic staff in terms of knowledge and ability in using electronic information resources. Many academic staff were more knowledgable and able to use electronic information resources than students. However, concerning knowledge in using certain IT facilities, many more students than academic staff knew how to use them; and (2) both students and academic staff preferred one-to-one training methods as their first choice. With
regard to the second choice of training method, students preferred computer-assisted instruction (CAI), while academic staff preferred library workshops with hands-on training. Recommendations based on the research findings were made.
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I owe a great deal to my parents, especially my late father for his unflawing faith in my ability.

My very special thanks are due to my family, especially my wife for her undying moral support and assistance throughout my study, without which I would not have completed this study.
DEDICATION

To my dear parents: Haji Hassan b. Mat Saman and Hajjah Fatimah bt. Puteh.

My beloved wife: Sithi Rasheeda bt. Hj. Mohd Razi,

And our dearest children:

Nur Shazwanee
Amaleena
Muhammad Aiman
Amirul Nadjmy
Fatin Farhanah

For their love, encouragement, perseverance and faith in me.
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CHAPTER 1

INTRODUCTION

1.1 OVERVIEW

This introductory chapter is divided into several sections as follows: section 1.2 presents the background and rationale of the study; section 1.3 provides a statement of the problem; section 1.4 states the study's aim and objectives; section 1.5 states the research hypotheses; section 1.6 discusses the significance of the study; section 1.7 provides a brief preview of the methodology adopted for this research; section 1.8 presents the operational definition of the main terms used in this study; and finally section 1.9 provides a brief structure of the whole work detailed in the following chapters.

1.2 BACKGROUND TO THE STUDY

It has been acknowledged that in today's world, information has become the critical economic resource because it plays a key role in wealth generation. Wealth comes from knowledge and knowledge is created through accessing, evaluating, synthesizing and using information (Oxbrow, 1998). With the convergence of computer technology and telecommunication, many countries including Malaysia are devoting increased resources to the development of their information technology (IT) and multimedia industries as central forces for future economical growth (Reid, 1998).
Malaysia’s economic growth and development has been shaped by several strategic five-year development plans, for example the Seventh Malaysia Plan 1996-2000. Malaysia’s Vision 2020 provides specific goals and objectives for long-term growth and development. Vision 2020 is Malaysia’s blueprint for development and progress into a developed nation and knowledge-rich society by the year 2020. This has been emphasised by the Malaysian Prime Minister, Dr Mahathir Mohamad (Mahathir bin Mohamad, 1998, p. 5),

“If Malaysia is to achieve developed-nation status by 2020, it cannot continue with conventional manufacturing industries. Therefore, we are taking a single minded approach to developing the country using the new tools offered by the Information Age... to establish a scientific and progressive society, a society that is innovative and forward-looking, one that is not only a consumer of technology but also a contributor to the scientific and technological civilization of the future”.

In order to fulfill the country’s ambition of becoming a developed nation by the year 2020, the Government has taken several steps such as developing the country’s first Multimedia Super Corridor (MSC). The MSC is a designated high-technology area in the country where world-class multimedia companies are invited by the Malaysian Government to come and develop state-of-the-art products and services (further discussion on the MSC is given in the next chapter). The Government envisaged that the MSC would support the transformation of the rest of the country into the information age and a digital economy. To realise the nation’s goals of becoming a developed and progressive nation, Malaysia needs a skilled workforce that is well equipped with IT knowledge. In relation to this, the Education Minister of Malaysia announced at the First MSC Educational Forum held in April 1998, that all
future graduates of the local public universities, irrespective of their degrees, would be computer literate and competent in IT (Najib, 1998).

IT skills are recognised by the Government as an important competency needed by future graduates to work in the Information Age society and digital economy. Closely related to IT skills are information skills. Since information has been acknowledged as a critical economic resource, hence, knowing how to access, retrieve, evaluate and use information is an important skill that is required by every individual in this information era. This fact was acknowledged by a leading figure close to the Government, Tengku Mohd Azzman\(^1\), who stated that all Malaysians must develop IT and information literacy skills (as quoted in Reid, 1998, p.45).

To realise the Government's objectives, the Ministry of Education has developed several strategies to introduce IT as an integral part of the education system. One of these strategies is the setting up of the "smart schools" pilot project. Further discussion on the "smart school" is presented in the next chapter (Chapter 2). At the higher education level, the Government through the Ministry of Education envisaged that every college and university student in the country would be aware of, and able to use the IT resources available in the universities. Through the power of information networking, college and university students can undertake research through electronic libraries accessible via the Internet. In order to do this, college and university students would require knowledge and skills to use computer-based information resources. This is stated by the Prime Minister, Dr Mahathir Mohamad (Mahathir bin Mohamad, 1998, p.65),

\(^1\) A member of the Malaysia's National Information Technology Council (NITC), which advised the Government on matters pertaining to IT and the MSC.
“Students will be equipped with the skill and ability to make sound judgements from the overwhelming amount of information that will be available to them.”

In this respect, library and information professionals have the responsibility to provide support and training to end-users so that they can access, select, retrieve, analyse and use the massive amount of networked and electronic information resources available to them. End-users in higher education institutions need to be trained in order to make the most effective and productive use of networked and electronic information services (Mendelsohn, 1996). Besides learning how to access information, end-users would also need to learn how to evaluate critically the Internet resources to determine their validity (Abbas, 1997). Therefore, information skills training in the broadest sense is very essential and the information and library services are a suitable context in which it can take place.

1.3 STATEMENT OF THE PROBLEM

University libraries in Malaysia have already embraced new information technologies to support research, teaching and learning in their respective institutions (Ding, 2000). However, since these technologies are still new, many end-users are unaware of them and unfamiliar in using them. Several user studies pertaining to academic libraries carried out in Malaysia earlier confirmed this fact (Hashim, 2000; Majid and Abazova, 1999; Majid and Mansor, 1996). Library users need to be trained whenever new technology comes along (Williamson, 1993). Electronic resources are a significant investment in many libraries, and therefore, it must be ensured that end-users get a good return on this investment. It is not enough to provide new
technologies without providing proper training to end-users (Fecko, 1997). It is crucial, therefore, for librarians to know what type of training is needed by end-users in order to use new information technologies available in the libraries, and also how such training should be carried out, and what training methods are preferred by end-users. Feedback from end-users concerning these issues should be sought and considered prior to designing and developing a suitable end-user training programme.

Mehta and Young (1995) noted that generally there were very few studies that explored how end-users think and feel about electronic information systems and services. This is also true in the case of Malaysia where there has been very little research carried out in this area. Previous studies concerning electronic information resources carried out in Malaysia approached the issues from different perspectives (Begum and Wong, 1999; Majid, 1998; Majid and Abazova, 1999; Majid and Mansor, 1996; Sharif et al., 1994; Wee, 1999; Yaacob et al., 1992). These studies either investigated the usage patterns of the end-users or confined the investigations to a particular electronic resource, for example CD-ROM and the Internet (details of these studies are discussed in the literature review - Chapter 3 - under section 3.5.2). So far there has been no attempt to study the end-users’ perceptions of their training needs in using the electronic information resources in the academic libraries in Malaysia. Hence, this study attempts to fill the gap and accordingly contributes to the body of literature in this area.

1.4 AIM AND OBJECTIVES OF THE STUDY

The aim of this study is to investigate the library end-users' perceptions of their training needs and preferred training methods in using the electronic information resources in the public university libraries in Malaysia. The primary interest here lies in identifying the differences and similarities between
the two groups of end-users - students and academic staff. The objectives of this study are:

1. To identify the end-users’ previous knowledge and skills in using IT facilities/applications.

2. To identify the end-users’ current knowledge and ability to use electronic information resources.

3. To identify the problems and issues faced by end-users in connection with using electronic information resources.

4. To assess the training needs of end-users in connection with using electronic information resources.

5. To identify the training methods preferred by end-users in learning about electronic information resources.

6. To determine the current training methods practised by the three selected public university libraries.

7. To propose a general framework of end-user training programme.

1.5 RESEARCH HYPOTHESES

The research hypotheses are formulated based on the research objectives. The primary interest here lies in identifying the differences and similarities between the two groups of end-users – students and academic staff. Hence, four research hypotheses are formulated and stated in null form as follows:
1. There is no difference between students and academic staff in terms of previous skills and knowledge of using IT facilities.

2. There is no difference between students and academic staff in terms of current knowledge and ability to use electronic information resources.

3. There is no difference between students and academic staff in terms of the problems faced in using electronic information resources.

4. There is no difference between students and academic staff in terms of the training methods preferred.

1.6 SIGNIFICANCE OF THE STUDY

With today's fast changing pace of information technology and information overload, it is important for library professionals to know exactly what end-users feel and think about electronic information resources, what are their problems concerning electronic information resources, what kinds of training do they need, and what training methods do they prefer. The answers to these questions can assist the library professionals to better understand end-users' needs and problems concerning electronic resources. Furthermore, feedback from end-users is useful for library professionals in designing and developing a suitable training programme for end-users.

1.7 PREVIEW OF THE APPROACH AND METHODOLOGY OF THE STUDY

This study employed both quantitative and qualitative approaches. A questionnaire survey is used as the main data collection method in the study and supplemented by semi-structured face-to-face interviews. A survey
research method has long been used to obtain reliable contemporary data concerning attitudes and opinions of library users and librarians, and many other kinds of information relating to various facets of the profession (Busha and Harter, 1980). Furthermore, a questionnaire survey provides an effective way to collect large amounts of data in a relatively short period of time, which would not be practical to collect through other ways such as observations, in-depth interviews or experiments.

The subjects of the study are the university students and academic staff of the selected public universities in Malaysia. In addition, the opinions of the university librarians responsible for end-user training are sought through semi-structured interviews. This study employed a non-probability sampling method in collecting the intended data. The data collected through the questionnaire survey (quantitative) is analysed by using the Statistical Package for Social Sciences (SPSS), while the qualitative data collected via the interviews is analysed manually.

1.8 DEFINITION OF TERMS

To avoid ambiguity and to ensure consistency in interpretation it was felt appropriate to provide an operating definition for this study.

*Computer skills*

The ability to use a computer and its software (for example, Windows and word-processing) to accomplish practical tasks.
Chapter 1

Introduction

Electronic information resources

The term electronic information resources used in this study refers to the more established electronic resources that are commonly available in many academic libraries today, such as online databases, online public access catalogues (OPACs), CD-ROM databases, and the Internet resources (Hsieh-Yee, 1997; Ray and Day, 1998).

End-user

The term end-user used in this study refers to an individual who actually searched and used the information directly without the help of the intermediaries (for example, librarian).

Internet skills

The term Internet skills refers to the ability to use the Internet tools (such as Web browsers, e-mail, FTP, discussion groups, Telnet, and others) to access, communicate, retrieve, and use electronic or digital information from the network.

Information/library skills

The term information/library skills used in this study refers to the ability to search, retrieve, evaluate and use information effectively in various formats that are available inside the library and also from remote locations.
Chapter 1

Introduction

Training

The term training used in this study refers to the formal efforts to transfer the required knowledge and skills from the library instructors to end-users in handling electronic information resources.

1.9 STRUCTURE OF THE THESIS

The thesis consists of eight chapters. Following this introductory chapter, Chapter 2 presents the research setting of this study, which explains the Malaysian context and provides details of the target population of this study.

Chapter 3 presents a critical review of the literature in key areas of relevance to the thesis. It looks at previous studies in this area.

Chapter 4 describes and explains the research methods and design adopted for this study. It also explains the conceptual framework adopted for this study.

Chapter 5 presents the results of the quantitative analysis of the questionnaire survey.

Chapter 6 presents the results of the qualitative analysis of the semi-structured interviews.

Chapter 7 discusses the findings of Chapters 5 and 6 and provides explanations of the results in light of the findings from the literature review (Chapter 3).
Chapter 8 summarises the main findings, make recommendations and provides the conclusions. It also states the research limitation and points out areas for further research.
CHAPTER 2

THE RESEARCH SETTING

2.1 OVERVIEW

This chapter aims to present the reader with background information relevant to the research topic. It begins with general information on Malaysia and a brief description of the Malaysian education system. Details of the three targeted public universities, including IT applications in their respective libraries, are also presented. This is followed by a discussion on IT in Malaysia, including the Multimedia Super Corridor (MSC). IT in education including the "smart schools" pilot project is presented after that. This is followed by a discussion on IT in the university libraries and its implications on end-user training. Finally before the summary, a brief discussion on the impact of the 1997-98 economic crisis on the country’s development is presented.

2.2 MALAYSIA

2.2.1 Geography

Geographically, Malaysia is located in Southeast Asia, and is divided into two regions, known as West Malaysia and East Malaysia (see figure 2.1: Map of Malaysia). The two regions are separated by about 640 kilometres of the South China Sea. West Malaysia is situated south of Thailand and north of Singapore. East Malaysia shares Borneo with the small nation of Negara Brunei Darussalam, on the north coast of Borneo, and with the Kalimantan region of Indonesia, which occupies the southern two-thirds of Borneo.
Malaysia is a federation of 13 states (Johor, Kedah, Kelantan, Melaka, Negeri Sembilan, Pahang, Perak, Penang, Perlis, Sabah, Sarawak, Selangor, and Terengganu) and 2 federal territories (Kuala Lumpur and Labuan). The states of Sabah and Sarawak (on Borneo) and the federal territory of Labuan (an island off the coast of Sabah) make up East Malaysia. Malaysia has an area of 329,750 square kilometres. Except in the highlands, the climate is hot and humid throughout the year. Average daily temperatures vary from about 21° to 32°C (70° to 90°F). Average rainfall for West Malaysia is about 2,540 millimetres per year. The northern slopes of Sarawak and Sabah receive as much as 5,080 millimetres of rainfall yearly (Food and Agriculture Organization production yearbook, 1994).
2.2.2 Brief History

The early history of Malaysia started with the Islamic empire of the Melaka Sultanate in the 14th century, which comprised the entire area of Peninsular Malaysia and the eastern coasts of Sumatra and Brunei. Melaka's widespread fame as a trade conduit for East-West commerce attracted the European powers. The Portuguese took over Melaka in 1511, and were followed by the Dutch in 1641. The British established a flourishing port in Penang in 1786 and then took over Melaka in 1795. They went on to colonise the interior of the Malay Peninsula. East Malaysia (Sabah and Sarawak) came under British control through James Brooke, an English adventurer (who became the Rajah of Sarawak in 1841), and the North Borneo Company (who administered Sabah from 1882). By the end of the 19th century, all the Malay states, including Sabah and Sarawak, had become British protectorates.

Indian and Chinese immigrants were brought into the country by the British Administration to work in the rubber plantations and the tin mines. These immigrants changed the racial composition of the country. During the Second World War the Japanese forces occupied Malaya. In 1945 the British once again took control after the Japanese surrender. An attempt by the British administration to impose a Malayan Union was strongly opposed by the Malays and this later led to the independence of Malaya in 1957. Sabah, Sarawak and Singapore combined with Malaya to form Malaysia in 1963, but two years later Singapore withdrew from the confederation. Today Malaysia comprises the Malay Peninsula or West Malaysia and the East Malaysia states of Sabah and Sarawak (Almanak Malaysia, 2000).

2.2.3 Social Situation

The total population of Malaysia was estimated at 22.7 million (1999 estimate) as reported by the World Bank (2001). Malaysia is a multiracial and multi-
religious society consisting of the Malays (mostly in West Malaysia) and other indigenous groups (mostly in East Malaysia), which make up 62 percent of the population, Chinese about 26 percent, Indians about 8 percent, and non-citizens about 3 percent. About 80 percent of the population lived in West Malaysia and 20 percent lived in East Malaysia (Malaysia Economic Planning Unit, 1996). Malay is the official language of the country but English is widely spoken. Islam is the official religion of Malaysia, but other religions are allowed in the country. Ethnic Malays are Muslim, Chinese are mainly Buddhist, and Indians are generally Hindu. In Sabah (East Malaysia), about 38 percent are Muslim, 17 percent Christian and the rest practised indigenous beliefs. In Sarawak (East Malaysia), where there are more Chinese, 24 percent are Buddhist, 20 percent Muslim, 16 percent Christian and the rest follow indigenous beliefs. About 51 percent of the population resides in urban areas. The capital city - Kuala Lumpur has a population of about 2 million (1997 estimate). The overall literacy rate is 91 percent (Malaysia Economic Planning Unit, 1996).

2.2.4 Economic Situation

Malaysian economy has shifted from an agriculture base to the manufacturing base, and today the manufacturing sector contributes the most in export earnings. Malaysia also produced her own brand of car – Proton, which is being exported to many countries. The country’s major exports include electrical and electronic products, palm oil, petroleum and petroleum products, wood and wood products, rubber, and manufactured goods. Malaysia had enjoyed rapid economic growth of an average 8 percent for eight consecutive years from 1989 until 1996 (Mahathir Mohamad, 1998). In 1997 the economic growth was reduced to 7.5 percent due to the start of the 1997-1998 economic crisis that hit many countries in East Asia such as Indonesia, Korea, Philippines and Thailand. In 1998 the country’s Gross Domestic Product (GDP) plunged steeply to minus 7.5 percent sending the country into deep recession. However,
in the second quarter of 1999 the economy started to show early signs of recovery with GDP growing at 4.1 percent. In the second quarter of 2000, GDP rose to 8.8 percent indicating that the country has recovered from the economic recession (The World Bank Group, 2000). The impact of the economic crisis on the country’s progress is discussed later.

2.3 BRIEF DESCRIPTION OF THE EDUCATION SYSTEM OF MALAYSIA

2.3.1 Primary and Secondary Education

The Malaysian Government, in its economic blueprint for 1996 to 2000, which is known as the Seventh Malaysia Plan, has placed special priority on improving the quality of education in the country, particularly with regard to science. In addition to this, greater emphasis is placed on improving the quality of schools in rural areas, providing incentives for teacher training, and on encouraging private sector participation in education (The World Bank Group, 1999).

Children in Malaysia generally begin their education at the pre-school or kindergarten level at the age of four or five. Kindergartens have been set up throughout the country by both government and non-government agencies and the private sector. Within the broad guidelines set by the Ministry of Education, kindergartens must provide a secure and stimulating environment that will prepare children for their first year in school. There is, however, flexibility in terms of teaching approaches and medium of instruction.

Primary education begins at six years of age, and may be completed within five to seven years. The Government has set up two categories of primary schools: the National and National-type schools. The medium of instruction in the National schools is Malay, while Chinese and Tamil are used in the National-
type schools. English is taught as a second language in both categories of primary schools, and is an integral part of the curriculum. Fluency in English is emphasised in order to facilitate effective assimilation of new knowledge in science and technology. At the primary education level, the emphasis is on acquiring strong reading and writing skills as well as building a solid foundation in mathematics and basic sciences. Two assessment examinations at years three and six are used to evaluate students’ performance. Outstanding students at year three can opt to go straight into year five (Malaysia Ministry of Education, 1998).

Secondary school provides a comprehensive education and the curriculum includes a wide range of subjects from the arts and sciences as well as vocational and technical subjects. Following the Lower Secondary Assessment examination (PMR) at year three, students move into more specialised fields of study at the upper secondary level, based on choice and aptitude. At upper secondary level, several technical and vocational schools have been set up to provide technically biased academic education and pre-employment skills. At the end of year five, students are again evaluated through the Malaysian Certificate of Education (SPM) assessment examination, which is equivalent to the English ‘O’ level.

Students who are successful in their SPM have a few options. They can proceed to Sixth Form which prepares them for entry into local and foreign universities if they pass the Malaysian Higher School Certificate (STPM) examination, which is equivalent to the English 'A' level; they can choose to enter the matriculation programmes offered by some local colleges and universities, leading to a university education; and they also choose to do certificate or diploma courses offered by polytechnics and vocational colleges in the country (Malaysia Ministry of Education, 1998). Figure 2.2 summarises the national education system of Malaysia.
2.3.2 The National Education Curriculum

The national education curriculum for primary and secondary education has been revised by the Education Ministry in 1983 and 1988. It had been criticised by the local educationists and the general public for being too 'examination-oriented'. Osman (1993, p. 57) described the situation clearly in her findings of school libraries in Malaysia,

"The current education system in Malaysia does not encourage students to be independent learners - capable of locating, retrieving and using information effectively for lifelong learning. It has been described as being 'examination-oriented', with undue importance given to paper qualifications...the existing curriculum of both primary and secondary schools does not enable students to participate actively in the teaching and learning process"

This issue was debated recently in the Malaysian Parliament and the Government was urged to review again the national education system so that the present 'examination-based' system is replaced with a 'learning-based' approach that incorporates creative and independent study (Said and Mohd, 2000).
TEXT BOUND INTO

THE SPINE
**Chapter 2**

**The Research Setting**

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**PRIMARY LEVEL**

**National Schools**
Bahasa Malaysia as the medium of instruction. English is a compulsory subject. Mandarin and Tamil are made available.

**National-type Schools**
Mandarin or Tamil as medium of instruction. Bahasa Malaysia and English are compulsory subjects.

**Level One Assessment (PTS)**
**Primary School Achievement Test (UPSR)**

**SECONDARY LEVEL**

**Academic Schools**
Offer general education and courses in the arts and science streams.

**Technical and Vocational Schools**
Offer general education and technical & vocational based subjects. Prepare students for entry into technological, vocational & science related courses at diploma and degree levels.

**Lower Secondary Assessment (PMR)**
**Malaysian Certificate of Education (SPM)**
**Malaysian Certificate of Education Vocational (SPMV)**

**POST-SECONDARY LEVEL**

**Sixth Form - Sijil Tinggi Persekolahan Malaysia (STPM) or A levels**
2-year programme conducted in selected schools and colleges. Offer academic, technical and religious subjects.

**Matriculation, Certificate and Diploma Programmes**
1-2 year programme (matriculation and certificate) conducted by some colleges and some local universities. Meets requirements for entry to local universities. Polytechnics and colleges offer certificate and diploma programmes. Duration of a diploma programme is between 2-4 years.

**Malaysia Higher School Certificate (STPM)**

**Figure 2.2**
National Education System of Malaysia - Educational Chart
In its effort to develop an IT literate workforce, knowledge society, and knowledge economy, the Education Ministry has outlined innovative features such as computer literacy and information management skills to be incorporated into the new curriculum (Malaysia Economic Planning Unit, 1996). These skills are crucial for future manpower to work in the technology-related employment such as the MSC. Thus, the Government’s idea of establishing the “smart schools” pilot project, which will utilise IT in primary and secondary schools for learning and teaching, is practical and timely. The “smart schools” project is discussed later.

2.3.3 Higher Educational Institutions

At the time this study was undertaken, there were nine public universities in the country, and more than 30 other institutions of higher learning. Each public university has developed its own competitive strengths, positioning itself as a centre of selective excellence. The first university, the University of Malaya, was established in 1962. This university succeeded the former University of Malaya in Kuala Lumpur, which was a division of the University of Malaya established in Singapore in 1949. The second university, established in 1969, is the University of Science Malaysia (USM). The third university, established in 1970, is the National University of Malaysia or Universiti Kebangsaan Malaysia (UKM).

In 1971, the College of Agriculture amalgamated with the Faculty of Agriculture of the University Malaya to form the University of Agriculture Malaysia or Universiti Pertanian Malaysia (UPM). This fourth public university changed its name on April 3rd, 1997, to the Universiti Putra Malaysia (UPM), reflecting a new image and identity. The fifth university, University Technology Malaysia (UTM), was established in 1972. It is located in the southern state of Johore, neighbouring Singapore. The sixth university, the International Islamic University Malaysia (IIUM) was established in May.
1983, and is the first university to be set up under the Company Act, but the major shareholder is the Government of Malaysia. This university came into existence as a result of the treaty signed between the Government of Malaysia and seven other Muslim countries and the Organisation of the Islamic Conference (OIC). It is located in Gombak near the capital city of Kuala Lumpur. It is unique because of its international nature of its student population and because the medium of instruction is English. In July 1984, the seventh university, the Northern University of Malaysia or Universiti Utara Malaysia (UUM) was established. It is located in the northern state of Kedah, next to Thailand.

In order to increase the student intake into the local public institutions of higher learning, two new universities have been established; the University Malaysia Sarawak (UNIMAS) and University Malaysia Sabah (UMS). The University Malaysia Sarawak (UNIMAS) was established in 1992, and was the first fully-fledged university to be set up in East Malaysia. It became the eighth public university in the country. The ninth university, located in the state of Sabah (East Malaysia), is the Universiti Malaysia Sabah (UMS). It was established in November 1994.

Although the focus of this study is on the public universities, it is deemed appropriate to mention briefly the private sector involvement in the higher education in the country. The government introduced a new law called the Private Higher Educational Institutions Act, 1996, which authorises the private sector to establish degree-granting institutions. As a results of this new law three leading corporations in the country: PETRONAS (National Petroleum); Telekom Malaysia Berhad; and Tenaga Nasional Berhad set up their own universities offering courses in science, technology and engineering. The Multimedia University, which was set up by the Telekom Malaysia Berhad in 1997, conducts courses in information technology and multimedia at the
undergraduate and postgraduate levels. It is equipped with various features such as high speed ATMs, multimedia learning facilities, intelligent building systems, electronic governance, digital library and an integrated campus management system. One of the primary roles of this university is to support the growth and success of the MSC project. Malaysia's first virtual university, Universiti Tun Abdul Razak (UNITAR) was set up in 1998, and uses multimedia and computer based technology. Besides these universities, other private colleges and branches of foreign universities have also been established in Malaysia.

2.4 PROFILE OF SELECTED PUBLIC UNIVERSITIES

The three public universities selected for this study are the National University of Malaysia or Universiti Kebangsaan Malaysia (UKM), International Islamic University of Malaysia (IIUM) and Universiti Malaysia Sabah (UMS). These public universities are located in West and East Malaysia. Both UKM and IIUM are located in West Malaysia; while UMS is located in East Malaysia. Figure 2.3 illustrates their geographic location.

FIGURE 2.3
Geographical location of the three selected universities
2.4.1 Universiti Kebangsaan Malaysia (UKM)

Universiti Kebangsaan Malaysia (UKM) or the National University of Malaysia was established in May 1970. It is one of the country’s prominent universities with 17 faculties, four centres, and three institutes. Its main campus is in Bangi, about 30 km south of Kuala Lumpur and close to the Multimedia Super Corridor (MSC). Universiti Kebangsaan Malaysia has a branch campus in the city of Kuala Lumpur, which houses the Faculty of Medicine, Health Sciences and Dentistry. It also has a Teaching Hospital in Cheras, south of Kuala Lumpur. UKM has used the Malay language as a medium of instruction since its inception. During the 1997/98 session (at the time of this study), UKM had about 1,804 teaching staff and a student population of over 17,000 at the undergraduate level, and about 2,700 at postgraduate level.

The University library system was set up in 1970, at the same time as the establishment of the University. Presently it comprises a main library, the Tun Seri Lanang Library, which is centrally located and surrounded by an outer ring of academic complexes; and three branch libraries, namely the Medical Faculty Library, the Law Library and the Institute of Malay World and Civilization Library. The main library collection has about 626,108 volumes and bound journals, including a collection of government documents and publications of international bodies. In addition, the library has a wide variety of non-printed materials and subscribes to about 5,000 journals. The main library has five special collections, namely the Arabic and Islamic Civilization collection, rare book collection, Southeast Asia collection, Law collection, and Audio-visual collection. Other services provided are literature searches, current contents, bibliographical compilation, induction courses and special classes on user education.
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The library had 32 computers for public use in early 1998. The total number of computers/workstations set aside for training was 20 (with Internet connection). The Internet training class started in 1997, and training was conducted regularly (every Monday, Tuesday, Wednesday, and Thursday during the semester period). Duration of training was two hours per session. However, there was a charge for the Internet training class of Ringgit Malaysia (RM) 10.00 per person.

2.4.2 International Islamic University Malaysia (IIUM)

The International Islamic University of Malaysia (IIUM) was founded in 1983 by the Government of Malaysia and co-sponsored by the Organization of the Islamic Conference (OIC). The University operates as a company under the direction of a Board of Governors with representatives from the sponsoring governments and organizations, namely: Malaysia, Bangladesh, Egypt, Libya, the Maldives, Pakistan, Saudi Arabia, Turkey, and the Organization of the Islamic Conference. During the 1997/98 session, there were about 7,000 undergraduate and 700 postgraduate students, including 1,000 international students from seventy-three countries, reflecting the geographic and cultural diversity of the university population. IIUM caters for diploma, undergraduate and postgraduate degree programmes in economics and management, law, Islamic revealed knowledge and human sciences, engineering and medicine. The university had attracted a broad mix of students from diverse cultural backgrounds and they represent more than 70 countries. The IIUM faculty was composed of scholars whose academic and professional degrees were from leading research universities around the globe. Like the student body, the 871 academic staff (1997/98 figures) reflects the geographical and cultural diversity of the campus population. IIUM has established strong connections with industry, business and the
public sector. These relationships have enhanced the quality of education and provided an effective avenue for prospective employment of its students.

At the time this study was undertaken, the University maintained four libraries at different locations – the Main Library at the Petaling Jaya campus, the Matriculation Centre Library at the Pantai Valley campus in Kuala Lumpur, and two in Gombak. The total stock was 320,242 items, which included 28,921 microforms and 14,982 units of audio-visual materials. The Main Library was established in 1983 and located on the Petaling Jaya campus. It had 25 carrel rooms, 4 discussion rooms, 4 media viewing rooms, and seating capacity for 897 users. The Matriculation Library had a seating capacity of 476 users, while the Education Library in Gombak had 102 user stations. The newly completed library building at Gombak houses collections related to Law, Economics and Management and Engineering.

Library operations were automated using the DOBIS/LIBIS package, an integrated library automation system. This system allows convenient access to the library catalogue and other related services on sixteen different terminals available in all libraries. The circulation system (issue and return, reserve and recall, and other related transactions) was also fully automated. There were 40 CD-ROMs and other databases covering a variety of disciplines available online and developed in-house. A cluster of 10 workstations provided a CD-Network of selected databases accessible throughout the campus and on the Internet. The Main Library was linked to the Internet and the national bibliographic network including the National Library and other university libraries. Library users were able to identify and locate additional research materials through online searching using the Internet. HukumSearch is a law database developed in-house and LEXIS is an online database located in the U.S. In addition to this, there are two CD-ROM databases on law; index to Legal Periodicals and LegalTrac.
User guidance and education programmes were conducted to expose end-users to all the available collections, services, and facilities in the libraries, and to maximise use of in-house facilities and external resources in the pursuit of academic excellence. A variety of printed guides and leaflets were also available.

2.4.3 University Malaysia Sabah (UMS)

Universiti Malaysia Sabah (UMS) was established on 24 November 1994. The University was temporarily located in Menggatal and Likas, Sabah, while its permanent campus was being developed in Teluk Sepangar, Kota Kinabalu, Sabah. The 909-acre permanent campus overlooks the South China Sea, and surrounded by spectacular rain forests. These provide a rich learning environment, particularly in areas relating to the conservation and management of the country’s natural resources. The university promotes research in marine science through its Borneo Marine Unit. University Malaysia Sabah places emphasis on areas of science, technology, engineering, business and management, economics and political and social science. During the period of this study Universiti Malaysia Sabah (UMS) had about 80 academic staff and 1,372 students at undergraduate level and about 68 students at postgraduate level.

The library services were provided at two temporary campuses, that is, Jalan Tuaran campus and Teluk Likas campus. The Teluk Likas library had an area of 2,600 square feet with a seating capacity of 50. Facilities here were quite limited due to the space constraints; it had a common reading room for students and photocopy machines. The Jalan Tuaran library had an area of 20,900 square feet, and had become the main Library with a seating capacity of 300. Facilities such as audiovisual viewing room, carrel room, discussion room, meeting room, and photocopy machines were available. The library at
Teluk Likas provided services primarily on non-sciences, such as social sciences, business and management, and economics, whereas, the focus at Jalan Tuaran was mostly on sciences, engineering, information technology and education.

The libraries were fully automated using an integrated library system called Virginia Technology Library System (VTLS) from the USA. The library system was linked to the campus wide area network (WAN). At the time this study was undertaken the total collections for both libraries were more than 25,000 volumes of library materials, excluding the audiovisual materials. The libraries subscribed to about 700 academic journals. The computer terminals in the libraries provided access to the online catalogue (OPAC), the Internet, and CD-ROM databases through a campus wide network. The main library at Jalan Tuaran subscribed to commercial online databases, such as EBSCO host (some full-text), ERIC, Business Source Elite (full-text), and Academic Search Elite (full-text). The library OPAC provided powerful search facilities for tracking down books and other materials that were available in both libraries. It has been available to library users since August 1996. The library had a total of 19 workstations for public use in early 1998. Out of this number, only 4 have Internet connections. The training room had 10 workstations; therefore, each training session was limited to 10 people at one time to facilitate effective training of end-users.

Training was held 4 times a week that is on every Tuesday and Thursday (2 sessions per day). There was only one librarian in charge of training. Users were taught how to use OPAC, CD-ROM and, to search the Internet using a Web browser. Training was open to both students and academic staff. New students were given library orientation during the start of every new semester. The library organised regular training on OPACs, electronic databases and searching the web.
2.5 INFORMATION TECHNOLOGY IN MALAYSIA

The Malaysian Government has recognised information technology (IT) as an enabling tool to support the growth of the economy as well as an enhancement to the quality of life of the Malaysian people. Information technology is envisaged as crucial in improving efficiency, productivity and competitiveness in the present as well as in the future. The official statistics show that investment in IT has grown at an average rate of 24 percent per annum from RM1.3 billion in 1990 to RM3.8 billion in 1995. The number of personal computers (PCs) has also increased substantially from 160,000 units in 1990 to 310,000 units in 1995 (Malaysia Economic Planning Unit, 1996, p. 452). The figure relating to PCs refers to those found only in the Government's departments and offices. The National Information Technology Council (NITC), formed in January 1995, has become the driving force for IT development in Malaysia. MSC was the brainchild of NITC. The Government perceived multimedia as the strategic sector to achieve Vision 2020\(^1\). The concept of MSC is discussed later.

2.5.1 IT infrastructure

Telekom Malaysia Berhad, the nation’s leading telecommunications company, has started installing a fibre-optic telecommunications network with a capacity of 2.5 to 10 gigabits per second, which will enable high speed transmissions of voice, video and data between companies operating in MSC and the rest of the world. Malaysia also launched her own satellites in January 1996. MEASAT-I (Malaysia East Asia Satellite) provides telecommunications, broadcasting and data services throughout the country and also in most of the Asia-Pacific region. The development of MEASAT I and II further advances the national

\(^1\) Vision 2020 is the long-term focus and direction for Malaysia to achieve the status of an industrialized and fully developed nation by the year 2020. It was initiated in 1991 by the Malaysian Prime Minister, Datuk Seri Dr Mahathir Mohamad.
telecommunications industry and the Internet technology. The Government allocated RM25.4 billion to expand further the telecommunications infrastructure under the Seventh Malaysia Plan. The private sector supplemented the Government funding by spending RM20.3 billion on the telecommunications infrastructure (Malaysia Economic Planning Unit, 1996, p. 465). The economic downturn did not deter the Government’s programme in building the IT infrastructure, as it is totally committed to the whole project. However, it did slow down the pace of some of the development activities.

2.5.2 The growth of the Internet in Malaysia

The Malaysian Institute of Microelectronics Systems (MIMOS) was established in 1985 to develop a strong indigenous capacity in microelectronics and information technology. The following year, MIMOS developed RangKom (Rangkaian Komputer Malaysia), small computer networks linked to four local universities offering e-mail and access to the USENET newsgroup. RangKom was connected to the outside world via four dialup maypack lines to Australia, the United States, the Netherlands and Korea (Wong, 1998). In 1990, MIMOS launched the JARING (Joint Advanced Research Integrated Networking) project to promote information exchange through access to the Internet and through a nation-wide network based on open standards. JARING was envisaged to become the base for the establishment of the Malaysian national information infrastructure (Bacha, 1996). In 1992, JARING was connected to the Internet via a satellite link between Malaysia and the USA and it became the ‘first real’ Internet connection as it provides Malaysians with accessibility to the Internet in more than 140 countries, through nodes located in 20 major towns. JARING exchanges and access points were further distributed throughout the country to provide an integrated communications network for both the public and private sectors (Malaysia Economic Planning Unit, 1996, p.458).
In addition to the above, JARING became the first Internet Service Provider (ISP) in the country (Wong, 1998, p.100). JARING subscribers increased rapidly from 30 in 1992 to 14,400 in 1995 (Malaysia Economic Planning Unit, 1996, p. 458). The Government allocated RM400 million to MIMOS under the Seventh Malaysia Plan to establish another 100 nodes throughout the country and also to increase the capacity of JARING. In order to meet the growing demand from the public for the Internet subscriptions, the Government decided to approve a second Internet Service Provider (ISP) in July 1996. This saw the arrival of Tmnet, which is managed by the leading telecommunications company, Telekom Malaysia Bhd. By the end of 1997, the total figure of Internet subscribers in Malaysia stood at 167,447. This figure comprised only 0.8 percent of the total population (22.7 million) of the country (Utusan Malaysia, 1997). The number of subscribers was expected to increase to 400,000 by the end of the year 2000. By the end of 1998, five more new ISPs joined JARING and Tmnet to provide Internet services to the public. They were Celcom Sdn Bhd, Mutiara Telecommunications Sdn Bhd, PrismaNet Sdn Bhd, Time Telecommunications Sdn Bhd, and Bina Sat-Com Sdn Bhd (The Star, 1998). This new development indicated that the demand for Internet subscriptions was growing rapidly and the general public was becoming more aware of IT and the Internet. This awareness may be attributed to the national IT campaigns spearheaded by the Government through its mainstream media and broadcasting agencies in promoting IT to the general public.

The Association of the Computer Industry of Malaysia (PIKOM), established in 1986, is a voluntary self-funding association representing the IT industry in the country. The main objectives of PIKOM are to spearhead, promote and coordinate development of resources, professional skills and programmes in the IT industry in Malaysia (Wijasuriya, 1998). In addition, it serves as a forum for discussion and promotion of computer usage and solves common problems of
the IT industry. It also represents the local IT industry to the Government and other public and private sector bodies, both local and overseas.

2.5.3 Multimedia Super Corridor (MSC)

Realising the important role of information technology as a catalyst for national development, the Malaysian Government decided to design and develop the Multimedia Super Corridor (MSC), which reflects the Malaysian long-term goal of becoming a service-based economy (Nantha, 1997). The MSC was designed as a high technology area where world-class multimedia companies were invited to establish their business and R & D facilities for developing new products and services (Mahathir, 1998). Local companies were also encouraged to set up their businesses and work collaboratively or as partners with big international companies. The MSC was expected to serve as a springboard for regional and global multimedia markets besides being a test-bed for the research and development (R & D) of new technologies and products (MDC, 1998).

Physically, the MSC is an area 15 kilometres wide and 50 kilometres long (750 sq. kilometres) that stretches from Kuala Lumpur City Centre (KLCC) in the north, to Kuala Lumpur International Airport (KLIA) in Sepang in the south (Mahathir, 1998). It covers an area larger than Singapore and it encompasses two mega-projects - Putrajaya and Cyberjaya. Putrajaya is the new administrative capital and Cyberjaya is an intelligent city, which comprises smart buildings with the latest IT infrastructure design to meet the business and living needs of the workers (Reid, 1998).

The Malaysian authorities identified seven flagship applications in order to get the Multimedia Super Corridor (MSC) started right away. They were Electronic Government, Smart schools, Telemedicine, R & D clusters, National Multipurpose Cards, Borderless Marketing Centres and Worldwide
Manufacturing Webs. The Multimedia Super Corridor (MSC) is being implemented in three phases. Phase one involves large international companies and small local companies working collaboratively with one another and with partners across the Asia-Pacific region and the world. Phase two will link up with other islands of excellence within Malaysia, and phase three will include making all of Malaysia a Multimedia Super Corridor, which is connected to other smart regions around the world. The final phase is projected for completion in the year 2020. Thus, the national aims of becoming a developed and industrialized nation, as stated in Vision 2020, will come to fruition by then.

2.6 INFORMATION TECHNOLOGY IN EDUCATION

For information technology programmes to be successfully implemented in the various sectors of the economy there is a critical need to develop human resources to meet the increasing demand for computer-literate and competent workers. Towards this end, education programmes have been revised to include information technology studies and training at various stages of the education system.

2.6.1 IT in Schools

Since 1994, the Ministry of Education has launched several programmes in selected primary and secondary schools with the objective of exposing students to basic computer knowledge. At the primary school level, the computer-assisted teaching and learning programme was implemented in 1994 as a pilot project for 15 schools. This programme utilises computer-software for mathematics and the English language, which were designed by the Computer Technology Laboratory of the Ministry of Education (Malaysia Economic Planning Unit, 1996).
At the secondary school level, a pilot project in computer literacy has been launched in the rural areas involving 60 schools where students have been introduced to computer applications such as databases, spreadsheets and word processing. Students in the secondary technical schools were also taught designing and programming using software such as CAD/CAM (Malaysia Economic Planning Unit, 1996).

The National Education Network or Jaringan Pendidikan was introduced in 1995 as a pilot project involving 50 secondary schools nation-wide to facilitate communication and interaction between students and teachers. The National Education Network provides access to educational information both within and outside the country via the Internet (Malaysia Economic Planning Unit, 1996).

2.6.2 The “Smart Schools” Pilot Project

As discussed in the previous section, the Malaysian Education Ministry has started several initiatives to introduce computer literacy in selected primary and secondary schools in 1994. In 1996, the Education Ministry announced a new concept of school education - “smart schools”. Reid (1998, p.44) described “smart schools” as networked schools that are equipped with IT resources, interactive courseware and access to information from around the world. The key concepts of the smart schools are multimedia educational courseware, exploratory learning, collaborative education and distance learning. Basically, it is meant to bring about a new generation of Malaysians who will be familiar with information technology.

Under the “smart schools” concept, students will be equipped with many skills such as critical thinking, language and independent learning skills. Students will learn how to access, analyse, synthesise and apply information effectively (Azmi, 1999). As for the teachers, they will have to readjust and change from
their traditional role to a facilitator role. This was stressed by the Prime Minister, Dr Mahathir Mohamad, in one of his speeches on the Multimedia Super Corridor (MSC) (Mahathir Mohamad, 1996, p.64),

"Teachers will need to change their role in the electronic classroom from being information providers to counsellors in order to help the students know how to select information sources, to make judgements about what they are downloading."

To this end the Education Ministry has started training selected teachers for the "smart school" pilot project in specific areas such as new teaching and learning strategies and technology management for effective learning (Azmi, 1999).

The "smart school" pilot project is one of the MSC's flagship applications and the project initially involved ninety selected schools throughout the country. The pilot project was scheduled to run from January 1999 until the year 2002. However, its implementation was slightly delayed due to several reasons: firstly, the East Asia economic crisis in 1997/98, which affects the country's economic growth severely; and secondly, certain technical problems relating to the courseware development. The multimedia courseware for the four basic subjects of English, Mathematics, Science and Bahasa Melayu, and the smart school management system were expected to be ready in September 2000 (Computimes, 2000).

2.6.3 IT in Higher Education

In terms of IT infrastructure in the higher institutions of learning, almost all the local universities have developed computer networking with adequate linkages within and between campuses as well as with access to international information via the Internet through JARING (Malaysia Economic Planning Unit, 1996). In April 1998, the Education Minister announced that all future
graduates of local Malaysian public universities, irrespective of their degrees, would be computer literate and competent in IT (The Star, 1998). This announcement reflects the Ministry of Education Malaysia’s commitment to ensuring that future graduates from the local universities are competent in IT skills. IT skills also encompass information skills.

2.6.4 IT in University Libraries

Computers were first introduced into Malaysian academic libraries in the late 1970s (Wijasuriya, 1998). During that time they were used mainly to automate repetitive and labour intensive processes such as acquisition, cataloguing and circulation. Now they are pervasive and have become very important information and communication devices in all libraries. Recent years have witnessed the widespread adoption of information technology in all public university libraries in Malaysia (Ding, 1996). CD-ROM databases are probably the most popular electronic sources in most university libraries in the country. This popularity is mainly due to the cost of searching a CD-ROM database, which is much cheaper than searching an online database because online search is charged as cost per minute (Yaacob, 1992). Furthermore, CD-ROM searches can be conducted by end-users at their own pace and this also increases its popularity.

A survey of some major libraries, including the academic libraries, indicated that all of them have access to the Internet (Bacha, 1996). The libraries surveyed mainly use the Internet for searching for information and sending and receiving e-mail messages. The university libraries in Malaysia have responded well to the current developments in information technology. It is postulated that electronic information resources will co-exist with printed materials in many university libraries in Malaysia for many more years.
2.6.5 The Implications of IT in University Libraries and on End-user Training

As the latest information is increasingly being produced and transmitted through the networks and other electronic means, new skills are needed in order to identify, locate, retrieve and use electronic information. Reid (1998, p.45) states that,

"The human resource challenge is not limited to just increasing IT workforce but must include providing relevant skills needed........"

The local academic librarians can play their role in equipping the undergraduate and postgraduate students and university staff with the necessary skills to handle the new information technologies available in their libraries. These skills will help students and academic staff in dealing with electronic information overload and in becoming critical users of electronic information services. It also facilitates students in their quest for knowledge and academic excellence during their study at the university and in acquiring new knowledge after leaving the universities. This will realise the concept of a life-long education.

2.7 THE IMPACT OF THE ASIA ECONOMIC CRISIS ON MALAYSIA'S DEVELOPMENT

As mentioned earlier in this chapter, Malaysia had previously experienced an economic growth of 8 percent per annum for eight consecutive years from 1989 to 1996. However, the financial and economic crisis in East Asia had hit the economy so hard that in the first quarter of 1998, the country's GDP reduced by 1.8 percent. The economic contraction led to unemployment, lower wages and depreciation of the Ringgit, which results in inflation. The Government had to
revise its initial forecast of 2-3 percent real growth downward to minus 1 to 2 percent real growth in 1998 (Worldbank, 1991). Overall budgets were slashed and many big development projects were put on hold until the economy recovered (Kaur, 1998). This caused a temporary setback to the country’s development.

Probably the most pressing question in many people’s minds during that time was how the economic crisis affected the on-going development of the Multimedia Super Corridor (MSC). During the tabling of the 1998 Budget, the Finance Minister at that time reiterated the Government commitment to the MSC. He described it as a “catalyst” for the development of an economy based on information technology, and it was deemed too important to the country’s future to be shelved or cancelled outright (Kaur, 1998). Despite the Finance Minister’s assurance, the economic crisis has had a fair impact on the MSC and the “smart school” pilot project.

The overall development strategies concerning the MSC have been readjusted. The “smart schools” pilot project, which was one of the flagship applications of the MSC, has had its budget reduced (Kaur, 1998). The ninety selected schools that were supposed to begin in January 1999 have been deferred to a later date, and the chosen number of ninety schools proposed earlier had to be reduced to eighty because of financial constraints (The Star, 1999). It was obvious that the economic crisis had to some extent affected the progress of the MSC and the “smart school” pilot project. However it did not stop the whole project from moving on, but at a slower pace. Beginning at the end of 1999 and early 2000, the Malaysian economy started to recover from the economic crisis and the Government began to speed up the process of developing the IT infrastructure, which include the MSC and the smart schools.
2.8 CHAPTER SUMMARY

Malaysia is a fast developing nation and it aspires to become a fully developed nation by the year 2020. In order to achieve the nation's goals and objectives, the Government is introducing and developing new ideas and concepts, such as the MSC and the "smart schools" project to get the country and the people moving forward to become a knowledge society.

The MSC and the "smart schools" concepts are about information technology (IT). The government has realised that the future of the country depends on the quality of workforce. The Malaysian workforce must be trained so that they possess the necessary skills to drive the nation forward. These skills must be acquired at the early stage - at primary and secondary school level. As Nieminen (1998, p.3) notes,

"Teaching people how to devise their individual search strategies and use creative thinking in information seeking has to begin at school level, because these skills create the basis for later learning and success in working life"

The national education system has been revised to be more relevant to the present Information Age and the Government's idea of the "smart schools" that is based on critical and creative learning and information technology is very encouraging and timely. It is hoped that when this new breed of school students enter higher education institutions, they will be competent in using IT and IT-related resources. The library professionals can then focus their time and energy in providing more relevant skills – information handling skills – rather than having to teach them how to use keyboard and mouse.
At the university level students and academic staff must be competent in handling IT-related information resources because the latest information is increasingly being published in electronic format. Competency in using these electronic resources is critical for research and academic success. The library and information professionals have the responsibility to provide adequate training to the library users to help them become competent users in accessing and using electronic information resources.

In its endeavour to become a fully developed nation, Malaysia is faced with many challenges, such as overcoming the 1997-1998 East Asia economic crisis, developing the IT infrastructure, and producing the IT-literate workforce needed by the country. This study is related to the issue of preparing an IT-literate workforce, particularly in the area of information skills training at the higher education level. This chapter described the Malaysian scenario. The next chapter will review the literature related to the topic of this research.
CHAPTER 3
LITERATURE REVIEW

3.1 OVERVIEW

This chapter reviews both empirical and theoretical literature that is related to the area of study. It is divided into various sections and sub-sections, and the main sections are as follows:

- Section 3.2 - Electronic information resources
- Section 3.3 - Established electronic information resources
- Section 3.4 - End-user training
- Section 3.5 - Studies on electronic information resources
- Section 3.6 - Assessing end-user training needs
- Section 3.7 - End-user training programme
- Section 3.8 - End-user training methods

3.2 ELECTRONIC INFORMATION RESOURCES

Electronic information resources are changing rapidly and in a relatively short period of time have expanded from a few dozen computerised bibliographic databases to include an overwhelming amount of information available on the Internet (Fecko, 1997). The variety of electronic information resources
3.2.1 History and Evolution of Electronic Information Resources

Tenopir (1995, p.3) traced the history of electronic information resources by devising a “database timeline” (see Figure 3.1), which showed the development of the electronic information resources over the years.

It started in 1964 when the Medlars system, developed by the National Library of Medicine (NLM) in the United States of America was first made available.
for batch searching. This was later changed to interactive online in the early 1970s with the appearance of the remote online systems such as DIALOG and ORBIT. Packet switching networks such as Tymnet followed in 1975 (Tenopir, 1995).

In the early stages, online searching was almost exclusively the domain of librarians and other professionals, who acted as intermediaries. However, beginning in 1980s it became accessible directly to end-users with systems like CompuServe and BRS/AfterDark. CD-ROMs appeared commercially in 1985 with more access to the end-users. Local loading of database tapes took off in 1990 (Tenopir, 1995).

The Internet became accessible to end-users in the early 1990s and it is the latest addition to the world of electronic information resources (Hsieh-Yee, 1997). The Web, which is one of the Internet tools, is now the vehicle of choice for many electronic publishers and producers to market their products (Large, Tedd and Hartley, 1999). Many online database producers and CD-ROM vendors such as SilverPlatter, EBSCO, UMI, OCLC, and Information Access are now making their products and services accessible via the Web (Notess, 1998).

### 3.2.2 Electronic Information Resources in Academic Libraries

Many academic libraries today provide a wide range of electronic information resources within and beyond the library walls (Lancaster and Sandore, 1997). Besides the more established electronic information resources such as online databases, online catalogues (OPACs), CD-ROMs and the Internet, there are other resources like electronic journals and the electronic document delivery services (for example, BLDSC and CARL Uncover). These electronic resources coexist alongside printed resources in many academic libraries today (Dugdale, 1999). This trend is likely to continue with electronic resources
becoming increasingly more important as they offer students and academic staff numerous choice of materials that would enhance their learning and teaching experience (Davies, 1997).

End-user access to electronic or networked information resources is now common in many academic libraries in the West (Large, Tedd and Hartley, 1999). This is confirmed by an international survey conducted in 1995 concerning the usage of networked information services by library end-users in six academic libraries in six different countries (Germany, Norway, Belgium, France, United Kingdom and United States) as reported by Biddiscombe (1996). About 150 questionnaires were sent out to the six selected academic libraries and 110 completed questionnaires were returned, yielding a 73% response rate. The findings of the survey revealed that (Biddiscombe, 1996, p. 170):

- Network databases are now a common feature for most universities across Europe and the United States;
- Academic libraries have enhanced their reputation as important information providers by their networked information provision;
- Library professionals should facilitate better access to information, and offering training to library end-users; and
- There is a need for a common database interface.

In the United Kingdom, end-user access to electronic information resources in academic libraries improved significantly in the early 1990s as a result of network CD-ROMs and the introduction of BIDS-ISI\(^1\). Since there was no

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\(^1\) The Bath Information and Data Services-Institute for Scientific Information (BIDS-ISI) citation databases was introduced in the UK academic libraries in February 1991 and hosted by the University of Bath. In August 2000, ISI Web of Science replaced BID-ISI. ISI Web of Science is hosted by MIMAS (Manchester Information Datasets & Associated Services) at the University of Manchester.
personal charge to end-users at the point of delivery, BIDS was able to attract and intensify usage by both academic staff and students (Wade, 1996).

In Canada and the US, Tenopir and Ennis (1998, p.22) noted that,

"Throughout the 1990s, the reference department of academic libraries have seen a rapid evolution from a print-centred world to a digital-intensive one. Online, CD-ROMs, and World Wide Web resources are often the first choice of both library users and reference librarians"

Tenopir and Ennis surveyed 68 academic libraries (library members of the Association of Research Libraries) in Canada and the United States of America. They found that almost all the academic libraries (except two) offered end-users access to the Web, networked CD-ROMs and databases loaded on the OPACs. They also discovered that while mediated searching of the traditional database was still available, libraries were increasingly offering unmediated access to remote database services via the Web. End-user searching via the Web on commercial online services such as OCLC’s FirstSearch, EBSCOhost, SilverPlatter ERL, and UMI ProQuest was growing in popularity. This could be attributed to the fact that no charge is imposed on the end-users by the libraries surveyed.

By comparing the situation in both the United Kingdom and the North American academic libraries, it can be implied that cost is a significant factor that determines the usage and popularity of electronic information resources in the academic libraries. This assumption concurs with the views expressed by Biddiscombe (1996, p.155),

"The cost of accessing databases is one of the key factors in the use that databases will receive. It has been free or low-cost network
access, which has been a vital element in the development of end-user searching. In those areas where access is free the end-user culture has thrived. There is evidence for this in the higher education sector.”

In Malaysia, public university libraries started installing their own computer systems and developing their own databases in the early nineties (Jaafar, 1998). Today there is widespread adoption of information technologies, such as online databases, online catalogues (OPACs), CD-ROMs and the Internet in all public university libraries in Malaysia (Ding, 1996). Some public university libraries in Malaysia provide Web-based commercial online services² to their registered users at no charge. However, the usage pattern of this service is not readily known due to the unavailability of published reports on this subject. Nevertheless, it can be said that public university libraries in Malaysia have responded quite well to the tide of information technologies. They are often the leaders in implementing and providing access to new technologies (Majid, 1998).

The next section will look at the four established electronic information resources (online databases, OPACs, CD-ROMs and the Internet) that are commonly available in most academic libraries today. These four categories of electronic information resources will be the focus of this study. The reason for selecting them is because they are commonly available in all public university libraries in Malaysia.

² Some of these Web-based commercial online services were on free trials provided by the overseas vendors and/or publishers.
3.3 ESTABLISHED ELECTRONIC INFORMATION RESOURCES

3.3.1 Online Databases

In the UK, university students and academic staff have access to a number of online databases, which include BIDS-ISI (now ISI Web of Science), EDINA\(^3\) and OCLC FirstSearch\(^4\), all of which provide references to journal articles for registered users (Ray and Day, 1998). All this was made possible through the auspices of JISC (Joint Information Services Committee). BIDS-ISI was the most popular online database in the UK. It was made available through JANET\(^5\) (Joint Academic Network) to all UK Higher Education institutions and is completely free at the point of delivery as each institution pays an annual flat rate subscription for each database they wish to offer their end-users. It was accessible to end-users for twenty-four hours a day (Wade, 1996). BIDS-ISI service ceased its operation at the end of July 2000 and it was replaced by a new service called the ISI Web of Science\(^6\). But BIDS itself is not closing, it continues to support a wide range of bibliographic and full-text services (Blagbrough, 2000).

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\(^3\) Launched in January 1996 and based at the Edinburgh University Data Library. It offers network access to a library of data, information and research resources for the academic community in the UK (Biddiscombe, 1996).

\(^4\) OCLC FirstSearch was launched in 1991 in the USA, and has been offered in the UK since 1993. It has over 5.9 million online full-text articles, full-image articles from nearly 3,000 electronic journals, library holdings, and interlibrary loan (OCLC, 2000).

\(^5\) JANET was formed in April 1984. It became the network for the education and research community within the United Kingdom and linked to other academic and commercial networks nationally and abroad to form part of the global Internet (http://www.ja.net). JANET was replaced by SuperJANET in 1992, which has a network capacity 1000 times faster than JANET (Ray and Day, 1998).

\(^6\) Web of Science consists of 10 million records and indexing details of over 8,000 journal titles that are updated weekly. It is the Web interface to the citation databases offered by the Institute for Scientific Information (ISI). It covers three major database products, i.e., Science Citation Index Expanded, Social Science Citation Index, and Art & Humanities Citation Index. (CHEST, 1999).
In the United States, Online Computer Library Center (OCLC) became one of the most important bibliographic utilities. OCLC has long been recognised as a major source for bibliographic information. It has more than twenty thousand members and more than twenty two million bibliographic records for various data formats (Hsieh-Yee, 1997). Other popular end-user online services include SilverPlatter ERL, UMI ProQuest Direct, Information Access Company (IAC) SearchBank, and EBSCOhost. The subscription costs of these online services allows unlimited searching at a fixed price, so libraries are able to promote and encourage usage of these services to end-users (Tenopir and Ennis, 1998). All of the aforementioned online databases have been made available directly to the library end-users via the Web since the mid-1990s (Notess, 1998).

In Malaysia, many university libraries provide access to both local and overseas commercial online search services. The most common local commercial online services are the New Straits Time Press (NSTP) Library Online system and the National News Agency (BERNAMA). Other online databases produced by the local statutory bodies include SIRIMLINK (dealing with patents and standards) and PALMOILIS (concerning palm oil information). Overseas commercial online databases are also available in many of the established Malaysian university libraries, and some of them are DIALOG, LEXIS, OCLC FirstSearch, EBSCOhost, and UMI ProQuest Direct (Yaacob and Abdullah, 1994).

In many public university libraries in Malaysia, it is normal to see the library professionals rather than the end-users searching the commercial online services on behalf of the end-users. The reasons are probably due to the complexity of search strategy or search commands and also the connection cost.

7 Founded in 1967 and formerly known as Ohio College Library Center.
involved in getting online (Yaacob, 1993). Since the ordinary end-users are not frequent users of online services, they are not familiar with the steps and techniques involved in searching online databases, so they would rather ask the librarians to search for them than conducting the search themselves.

3.3.2 Online Public Access Catalogues (OPACs)

Online public access catalogues (OPACs) are bibliographic access tools for end-users (Mischo and Lee, 1987). They contain bibliographic records describing the holdings of libraries and are the basic key with which end-users can open up the library collections (Lapp, 1996). OPACs first appeared in the late 1970s providing users with search facilities similar to those of a traditional card catalogue. The present OPACs system are more 'user-friendly' than before and use a variety of interaction methods such as commands, menus, form filling and function keys (Large, Tedd and Hartley, 1999).

Today many OPACs can be accessed via the Internet; for example, in the UK academic libraries, end-users can access the OPACs of other university libraries via JANET (Ray and Day, 1998). The National Information Services and Systems (NISS) home page provides a gateway to many of the UK higher education library OPACs (Large, Tedd and Hartley, 1999). In Malaysia the OPACs of many university libraries can be accessed via the Internet (Wijasuriya, 1998). Thus, providing end-users with a huge amount of information resources outside their own institutional libraries.

3.3.3 CD-ROM

CD-ROM appeared on the market for public consumption in 1985 (Tenopir, 1995) and it popularised the idea of end-user searching (Wilson, 1997). Initially CD-ROM was used to store text-based data due to its large storage capacity (about 650 megabytes) and was mainly used in the library and
information centres for storage and retrieval of bibliographic records (Elshami, 1996). Today many standard library reference sources such as encyclopedias, dictionaries, yearbooks and atlases are available on CD-ROMs (Sheehan-Harris, 1996). Lancaster and Sandore (1997, p. 117) stated that,

"...The obvious appeal of CD-ROM is that it can be used to put bibliographic databases and other reference tool directly into the hands of users, giving them more sophisticated searching capabilities than they have with comparable printed tools..."

In the context of the Malaysian public university libraries, CD-ROM databases were the most popular and widely available information tool after OPACs (Ding, 1996). In a study of CD-ROM services in the Malaysian academic libraries, Majid (1998) found that all public university libraries had installed CD-ROM services. However, most of the CD-ROMs were bibliographic in nature with few in full-text. The popularity of the CD-ROM services in the Malaysian academic libraries has sparked a number of studies in the past in this area (Majid, 1998; Majid and Mansor, 1996; Sharif et. al, 1994; Yaacob, 1993).

3.3.4 Internet

The United States Defense Department’s Advanced Research Project Agency (ARPA) first developed the Internet in the late 1960s. The early network called ARPANET connected only a handful of computers at a few sites around the United States of America. Later in the mid-1980s, the United States National Science Foundation (NSF) created a network called NSFnet that interconnected many smaller networks and provided researchers with access to information resources loaded on the computer servers located in remote sites around the globe (Swain and Cleveland, 1994).
In the UK, Joint Academic Network (JANET) provides free access at the point of use to the Internet as well as to a number of information services supported by the Joint Information Systems Committee (JISC), for students and staff members within the UK academic institutions (Ray and Day, 1998). In Malaysia, the Joint Advanced Research Integrated Networking (JARING), formed in 1990, was also linked to the Internet and it became the main backbone for the Internet services in the Malaysia (Wong, 1998). JARING has been discussed in Chapter 2.

The World Wide Web (WWW) or Web is one of the most popular Internet tools. Other tools include Telnet, File Transfer Protocol (FTP), Wide Area Information Server (WAIS), Gopher, and electronic mail (Valauskas, 1994). The World Wide Web is a system that provides simple access to a variety of Internet resources through hypertext interface. Telnet or remote login allows a local computer to connect to a remote computer as a terminal. It is used by libraries to connect to remote systems such as the catalogues of academic libraries. File Transfer Protocol (FTP) allows moving files from one computer to another. WAIS is a document delivery system that allows natural language queries of remote WAIS-formatted databases. Gopher is a system that provides menu-driven access to many network resources, including FTP sites and WAIS system. Electronic mail or e-mail involves sending and receiving messages from one computer to another. It is usually used by libraries and individuals for personal communication, electronic publishing and other activities (Swain and Cleveland, 1994).

There are many useful search engines and search tools that have been developed for end-users, for examples, Alta Vista, Infoseek, Excite, Lycos and Yahoo. Search engines are continuously being upgraded and new ones being added to enable end-users find what they want (Begum and Wong, 1999). Bradley (1996) grouped search engines into four types: 1) free text search
engines; 2) ‘index’ based search engines; 3) multi-search engines; 4) intelligent agents. Each type operates quite differently and yields different results, it is therefore, important that end-users understand how they function in order to use them effectively. Hence, knowledge of search engines is crucial in order to be able to search for information effectively on the Web.

3.4 END-USERS TRAINING

3.4.1 Nomenclature

There have been various terms used in the library and information science (LIS) literature when referring to teaching end-users to use information resources and services provided by libraries. For examples, ‘user education’, ‘bibliographic instruction’, ‘user instruction’, ‘information skills’, ‘user empowerment’, and ‘information literacy’ (Farber, 1995; Heery and Morgan, 1996; Hepworth, 1999; Hopkins, 1995; Kirby, Liddiard and Moore, 1998; Lwehabura, 1999; Rader, 2000).

A review of the LIS literature for a period of 25 years (from 1973-1998) by Rader (2000) shows that the concept of user instruction changes over the years from library orientation to library instruction and finally to information skills instruction. According to Watson (1998) the term ‘bibliographic instruction’ is most commonly used in the USA, while ‘user education’ and ‘information skills training’ are more commonly used in the UK. Sometimes these terms are used interchangeably (Julien, 2000; Taher, 1997).

Malley (1984, p.50) defines the term information skills as “a set of skills that includes library skills, communication skills, study skills, reading skills and learning skills”. He argues that all these skills have one thing in common, that is, the handling of information. According to Wilson (1997), the term
'information literacy' emphasises the user's ability to evaluate critically the information on hand as to its authenticity, currency and appropriateness to the problem solving process. Nevertheless, Budd (1998, p.283) argues that "whether termed library instruction, bibliographic instruction, information literacy, or information proficiency, the programmes offered by libraries tend to share some common goals." Lwehabura (1999, p.129) reinforced Budd’s argument by stating that "what is common among them is that they all refer to organised programmes practised across various types of libraries to enable library users to acquire skills to allow them to use the library resources effectively."

As can be seen from the above discussion, many terms were used to describe the education, instruction, and training of end-users to use library information resources and services. In the context of this study, the term 'end-user training' is preferred as it refers to the process of imparting knowledge and skills to end-users for using electronic information resources. In the researcher’s opinion, the term 'end-user training' represents exactly the theme of this study, which is about end-users and their training needs in using electronic information resources. From the review of the LIS literature, the researcher found that this term has been used by quite a number of authors/writers in the past (Davies, 1992; Lapp, 1996; Majid, 1998; Marshall, 1989; Nieminen, 1998).

3.4.2 Why train end-users?

Today many academic libraries are changing their emphasis from holding a collection of printed material to becoming an entity providing access to other library collections and global information via networked computers (Nieminen, 1998). As a result of this change, the knowledge and skills that are required by
end-users to exploit the new wired resources and services are also changing. End-users not only need to become familiar with resources available in their libraries, but also how to access information (in electronic format) from beyond their libraries. The knowledge and skills required to take advantage of the new electronic resources are completely different to those which might have been needed by the traditional user of libraries (Davies, 1997; Dutton, 1990; Hu, 1996; Nieminen, 1998; Ray and Day, 1998; Wilson, 1997).

An earlier study has shown that a large number of end-users were unaware of the new IT tools and methods for information retrieval. As for those who were aware of and familiar with the electronic resources, only a small number really knew how to use the full capabilities of the software (Thomasson and Fjällbrant, 1996).

Adams and Bonk (1995) found that lack of knowledge about electronic information resources was the main reason why faculty members at the State University of New York (Albany, Binghamton, Buffalo, and Stony Brook) did not use electronic information resources extensively. This reason was seen as a major obstacle to the exploitation of electronic information resources. They argued that if faculty members were given appropriate training it might stimulate their usage of electronic information resources.

The findings of Adams and Bonk were supported by the findings of Eager and Oppenheim (1996), who also found that academic staff at the University of Strathclyde, UK, lacked knowledge about networked information resources. As a result of this deficiency they (academic staff) had ‘frustrating’ experiences when searching networked information. The researchers suggested that this problem could be addressed by providing sufficient information and appropriate training to the academic staff.
McCarthy, Krausse and Little (1997) surveyed end-users at the University of Rhode Island, USA and found that they lacked the basic knowledge of search strategies, which includes how to limit searches, how to use the software retrieval commands and how to choose the right databases. The three empirical studies as described above demonstrate that lack of knowledge and skills about electronic information resources impede its usage.

A study conducted by Vander Meer, Poole, and Van Valey (1997) on end-users' attitudes toward computer and library use at the Western Michigan University Libraries, USA found that end-users trained in the use of computers, the Internet, and information-handling skills can search, retrieve, evaluate and use electronic information resources effectively. The findings of this study reinforce the earlier findings by Adams and Bonk (1995), Eager and Oppenheim (1996), and McCarthy, Krausse and Little (1997). On the one hand, the absence of training leads to unawareness and lack of knowledge and skills in using the electronic information resources. On the other hand, given appropriate and adequate training, end-users were able to use and manipulate the electronic information resources. Hence, it may be argued that training improves end-users' knowledge and abilities to use effectively the electronic information resources available.

3.4.3 What Are the Problems Faced by End-Users?

Miscoh and Lee (1987) reviewed the literature on the problem of ‘end-user searching of bibliographic databases’ in the Annual review of information science and technology (ARIST); they identified some of the problems that end-users usually encountered when searching bibliographic databases as follows:

- Complexities of search strategy formulation and logic;
- Variations in command languages from publisher to publisher; and
• Huge variety of available databases (users are unable to choose the right database to use).

Davies (1992, p. 56) described the problems that novice end-users would generally encounter when dealing with new information technologies as below,

“These newer electronic systems bring in their wake a range of additional problems and obstacles for the end-user, which are of a different dimension to what has gone before. Now, not only has the end-user to be able to read/decode and interpret information but also to operate successfully the complex technology within which the information is embedded. Depending on its level of sophistication and end-user orientation this may entail learning the basics of an operating system, text editing, retrieval command language and other refinements, let alone discovering how to switch the things on!”

Novice users usually encounter difficulties in finding relevant information on the Internet because of the enormous amount of resources available. They are often lost in the maze of information resources due to inadequate knowledge and skills (Sabaratnam, 1997). It is not uncommon to do a search on the Internet and be faced with a million or more hits (Harmon, 1996). Huge volume of search hits makes selecting relevant items very difficult (Koutnik, 1997), and this can result in users spending longer time sifting and looking at each hit, which may or may not be relevant to their topic (Abbas, 1997). This can leads to ‘frustrating’ experiences when searching the Internet. This problem could be addressed if end-users have appropriate training and knowledge in handling electronic resources.
Gan (1998) reviewed an information literacy programme conducted by one of the public universities in Malaysia, which listed two types of skills required by the library users in order to use the library IT systems. They are (i) information retrieval skills; and (ii) IT skills. With regard to information retrieval skills, Bruce (1992) identifies the following skills that end-users need to learn:

- How to use information retrieval tools effectively;
- How to construct a search strategy;
- How to evaluate information;
- How to select the most appropriate source.

Pertaining to IT-skills, many in the LIS literature suggested that in order to use electronic information resources, end-users need to learn to use computers, search full-text multimedia and hypermedia systems, use word processing, and use multiple search interfaces (Davies, 1992; Vander Meer, Poole, and Van Valey, 1997; Watson, 1998).

Barry (1997, p.227) identifies three broad categories of information skills required by end-users in an electronic environment. They are as follows:

- Judgement of information – comprises evaluation of quality, filtering out excess information and focusing on specific needs.

- Knowledge and operation of resources – the need to acquire knowledge of the diverse resources and skills to operate the complex technology within which the information is embedded.

- Linguistic/logical interaction skills – the linguistic and logical skills needed to formulate information needs and make them explicit in a form
understandable by IT systems and also to read, decode and interpret electronically provided information.

Similar to Barry’s ideas concerning judgement of information, King (1996) also argues that that besides learning how to find and use the electronic information resources, end-users must learn how to examine and judge the authenticity, accuracy and applicability of the information retrieved. His argument is supported by Abbas (1997), who emphasise on the importance of teaching end-users to critically evaluate the Internet resources to determine their validity. The aforementioned authors provide some useful perspectives about the knowledge and skills needed by end-users. The following empirical studies illustrate some of the important skills that are required by end-users in handling electronic information resources.

A questionnaire survey conducted by Allen (1990) on CD-ROM training needs of students at the University of Illinois at Urbana-Champaign, USA, found that students needed training on how to develop search strategy and how to proceed through a search. She suggested that basic element of search strategy and procedure could form the first level of instruction, with advanced searching methodologies, such as Boolean operators taught to those who wish to attain higher levels of competence. Allen findings supported the ideas put forward by Bruce (1992) concerning constructing or developing a search strategy.

A study on faculty members’ attitudes toward computer and library use at the Western Michigan University, USA, revealed that basic computer skills are necessary prior to using electronic information resources (Vander Meer, Poole, and Van Valey, 1997). Koohang (1986) found that experience of computer use was the most significant factor in relation to use of library computer systems. Majid and Abazova (1999) and Ochs et al. (1991) confirmed that computer
skills are important and lack of them is likely to affect usage of electronic information resources.

Perry (1995) reported an online survey carried out in 1994 that was sent to 18 listservs (discussion lists); 84 respondents with different backgrounds and from seven countries responded to the survey. The findings revealed that more than half of the respondents (57%) thought that Internet was somewhat difficult, but those respondents who possessed higher level computer literacy found it easier to master. Many of the respondents felt the need for training that could help them to navigate quickly through the Internet to find the desired information. Most respondents indicated that they learned about the Internet through self-study by reading books and periodicals, and by consulting their colleagues.

Cullen and Cheng (1999) in their survey of training needs of library professionals in using new technologies in China and New Zealand, identified some competencies needed by the library professionals. These competencies are the ability to use appropriate search engines to search the Web, and the ability to evaluate critically information found on the Web. The findings are consistent with the points raised by Abbas (1997) and King (1996) regarding critical evaluation of the information resources retrieved from the Web. These competencies are not only needed by the library professionals, but are also relevant to the library end-users.

The literature reviewed so far indicates that end-users require skills in basic computer applications, information retrieval, Internet/networks, and knowledge of critical evaluation of electronic information. These important skills and knowledge will be discussed in the next section on literacy concepts.
3.4.5 Literacy Concepts

There have been many concepts of literacy, "expanding from its traditional concept as the ability to read and write, literacy has been variously connected with different educational and cultural activities and linked with a great variety of mechanisms and technologies" (Siitonen, 1996, p.1). The concept of literacy has been expanded to cover information literacy that goes beyond traditional literacy including computer literacy and use of computer produced information.

McClure's (1994, p. 118) model of information literacy illustrates the range of skills needed by the library and information workers in the networked environment. The diagram (See Figure 3.2) shows four different types of literacy that a worker needs in order to be multi-skilled and become an information-literate person. They are: (i) traditional literacy – the ability to read and write; (ii) computer literacy – the ability to operate a computer and its software; (iii) media literacy – the ability to decode, evaluate, analyse, and produce both print and electronic media; and (iv) network literacy - the ability to identify, access, and use electronic information from the information network. According to McClure, all of these types of literacies can be cast in the context of information problem-solving skills.

Information literacy is defined as "the ability to locate, evaluate and effectively use needed information." (American Library Association, 1989 as cited in Hu, 1996, p. 1)
Based on McClure’s literacy concepts, Hu (1996) elaborated and described the network literacy concept in relation to the library end-users. According to Hu (1996, p. 2), network literacy for library users consists of two aspects: (i) knowledge of networked information; and (ii) skills to locate, select, evaluate and use the networked information. Hu described the knowledge of networked information as:

- To recognise the range and uses of global networked information resources and services;

- To understand the role and use of networked information in problem solving and in performing basic life activities; and

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9 All networked information is in electronic or digital form and delivered and accessible using computerised and networked facilities such as microcomputers, dumb terminals or other electronic and telecommunication devices in a networked environment. (Hu, 1996, p.2)
• To know the system used by which networked information is created, managed and made available.

And the *skills* include:

• To defined information needed for specific purpose;
• To locate information needed from networks with efficient information retrieval methods, skills and tools;
• To select and evaluate information gained from networked information on a given topic;
• To manipulate and organise networked information with other resources to enhance its values; and
• To use, analyse and present networked information for problem solving and life-long learning.

Hu (1996) argued that in order to acquire network literacy, library end-users should first of all possess other basic literacy as follows:

• Traditional literacy - to read and write;
• Computer literacy - to understand and operate computers which are interfaces between networked information and end-users;
• Media literacy - to understand different media storing networked information and use them; and
• Information literacy - to locate, select, evaluate and use information effectively.

McClure’s model of literacy concepts and Hu’s (1996) elaboration of network literacy are relevant to this study, which is concerned with the training needs of library end-users in using electronic information resources. Library end-users
must possess all the above-mentioned literacies in order to use electronic information resources effectively.

3.5 PREVIOUS STUDIES RELATED TO END-USER TRAINING IN USING ELECTRONIC INFORMATION RESOURCES

A literature search was carried out for previous studies focusing on training needs of end-users following the introduction of new technologies in academic libraries. The literature search uncovered very few empirical studies focusing on training needs of end-users following the introduction of new technologies in academic libraries. Cullen and Cheng (1999) also found little literature in this area when conducting their literature search. This section discussed the relevant empirical studies, and is divided into two subsections: studies in developed countries; and studies in developing countries.

3.5.1 Studies in Developed Countries

Allen (1990) conducted a study on CD-ROM training needs of eighty-seven students at the University of Illinois at Urbana-Champaign, USA. The study used questionnaires with Likert scale to collect quantitative data on students' perceptions of their training needs and preferred methods of training. Comparisons were made between different groups of students - inexperienced and experienced - and different gender. The statistical test used for making comparisons between two groups was Mann-Whitney U tests. The findings of this study revealed that respondents wanted training in developing search strategy, search procedures, Boolean logic and using the equipment. Experienced and inexperienced students generally expressed the same training needs except for using the equipment. Female students expressed a stronger desire for training than males in all areas. The training method preferred by
respondents was individualised training method, such as one-to-one instruction and help available in the computer laboratory.

Puttapithakporn (1990) studied the problems or difficulties that end-users faced when searching CD-ROM databases in an academic library at Indiana University, Bloomington, USA. He used participant observation, self-administered questionnaire and selective interviews in collecting the data. He found that the problems faced by end-users were semantic and syntactic errors. He argued that training programmes that are geared towards problems end-users may encounter in the course of searching can benefit end-users.

The findings of the survey by Mehta and Young (1995) at the University of Alabama, USA showed that only 42% of respondents (faculty members) had used electronic information resources. Of this number, less than half (42%) had used CD-ROM databases; and almost half (49%) had used online databases. Although some of them were familiar with electronic products, they preferred to use print sources and informal channels to get needed information. More than half of the respondents viewed electronic information resources negatively in terms of coverage, relevance and ease of use. The survey results highlighted faculty members' viewpoints on electronic information resources. Librarians and electronic publishers could learn some lessons from it, particularly points related to 'user unfriendliness' of the information systems. The sample size of this study was 280 faculty members from two disciplines namely, science and engineering. However, due to a low response rate (only 35%), the findings of this study could not be generalised.

In a small scale study of Malaysian postgraduate students at the University of Leeds, UK on the usage of CD-ROM databases, Nasir (1996) found that slightly over half (58.3%) of the Malaysian postgraduate students had used CD-ROM databases. About 41.7% of the Malaysian postgraduate students did not
Chapter 3 Literature Review

use CD-ROM databases. Among the reasons given for non-use of CD-ROM databases were unawareness of CD-ROM databases, lack of familiarity with their use and no prior training. The result of this study was quite disturbing, but due to the small sample size (only 45 respondents) it could not be generalised. However, the findings highlighted certain issues that need to be addressed by the library, particularly concerning international students’ information training.

A study by Hsieh-Yee (1996) of undergraduate students’ use of online catalogues (OPACs) at two American universities found that the online catalogue (53%) was the most commonly used information channel. Her findings also revealed that only 19% of students used online databases and 28% used CD-ROMs, although more than half of the respondents had knowledge of CD-ROM databases. Students clearly preferred online catalogues (OPACs) to other information channels. She also discovered that most students failed to understand the differences between keywords and subject headings and they did not know how to use the Library of Congress Subject Headings (LCSH) and the thesaurus.

A study by Connaway, Johnson, and Searing (1997) at the University of Wisconsin-Madison, USA concerning the usage of OPACs found that undergraduate students were inclined to use subject searching in their OPACs searches, while the graduate students and faculty members tend to search OPACs by known author or title. The study also found that respondents, particularly undergraduate students were confused about keyword searching and controlled vocabulary.

Massey-Burzio (1998) used a focus group interview technique to collect data from 38 library users at the Johns Hopkins University, USA concerning their experiences, needs and preferences in using the library. The study found that the majority of library users do not like to ask questions; they faced difficulties
with basic information retrieval principles, and were not aware of many services and resources available in the library. The most common ways of learning to use the library were found to be through friends and experimenting. The results also showed that most undergraduate students did not understand the difference between subject and keyword, and they did not understand the Library of Congress (LC) call number system. This result is consistent with the findings by Connaway, Johnson, and Searing (1997) and Hsieh-Yee (1996). While the findings of this study cannot be generalised to all students and faculty members due to the small sample used, they do reflect the perspectives of 38 individuals – students and faculty from various departments.

Ray and Day (1998) used questionnaire survey to determine the attitudes of students towards electronic information resources in three universities in the UK. The questionnaire was distributed to 317 students across 3 universities. Their findings revealed that majority of respondents (96.4%) was aware of electronic information resources, but insufficient computer workstations deterred them from using electronic information resources. The results also showed that limited time and lack of effective information retrieval skills form the main barriers to using electronic information resources. The most popular electronic information resources were the Internet and CD-ROMs. About 70.3% of respondents perceived that they were able to utilise the services offered effectively. It is also interesting to note that most students acquired the skills necessary to exploit the electronic resources through trial and error and through guidance from other students. However, the effectiveness of the skills acquired via these methods is somewhat questionable.

3.5.2 Studies in Developing Countries with emphasis on Malaysia

Moyo (1996) studied the training needs of 164 academic staff in using the Internet at the University of Botswana. His study found that there were low
level of 'net-awareness' and under-utilisation of the existing e-mail services among the academic staff of the University of Botswana. The majority of the academic staff lacked basic IT skills. Only 25% of the respondents had moderate to advanced computer skills and able to use e-mail. The majority of respondents did not have basic keyboard or word-processing skills. About 5% of the respondents had never used computers prior to exposure to the e-mail facility at the University of Botswana. Moyo listed the following factors as barriers to usage of the facility:

- Lack of basic IT skills
- Insufficient number of workstations
- Lack of awareness of the usefulness of Internet facility
- Inadequate help provided to the academic staff

He recommended that systematic training should be organised for all academic staff and also the training should accommodate the different levels of skills of the academic staff at the University of Botswana. He suggested that the content of the training should include both theoretical and practical hands-on exercises. He noted that for the initial training the content should also include general IT literacy, incorporating basic computer skills, concept and uses of computers in networked environment.

Fidzani (1998) in his study found that the graduate students at the University of Botswana did not have adequate training in the use of library and as a result lacked basic skills in using the library resources and services. They were also not aware of the services provided by the library. He suggested that the library must strive harder to promote their resources and services and try to attract more students to the library.
A study conducted by Yaacob et al. (1992) on the impact of the CD-ROM systems on students at the MARA Institute of Technology, Shah Alam, Malaysia found that CD-ROMs were well accepted by students. The majority of respondents (89%) reported that they utilised the service. Almost all of them (97%) stated that the library training programme was useful. The findings showed that nearly half (49%) of the respondents received encouragement from their lecturers to attend the training programmes. This factor is very important because academic staff can determine the success or failure of a library training programme. This is because academic staff have great influence on students' learning behaviour. The study suggested that the library publicise its training programme more widely. The findings of this study supported a previous study by Baker (1989) that academic staff can influence students' utilisation of the library resources and services.

In a small-scale telephone survey conducted in 1994 on CD-ROM based information retrieval services in the Malaysian University libraries, Sharif et al. (1994) found that all public university libraries had installed CD-ROM based information retrieval services. The study found that end-users preferred self-searching when using CD-ROM databases. All the surveyed libraries provided user education to their end-users. However, the delivery methods used by these libraries varied slightly. Among the common training methods used were classroom lecture, one-to-one instruction, workshop, and printed instructions. However, none of the libraries surveyed had any experience in using computer-assisted instruction (CAI). As noted earlier, end-users preferred self-searching in using CD-ROM databases and librarians must try to draw their attentions to the benefits of attending the CD-ROM training programme organised by the libraries.

A study of CD-ROM usage by postgraduate students and faculty members in two university libraries in Malaysia (University of Malaya and International
Islamic University Malaysia) by Majid and Mansor (1996) found that the majority of end-users preferred to do their own searching of CD-ROM databases. This finding is consistent with the previous finding by Sharif et al. (1994). The majority of end-users were unaware of CD-ROM services in their university libraries. The study suggested that the two university libraries should aggressively promote and market their electronic services to all potential users.

Majid (1998) conducted a questionnaire survey in 1997 of CD-ROM based services in the public university libraries in Malaysia. The main objectives of the study were to gather information about the management and marketing issues related to CD-ROM services. The results of his study revealed that five university libraries had established CD-ROM networking including four libraries, which had their CD-ROM networking accessible through campus-wide networks. All the university libraries surveyed produced handouts about their CD-ROM services and four libraries provided simple searching guides for their end-users to use during searching. All the university libraries promote their CD-ROM services using various channels such as poster, office memo, demonstrations, library tour, library homepage, email and library bulletin or newsletter. All the university libraries had been conducting end-user training programmes to promote the CD-ROM service and to familiarise end-users with basic searching techniques. The training methods used by the university libraries surveyed were point-of-use instruction and classroom training sessions. The results also revealed that less than ten per cent of the total university population had attended CD-ROM training. The main reasons for under-utilisation of CD-ROM services were inadequate publicity and low computer skills among end-users.

Majid and Abazova (1999) conducted a questionnaire survey of computer literacy and use of electronic information resources by the academic staff at the International Islamic University of Malaysia. They used a stratified-random
sampling technique to select 180 respondents from four faculties in the university – Laws; Economics and Management; Engineering; and Islamic Revealed Knowledge and Human Science. The response rate was 63.3%. The study found that a majority of academic staff was knowledgeable about OPAC search options and had been using them. About one half of the respondents had been using the Internet, although the majority was only using the e-mail facility. Use of CD-ROM was very low, possibly due to lack of awareness about the service. The findings also showed that usage of electronic information resources was influenced by factors such as computing skills, gender and age. They found that academic staff who have good computer skills used electronic resources more frequently than those with low computer skills. Academic staff whose were above fifty years old used electronic resources less frequently than those below fifty. They suggested that emphasis on developing basic computer skills among library users should be given.

Begum and Wong (1999) conducted a survey on the Internet use patterns among the academic staff at the Universiti Sains Malaysia (USM), Penang in December 1996. Two faculties were selected in the survey - the School of Industrial Technology and the School of Social Sciences. This study used a combination of three data collection techniques – questionnaire, focus group (consist of 8 academic staff and 4 librarians) and in-depth interviews (with 6 academic staff). The results of the study showed that scientists used and were aware of the Internet resources more than the social scientists. The level of computer literacy among academicians in the two faculties varied significantly. On the one hand, there were those who could not handle a mouse. On the other hand, there were people who could do FTP. The study suggested that the library should offer Internet workshops at two levels of instruction to accommodate beginners and advanced users.
In a similar study by Wee (1999) concerning Internet use patterns among the upper secondary school science students in Kuala Lumpur, Malaysia it was found that only 64% of computers in all the fourteen secondary schools in this study were connected to the Internet. About half (52%) of the respondents used the Internet; the main reasons for non-use of the Internet were lack of skills (36%), not available at home (23%) and not available at schools (12%). Non-availability of the Internet facilities at home and in school was cited as a barrier to its use. The main problem faced by the respondents when using the Internet was lack of skills. This implies that in order to promote Internet use to potential users, training needs to be provided and access to IT improved. Many respondents learned to use the Internet through teaching themselves (47%) and from friends (42%). Only 6% of the respondents acquired Internet skills through a formal training programme. It was suggested that the schools should give formal training so that students could acquire the Internet skills as well as the information skills; these skills should be integrated into the school’s curriculum. This study used questionnaire survey and random sampling technique. The statistical techniques used were crosstabulations and chi-square tests.

Hashim (2000) conducted a study on end-users perceptions of academic library services in Malaysia. The sample population was students and academic staff of three universities in Malaysia. The data collection methods used were questionnaire, interviews and focus group. The statistical techniques applied were Crosstabulations in conjunction with chi-square test and Fisher’s exact test (test of significant difference for 2x2 tables). The findings of his study revealed that end-users lack knowledge and skills, as well as lack of awareness about the library resources and services. This results in low usage of library resources and services. Furthermore, there were inadequate computer facilities for public use in the libraries. Lack of computer facilities impedes usage of IT resources and services. The study suggested that the academic libraries provide
intensive information skills training for end-users in accessing and using electronic information resources; more computer facilities to end-users; and the integration of library and information skills into the university’s curriculum.

A study by Majid and Kassim (2000) on the information-seeking behaviour of the law faculty members of the International Islamic University Malaysia (IIUM) revealed that the respondents used IT-based library sources and facilities less frequently than printed sources. They concluded that the respondents were unaware of the availability of IT-based sources and unfamiliar with using these products. The findings also showed that e-mail was the most popular Internet application, while the file transfer protocols (FTP) was the least popular Internet application. They also discovered that only a limited number of respondents used other Internet applications besides e-mail. They suggested that the IIUM library should review its electronic information resources, and at the same time undertake a far-reaching library promotion and end-user training programme.

3.6 ASSESSING END-USER TRAINING NEEDS

The successful provision of a suitable training programme is largely dependent upon an understanding of the needs of those for whom the training is to be provided (Walker, 1995). In order to understand the exact training needs of different groups of end-users, training needs assessment or user needs analysis should be carried out (Watson, 1998). Anwar (1998, p.27) stressed, "Once librarians begin to employ training needs assessment in their organizations, they will be in a better position to develop customized training packages governed by real needs."

Lubans, (1974) cautioned that training programme should not be developed out of what the librarians guess to be user needs. Studies have shown that quite
often users' training needs do not match with librarians' perception of user needs (Allen, 1990; Barbuto and Cevallos, 1991). Tiefel (1995, p. 62) reinforced Luban's views,

“Quite often librarians do not study users' needs well enough and often do not teach what is actually needed by the students, but what they assume is needed”

Very often the library overlooked the idea of undertaking user needs analysis prior to developing the end-users' training programme. In order to avoid making mistakes in designing a training programme, Lwehabura (1999) suggested that user studies should be conducted so as to understand the exact needs of different user groups. The user studies concerning training needs can employed the training needs analysis (TNA) technique. Williamson (1993, p.1) defines training needs analysis (TNA) as "the systematic approach to determining the real training needs which exist within an organization or department.” He lists questionnaire, interviews, direct observation and/or self-observation as some of the tools or aids that can be applied for the identification of the library staff training needs. On questionnaires, Williamson describes certain criteria that need to be followed when designing questionnaire for identifying training needs. Some of these criteria are listed below (p.12):

- Restrict the questions to a manageable number. For example, not more than 20 questions and to plan for the questionnaire to be completed easily within 30 minutes;

- Use a style and language that the respondents will understand;

- Be straightforward and do not play tricks on the respondents or set any traps for them;
• Make the questions as specific as possible; and

• Test run any new questionnaire (pilot test).

A search in the LIS literature concerning the application of training needs analysis (TNA) on library end-users was unfruitful. However, the literature search detected a few studies concerning applying TNA to library staff training, which may provide a relevant approach to this issue, for example, a study reported by Parry (1991), which employed TNA interview to elicit library staff training needs at the then Bristol Polytechnic, UK. During the interviews the library staff were asked to suggest areas of their work in which they thought that further training would be beneficial. According to Parry the interviews were successful and the information gathered was useful for the library management in devising a comprehensive training programme. However, no description was given about the sampling technique used and how the interviews were carried out (unstructured or structured interviews) in the study.

A similar study was conducted by Cox (1995) to assess the training needs of the library staff both professional and non-professional at the Health Care Libraries of the South Thames (East) Region, UK in November 1993. In this survey, questionnaires were sent to 48 sites and replies were received from 87 staff producing a 90% response rate. The findings of the survey revealed that information technology skill training was the most dominant need, with nearly two-thirds of all staff identifying this as their first choice. The second major area identified was a need for general information skills training for library assistants. No description was provided about the sampling method used in the study or whether the questionnaire was pre-tested before sending the actual ones.

Anwar (1998) also applied TNA in his survey of the academic librarians’ perceptions of their ‘continuing professional development’ needs in Malaysia.
Questionnaires were sent to 249 academic librarians in Malaysia and 122 were returned yielding a response rate of 49%. He employed a ranking technique (means score) in analysing the collected data. His study revealed that competencies in electronic information resources, user education, Internet and microcomputer applications received high scores in terms of ranking. This indicates that IT related skills are top priority amongst the academic librarians in ‘continuing professional development’.

In summary, it can be said that training needs analysis is crucial if appropriate training programme is to be developed. By conducting the needs analysis the library will be able to decide on the level of training required, that is, what level of knowledge and skill is needed by the users (Day, 1994).

3.7 END-USER TRAINING PROGRAMME

The question that arises now is what needs to be taught in a training programme? Some experts in this field provide some explanations and guidelines. For example, Lancaster and Sandore (1997) emphasised that in the electronic library environment end-users must acquire technical skills to use online resources. In addition to technical skills, end-users must also have conceptual knowledge. Their view is shared by Tenopir (1995), who also stressed conceptual knowledge, for example, how to construct a search strategy and how to choose an appropriate database.

Wielhorski (1994) on the other hand, advocates procedural knowledge and conceptual knowledge. Procedural knowledge is how to access the system, logon procedures, and other technical details needed to access and use the systems. This is quite similar to technical skills as mentioned earlier by Lancaster and Sandore.
Chrisman and Beccue (1990) place emphasis on integrating concepts and skills in the end-user training programme. They state that excluding concepts from skills in teaching end-users to use tools is likely to cause a major problem in the long run. They assert that users are usually taught to use a particular tool with little explanation given on why it is done that way. As a result, training also tends to concentrate on the how rather than the why. They argue that users who receive this type of training are limited in their ability to adapt to new situations. Teaching users the concepts in addition to specific skills should provide a proper foundation for learning how to use a particular tool. Furthermore, they suggest that teaching concepts also help users form an appropriate conceptual model, which often allows users to transfer their prior knowledge to the new situation and thus become comfortable with tools more quickly.

Henley (1992) proposes a general outline concerning training on using online databases. She suggested that at the introductory level, the emphasis should be on procedural training that teaches the step-by-step aspects of searching. The skills involved are learning how to log-on to the search system, how to enter commands, how to follow menu choices to obtain the desired results, and how to print out or download the search results and so on. This is similar to the procedural knowledge as advocated by Wielhorski (1994), and skills training (how to do it) as suggested by Chrisman and Beccue (1990).

At the advanced level, Henley proposes that the teaching of the intellectual approach to searching is necessary. This would include search strategy, choice of keywords, use of the Boolean logic, the concepts of relevance and recall, and using the controlled vocabulary of a specific database for any given search topic. This is similar to the conceptual training suggested by Chrisman and Beccue (1990), Wielhorski (1994), Tenopir (1995), and Lancaster and Sandore (1997). However, Henley cautions that the advanced level is more difficult to
teach and it is where end-users faced most problems in learning about online databases.

Hu (1996, p.4) proposes the basic contents for a network literacy instruction course as below:

- Computer operation knowledge and skills, (which constitute computer literacy), such as how to operate OPACs or microcomputer workstations, how to use modem with communication software to dial in systems and to download files, how to use stand-alone or networked printers to print information, how to use CDROM devices, etc.

- Network knowledge such as some basic concepts on networking technology, overview of library network environment, different network systems' features and usage of LAN and online cataloguing systems, WAN especially Internet related Gopher, WWW, Email, and FTP functions, CDROM databases, necessary functions and commands to use networking systems such as login/out.

- Multimedia knowledge and skills for graphic/image resources, sound information resources, and other devices such as scanner with OCR applications.

- Networked information available in network systems, in their contents of databases (in subjects), coverage and formats, structure of files and records, information intended market for user and uses, information delivery services, types of information such as utilities and index tools (Yahoo and Lycos in WWW, Veronica and Jewels in Gopher), resources guides and subject guides, bibliographic lists and full text full-image electronic publications, email discussions groups (Listserv) and training resources of different purposes.
- Information retrieval skills such as Boolean logic searching.

- Standards and methods to evaluate information results for effective use of information.

Downard (1992, p. 34) illustrates the stages involved in developing a suitable end-user training programme using a flowchart as shown in Figure 3.3.

![Flowchart Showing Stages in the Development of End-user training Programme](source: Downard (1992))
According to Downard, in planning the training programme it is important to have written objectives. This is because the choice of the content and methods of instruction will be based on the objectives and they will also provide a focal point for evaluation. In deciding on the content of a course of instruction, it will be useful to consider three types of skills that end-users will need to use electronic information resources effectively. These are cognitive, affective and psychomotor skills. Cognitive skills are to do with facts and rules about, for example, how to use the library online catalogue. Affective skills are concerned with the understanding of concepts. Psychomotor skills involve physical activity such as the operation of the keyboard of an OPAC. Downard (1992, p. 35) suggests that the library should incorporate all these skills in their training programme.

There is a very useful guideline developed by the Reference and Adult Services Division (RASD) of the American Library Association (ALA) entitled, “Electronic Information Sources: Guidelines For Training Sessions” which covers topics such as purpose, audience level, content, length of session, location and facility, type of presentation, and so on. However, this guideline is meant for the classroom presentation only.

3.8 END-USER TRAINING METHODS

A wide variety of training methods is available to instruct end-users in handling electronic information resources. However, there does not seem to be agreement as to which is the best method to use for training electronic information resources in general (Barrett, 1995). Some successful efforts in teaching effective searching techniques according to Wielhorski (1994) have often employed interactive, one-to-one, point-of-use instruction by library staff working with end-users. The Reference and Adult Services Division (RASD), American Library Association (ALA) (1995, p.187) listed the following
training methods for instructing end-users in using electronic information resources:

- Classroom presentations;
- Online tutorials or computer-assisted instruction (CAI);
- Individual instruction;
- Point-of-use signage;
- Printed guides.

Hu (1996, p.4) categorised the methods for training networked information resources as follows:

- Classroom presentation/lectures with computer demonstration;
- Workbooks/printed texts for learner to practice with a networked terminal;
- Multimedia and audio/video instruction programmes;
- Computer-assisted instruction (CAI);
- Electronic user guides in HTML format with full-text and/or full image published on the Web;
- Point-of-use signage; and
- Individual instruction or counselling;

Qari (1999) describes the training methods practised in the King Abdulaziz University Library (KALIL), Saudi Arabia in training library users to use electronic information services. The training methods used were:

- Video-based training;
- Telephone-based training;
- Printed guide; and
- Self-training package.
Web-based training (WBT) is the most recent training method used in many academic libraries. According to Steed (1999), WBT is a computer-based training that is delivered via a Web browser (such as Microsoft Explorer or Netscape Navigator) through the Internet. WBT is interactive and flexible and can be structured to provide information at different levels of detail or intellect to meet particular situations (Kirby, Liddiard and Moore, 1998).

Web-based training (WBT) has many advantages over other self-instruction methods, such as CAI and printed self-guides. The advantages of using Web-based training (WBT) are well documented in the library literature (Creanor and Durmdell, 1994; Fjällbrant et al., 1997; Kirby, Liddiard and Moore, 1998; Tobin and Kesselman, 1999; Vishwanatham, Wilkins and Jevec, 1997). Some of the advantages are given below:

- Interactive - provides feedback so that user can gauge his or her progress;
- Can be used independently by individual users;
- Users can select the elements they need at the times they feel are right;
- Can deliver help at the point of need;
- Can be repeated as necessary;
- Available 24 hours a day, most days of the year;
- Can be used to train a large number of users in a short time;
- Can be accessed anywhere with appropriate equipment; and
- Can be incorporated into the teaching programme/curriculum.

Web-based training (WBT) has a few drawbacks: first, users would need a personal computer with Internet connections to be able to access it; second, users who are unfamiliar with the Web browser would not be able to benefit from it; and third, slower university’s servers may cause delay in accessing the training modules and this could leads to ‘frustrations’ on the part of the learner.
Steed (1999) noted that limitations in bandwidth may restrict instructional methodologies as performance for sound, graphics and video can be very slow.

In the next section, the relevant empirical studies relating to end-user training methods in using electronic information resources will be discussed.

3.8.1 Previous Studies Concerning End-User Training Methods

A nation-wide survey carried out in the United States in 1982 on using the online catalogues (OPACs) found that the majority of users (70%) learn to use OPACs without library staff help. Most of them learned to use OPACs from printed guides and online aids (Matthews, Lawrence and Ferguson, 1983). In another survey carried out at the Northern Illinois University Libraries in 1991 to determine the training needs concerning various online systems, Becker and Huang (1992) found that library users needed self-help guides in order to construct a search strategy. The findings of this study supported the earlier findings by Matthews, Lawrence and Ferguson (1983). An earlier study by Nielsen and Baker’s (1987) concerning OPACs, however, did not find similar preference of library users for printed guides in learning to use OPACs. They found that classroom instruction has a greater impact on users’ success in learning how to use OPACs rather than printed guides. The above empirical studies suggested that end-users are not a homogeneous mass; their preferences of training methods differ with time, place and context.

Critchley (1992), in a study of CD-ROM training methods at the Pilkington Library, Loughborough University, UK, found that demonstrations, printed guides, and one-to-one instruction were the most popular choices of training methods of library end-users. Demonstration has been shown to be an essential part of a training session, particularly to the novice user. Bostian and Robbins (1990) found that live demonstrations produced a significant difference in search strategy. They concluded that without a demonstration, “you can teach
computer searching till the cows come home, and the students won't know much more than when they started” (p. 17).

Cannon (1994) conducted a questionnaire survey on library research instruction involving 231 faculty members in the social sciences and humanities disciplines at York University, Ontario, Canada in March 1992. The response rate was 41%. Her findings revealed that the most popular method overall was hands-on training for computerised information resources, followed by computer-assisted library instruction. She suggested that the library set up a computer laboratory in the library for use by students and faculty during instruction and for librarians to provide support and expert guidance to end-users concerning the Internet resources. She also pointed out that end-users should be made self-sufficient and this could be achieved by providing more guides, pathfinders, handouts, better signage, and more detailed help screens to the library OPAC. However, she cautioned that these should not be considered ends in themselves.

Adams and Bonk’s (1995) study of faculty members’ experiences with electronic information resources at the State University of New York (Albany, Binghamton, Buffalo, and Stony Brook) found that faculty members preferred workshops or small-group classes as their mode of training. Usually in the workshop sessions, hands-on training is included as part of the programme, and therefore, the finding underpinned the earlier findings by Cannon.

In another study concerning academic library users in using electronic retrieval systems at the University of Haifa Library, Israel, Sever (1995) concluded that the library should provide intensive individual training sessions for academic staff. However, she noted that due to certain constraints - such as not enough reference librarians as compared to the large number of library users - this type
of training for the academic staff could not be consistently and efficiently carried out.

Kaczor and Jacobson (1996) analysed 94 questionnaires collected at the University at Albany, SUNY in 1995 on Internet training. Cross-tabulations and chi-square tests were used in the analysis of data. They found that respondents (both students and academic staff) preferred hands-on instruction rather than demonstration in class. This finding is consistent with the findings by Cannon (1994). They also found that the majority (80%) of respondents had not attended any Internet instruction sessions provided by the library or computing services. The results also revealed that 54% of the respondents learned to use the Internet mostly by themselves. Other methods used were learning from friends (16%), library instruction session (10%), one-to-one instruction from the librarian (6%) and computing services (6%).

Hsieh-Yee (1997) conducted a survey in early 1994 of the coverage of four major electronic information resources, namely, OCLC online union catalogue, CD-ROM databases, online databases and the Internet resources by the Library and Information Science (LIS) educators in the North American higher institutions. She found that the most popular teaching method used by the LIS educators to teach their students on these electronic resources was the lecture accompanied by hands-on practice. This study had a sample size of 294 educators and the response rate was 59.2%. The questionnaire was pre-tested on 12 educators before it was finally sent out, which provides confidence in the research instrument used.

Tenopir and Ennis (1998) conducted a questionnaire survey in 1997 on how academic libraries in United States and Canada incorporate electronic information resources into their reference activities and the effect on library services. The questionnaires were sent to 110 academic libraries in these two
countries. The response rate was 62% (68). They found that the training methods used in teaching the Internet for the on-site library users were one-to-one instruction (95%), group instruction (89%), printed guides (70%), computer-assisted instruction (20%), and video (2%).

Manzari (1998) surveyed student preferences for CD-ROM instruction at the B. Davis Schwartz Memorial Library in C.W. Post College, New York, USA. About 200 questionnaires were distributed and 66 questionnaires returned, giving a response rate of 33%. The statistical techniques used to analyse the data were cross-tabulations with chi-square test of significance (in conjunction with Cramer's $V$). The findings showed that: (i) most students that needed training preferred individual instruction on demand; (ii) most students that needed assistance asked a library staff member; (iii) most students were satisfied with their search results; (iv) the time spent teaching advanced search techniques to classes showed few positive results as most students did not make use of advanced search techniques, and those that did were not more satisfied with their search results; (v) many students were not interested in attending CD-ROM training sessions; and (vi) most students (98%) said that CD-ROM system was easy to learn and use, and therefore, little formal instruction was needed. The findings of this study could not be generalised due to the low response rate (33%). Nonetheless, it does reflect the opinions of a section of end-users (students) concerning CD-ROM services.

Hopkins (1995) conducted a questionnaire survey in 1995 on user education and computer-based training (CBT) packages in UK academic libraries. The aim of the study was to determine whether CBT packages have a valid place for user education training. The study was undertaken as a project under the Computers in Teaching Initiative Centre for Library and Information Studies (CTILIS), Department of Information Science, Loughborough University. A high response rate of 84% was achieved in this study and the results revealed
that only 57% (87) of those libraries surveyed provided training in using electronic information resources (CD-ROM, OPACs, Internet and online databases). Concerning the training methods applied, most academic libraries surveyed offered more than one method, which include lecture, demonstration, tour and video. The results showed that only 20% (31) of academic libraries used CBT packages. However, the rest of the academic libraries stated that CBT packages have a valid place for user education in the future. The findings indicate that CBT is well received in theory, but not widely practised by the UK academic libraries. However, the findings are already outdated.

Hopkins (1999) conducted another similar study, which surveyed the librarians’ attitudes towards computer-based tutorial (CBT). This study involved 74 librarians from 61 UK institutions. She found that the most popular training methods for user education were verbal presentations, followed closely by tours of the library. OPAC and CD-ROM demonstrations were the third most popular method. Only 4 respondents (5%) stated using CBT packages as a delivery method in conjunction with other methods. The results also revealed that most libraries used a combination of delivery methods in user education programmes. Thirty-six libraries (59%) used a mixture of three or four delivery methods. The majority of librarians (66%) agreed that CBT packages were an appropriate medium for user education. However, 15% of the librarians stated that this medium should be used in addition to existing methods rather than as a replacement. The findings of this study are not very different from the earlier study by Hopkins (1995).

A study carried out in 1996 by the Department of Information Studies, University of Sheffield, UK aimed to find out how academic libraries in the UK were responding to the increased demand for networked information resources. The results showed that some of the UK university libraries were already using the Web to provide some form of end-user training via their
libraries' home pages. However, a large number of libraries were still using 'traditional' methods to teach end-users about networked resources. The reason for using the traditional methods as stated by the librarians surveyed was that end-users still preferred the 'human touch' offered by a lecture or a one-to-one training with a librarian (Levy, Fowell, and Worsfold, 1996). The findings imply that human instructors are still required when teaching electronic resources.

A survey carried out in 1998 on the use of the World Wide Web for end-user education at 68 UK University libraries found that almost three-quarter of the libraries surveyed had used the Web for user education. However, only 10% of user education was delivered via the Web. The 10% of user education refer to the information skills, while library induction, which represents the bulk of user education, was delivered via the conventional methods (Rhodes and Chelin, 2000). The findings are consistent with the findings by Hopkins (1995; 1999) and Levy, Fowell, and Worsfold (1996).

Kaplowitz and Contini (1998) carried out a study at the UCLA's Louise M. Darling Biomedical Library, USA to evaluate the effectiveness of using CAI method to teach library skills as compared to the lecture method. The study utilised both quantitative (pre and post-test design using objective questions) and qualitative follow-up survey (featuring open-ended questions). The sample size for this study was 423 students. The first part of the survey was carried out in the 1994-95 academic session, while the second part of the survey was done in the spring of 1996. The findings revealed that students viewed CAI as a very viable option for bibliographic instruction.

However, the results did not show any clear difference between the two modes of instruction: 37% CAI method; 32% lecture method; and 31% undecided. Nevertheless, CAI was deemed as the preferred method by students. The
authors noted that from the library’s perspective this mode of instruction was not very cost-effective, as it required hiring a programmer and spending many hours to revise and update the system after sometime. They viewed Web tutorials as a better alternative to CAI as it is more flexible and can be easily updated. Furthermore, the hyperlink characteristics of the Web allows students to move or jump to the materials they felt they needed to learn rather than moving from the beginning until the end, step-by-step in a linear manner (in the case of CAI). Web tutorials can be accessed from anywhere within the campus and even from home, provided the students have the necessary equipment.

In summary, it can be deduced that no one training method is superior and fits all occasions. This is because each individual has different style and preference with regard to learning. From the findings of the previous studies, there is no conclusive evidence that any one training method performs better than another. One method may work best for one person, while another method is more suitable for the next person. Probably the combined efforts of IT and ‘human touch’ (librarians) could have a significant impact on the end-user training in using electronic information resources. Hence, library instructors need to be aware of their end-users’ training needs and preferences and try to offer training methods that matched their needs.

3.8.2 Self-training Packages

The development of self-training packages that can be used without an intermediary can be viewed as part of a general philosophy advocating the self-explanatory library in which library users can acquire information skills simply by using the package anytime they need (Pacey, 1995). At the Glasgow University library, UK a computer-based learning package was developed using hypertext and hypermedia. This learning package enables end-users to pace their learning according to their own needs and convenience. Further, the information provided is consistent. This training package was developed under
the Teaching with Independent Learning Technologies (TILT) project, which started in January 1993. Its main aim was to demonstrate how IT could be successfully incorporated into university teaching within a single institution (Creanor, Durndell and Primrose, 1996).

Five hypertext information skills modules were developed under the TILT project to facilitate self-paced learning. The end-user can opt to complete all modules at once or just select relevant sections for training. The five modules are as follows:

1. How to choose books and journals - evaluation of books and journals.
2. Library search skills (General) - deals with search strategy.
3. Library search skills (Business) - deals with search strategy.
5. Study skills - deals with time management, note-taking, writing skills, etc.

The TILT packages have been used by many institutions in the UK and overseas and now it is being delivered via the Web (Creanor, Durndell and Primrose, 1996).

Another similar self-learning package was developed at the Ohio State University (OSU) library system, USA and was named the Gateway. It started in 1980s using HyperCard and has now changed to a hypertext version on the WWW. The Gateway was designed to make the users independent in searching for information; the system provides instruction and guidance in identifying materials that would likely meet end-users' information needs. All sources (electronic and printed) are linked and integrated using a subject framework.
The Gateway has few help screens and is not accompanied by printed handouts (Herrington, 1998; Tiefel, 1995).

The Gateway's design is based on the search strategy concept as users begin with a broad information source, such as an encyclopaedia to help define and narrow their topics. Following the search strategy map, users are presented with resource options such as periodical indexes, books, biographies, and statistical sources. The search strategy map guides a researcher from the broad information sources to the more specific. By providing this service the Gateway offers a degree of independence to users and at the same time it can assist or instruct large numbers of users at their time of need. Integral to the Gateway is an evaluation section that guides users in applying critical thinking skills in evaluating their information (Tiefel, 1995).

The system has been continuously evaluated, revised and developed according to user evaluation of the system. Students' evaluation of the system indicates that most students really like using the system. Of 4,693 evaluation forms recorded between July 16, 1990 and November 30, 1993, 79% of students indicated that their search were mostly successful, 81% considered usage of the Gateway was generally easy and 83% said that they would use The Gateway again. Only 5% said they would not use it, and 12% were either unsure or had no opinion. Comments are generally positive with many suggestions on how to expand the system, for example, by adding databases and providing remote access to residence halls, offices, and homes (Tiefel, 1995).

3.9 CHAPTER SUMMARY

This chapter has examined the related literature on the area pertaining to the study and valuable information was gathered on problem and issue under study. With regard to the research methods used in the previous research related to the
end-users’ usage of electronic information resources, end-users’ perceptions and attitudes towards electronic resources, library staff and end-users training needs, many of them had used the survey research method. Furthermore, the most common data collection techniques employed in those researches were questionnaires and in-depth interviews. Although other techniques such as experiment and observation were also used but they were less common.

This literature review has revealed that there have only been a small number of empirical studies conducted in this particular area. There were hardly any previous studies on this topic pertaining to the developing countries and none found concerning Malaysia. It could be that no empirical studies on this topic have been done in Malaysia, and therefore, not reported in the literature. The information gathered from the literature review provides the ingredients for developing the next chapter - research methodology.
CHAPTER 4

RESEARCH METHODOLOGY

4.1 OVERVIEW

The previous chapter discussed the literature review that forms the foundation of this study. This chapter discusses the research methodology and it is divided into several sections: section 4.2 presents the theoretical framework of the study; section 4.3 discusses the research design; section 4.4 presents the data collection methods; section 4.5 describes the development of survey instrument; section 4.6 describes the population and sampling; section 4.7 describes the data collection process; section 4.8 discusses the data analysis techniques; and finally section 4.9 is the summary of the chapter.

4.2 THEORETICAL FRAMEWORK

The theoretical framework developed for this study was based on the generally accepted model of the training cycle (Phillips, 1993 as quoted in Mathews, 1997, p. 94) as shown in Figure 4.1. The first process in the training cycle model is identifying training needs; followed by planning and designing the training programme. The third process is delivery of the training programme and the final process is the evaluation of the training outcomes. The main interests of this study were the first (identify training needs) and the second (plan and design training) processes of the training cycle model as shown in Figure 4.1.
As stated earlier in the introduction chapter, the aims of this study are to investigate the library end-users' perceptions of their training needs and preferred training methods in using the electronic information resources in the public university libraries in Malaysia.

It was anticipated that the results of the investigation would provide the information about the training needs of the end-users and their preferred training methods. The findings are essential for the design of a general framework of an end-user training programme that incorporates end-users’ perceptions and preferences. The importance of end-users’ opinions, perceptions and preferences in planning and designing a training programme has been emphasised in the LIS literature (Luban, 1974; Malley, 1984; Tiefel, 1995) and in previous studies by Allen (1990) and Massey-Burzio (1998).
According to Allen (1990, p. 89),

"Patron perceptions and preferences should be considered in designing bibliographic instruction programmes."

Based on her study concerning end-users’ perceptions of training needs, Allen found that there was a difference of perceptions between librarians and end-users with regards to the importance of certain areas of training, for example, vocabulary control and database selection. While librarians regarded these areas as important, end-users considered them less important. It is therefore, very crucial that any training intended for end-users should consider their needs, views and preferences prior to developing a training programme.

This study investigates end-users’ perceived training needs and preferences in using electronic information resources. It is acknowledged here that the user’s perception of his/her training needs has limitations because the perceived training needs may not necessarily equate to actual training needs. It is therefore, important when discussing user’s needs that it should be clear what is meant by need. Bradshaw (1972, p.640-641) classified social need into four categories in a paper that examined social services requirements. This approach it may be argued, is also valid when considering other types of service needs. Bradshaw’s categories include:

i) Normative need – here the experts or professionals set up a ‘desirable’ standard and then compared it with the existing standard and if an individual/group falls short of the desirable standard then they are identified as being in need;

ii) Felt need – it is equated with want, here people are asked whether they feel they need something. It is the perception of an individual;
iii) **Expressed need** or demand - it is a felt need turned into action. Here total need is defined as those people who demand a service; and

iv) **Comparative need** – here a measure of need is found by studying the characteristics of those in receipt of a service and if people with similar characteristics are not in receipt of a service, then they are in need.

Considering the definitions given by Bradshaw (1972), this study is concerned more with *felt need*, and to a lesser extend the *normative need* and *comparative need*. *Felt need* is what the end-users reported their training needs were in the questionnaires and during the interviews. Here end-users' perceptions were the focus of this study. With regard to *normative need*, the librarians' perceptions or views of end-users' training needs were taken into account. While *comparative need* is the result of the researcher's analysis of data gathered from both the questionnaires and interviews concerning end-users' training needs. Those end-users who had not received training concerning electronic information resources were identified as being in need of training.

In the context of information management, Line (1974, p.87) suggested several definitions that are relevant to this discussion. He described several types of requirements in relation to information and document supply. These include:

- **Need** what an individual ought to have;
- **Want** what an individual would like to have; and
- **Demand** what an individual asks for.
- **Use** what an individual actually uses.
Requirement is a useful bridging term; it can mean what is needed, what is wanted, what is demanded, and can therefore be usefully employed to cover all three categories.

In light of Line’s definitions, this study is related to the needs and wants of the end-users. With the emphasis being on want rather than need; the want is related to the end-users’ perceptions of what they would like to learn, while the need is the librarians’ perceptions of what end-users ought to learn or train.

A conceptual model was necessary to explain the relationships between the factors or variables that were significant for the investigation of this study. A research model for this study is shown in Figure 4.2, which illustrates the relationships between the variables involved in the investigation.

The main variables in this study are identify training needs and preferred training methods. The other variables are perceived training needs, previous skills and knowledge in using IT facilities, current knowledge and ability to use electronic resources, problems faced in using electronic resources, current training methods and design end-user training programme.
FIGURE 4.2
Schematic Diagram of the Theoretical Framework for this Study
4.2.1 Identify Training Needs

The main variable - identify training needs - affects the other variable - design end-users training programme. However, this variable (identify training needs) is shaped by four other independent variables - perceived training needs, previous skills and knowledge in using IT facilities, current knowledge and ability to use electronic resources and problems faced in using electronic resources.

4.2.2 Perceived training needs

This variable represents the respondents’ own perceptions of their training needs in connection with the electronic information resources, and also the librarians’ perceptions (third party observation) of end-users’ training needs. Data would be gathered through the face-to-face interview with the respondents and also via open-ended questionnaire survey.

4.2.3 Previous Skills and Knowledge

The variable previous skills and knowledge in using IT facilities in this study refers to the IT skills and knowledge that end-users already have. Previous IT skills and knowledge affect the skills needed when using electronic information resources and services (Kemp, 1990, p.8; Watson, 1998, p.396). Previous studies (Koohang, 1986; Majid and Abazova, 1999; and Vander Meer, Poole and Van Valey, 1997) found that experience of computer use or having computer skills influenced the usage of electronic information resources. Concerning the IT facilities, the researcher selected eight IT facilities by which a respondent could report his/her previous knowledge in using these facilities. The items in the list were taken from the literature, discussion with supervisor
and personal experience. The level of measurement applied on this variable was categorical (nominal).

### 4.2.4 Current Knowledge and Ability

The variables *current knowledge and ability to use electronic resources* in this study refer to the current knowledge and ability that a respondent has concerning four categories of electronic information resources (the Internet, online databases, CD-ROMs, and OPACs). In order to measure end-user knowledge and ability, the researcher developed an instrument by which a respondent could report his/her perceived knowledge and ability on a scale of 1 to 5 (Likert-type scales).

### 4.2.5 Problems faced

The variable *problem faced in using electronic resources* in this study refers to the difficulties or problems encountered by respondents when using electronic information resources. By studying the problems faced by end-users the library professionals can design their training programme in such a way that it will help end-users to overcome their problems (Puttapithakporn, 1990). In order to measure the problems, the researcher developed an instrument by which a respondent could report the problems he/she encountered in specific areas of information retrieval activities. A list of eleven problem areas was identified from the literature review, discussion with supervisor and personal experience.

### 4.2.6 Preferred training methods

This variable affected the design of the end-users' training programme. Allen (1990) emphasised that when designing a training programme, end-user perception and preference for certain training methods should be considered.
4.2.7 Current training methods

This variable, to some extent, affects the design of the end-users' training programme.

4.2.8 Design End-users Training Programme

This variable depended on other variables as discussed above. Its outcome is shaped by three other variables - *identify training needs, preferred training methods* and, to some extent, *current training methods*.

Thus far, the theoretical framework of the study has been discussed and the important variables have been explained. In the next section, a discussion of the research design will be undertaken. This is followed by discussions of the data collection method, development of the research instruments, population and sampling, data collection process and data analysis technique.

4.3 RESEARCH DESIGN

This study employed a combination of quantitative and qualitative approaches. The differences between the quantitative and the qualitative approaches are well documented in the literature (Busha and Harter, 1980; Silverman, 1993). The quantitative approach is employed to measure the perceptions of a greater number of people to a limited set of questions, thus facilitating comparison and the statistical aggregation of data, while the qualitative approach is employed to gather in-depth information on a small number of people or subjects (Patton, 1990). However, the differences between the quantitative and qualitative approaches make them good partners (Silverman, 1993). This statement is reinforced by Glazier and Powell (1992, p. 208) who state, "a research design that takes advantage of the complimentary aspects of qualitative and
nonqualitative methodologies is likely to generate a richer cache of data overall.”

The quantitative approach in the social sciences involves the survey method and also other methods, such as experimental investigation. The survey method has allowed researchers to obtain contemporary data concerning opinions, attitudes, preferences, problems encountered by users and librarians, and many other kinds of information relating to various facets of the profession (Busha and Harter, 1980).

4.3.1 Justification for the Research Design

The study used a two-phased approach in its research design. Phase one consisted of a questionnaire survey (quantitative). Phase two was comprised of interviews (qualitative). Since the study involved a large sample size, comprising students and academic staff of three public universities in Malaysia, it was deemed appropriate to use a questionnaire survey (quantitative) in the first phase of the study. Furthermore, many research studies in library and information science (LIS) have used the survey method (Julien, 1996; Powell, 1997; Rochester and Vakkari, 1998). The second phase of the study required in-depth qualitative data relating to end-users’ and librarians’ perceptions about the issues under study, hence it was deemed appropriate to use a semi-structured face-to-face interview to gather data. The approach adopted by this study was deemed most suitable for accomplishing its aim and objectives as stated in Chapter 1.
4.4 DATA COLLECTION METHOD

This study employed a *triangulation* technique in collecting the intended data. Cohen and Manion (1994, p. 233) defined *triangulation* technique as "the use of two or more methods of data collection in the study of some aspect of human behaviour."

The data collection methods used for this study were as follows:

- Questionnaire (quantitative)
- Interviews (qualitative)

The combination of these two differing but complimentary instruments was used to triangulate results. Moore (2000) noted that although each instrument would provide a slightly different view of an issue, together they offer a very rich picture.

4.4.1 Questionnaires

The questionnaire was chosen as the main data collection method for this study because it provides an effective way to collect large amounts of quantitative data in a short period of time, which would not be practical to collect through other ways such as in-depth interviews or observations. The advantages of using questionnaires are well documented in many research methodology literatures (Busha and Harter, 1980, p.62; Oppenheim, 1992; Powell, 1997, Sekaran, 1992).

Among the advantages are as follows:

- Facilitates the collection of large amounts of data in a short period of time.
• Allows a wider range and distribution of the sample than the interview method.
• Provides an opportunity for respondents to give frank, anonymous answers (provided the questionnaires are anonymous).
• Allows greater economy of effort (i.e., a single instrument, duplicated and distributed to numerous respondents, can produce a large amount of data).
• Can be constructed so that quantitative data are relatively easy to collect and analyse.
• Can be designed to gather background information about respondents, as well as original hard-to-obtain data.
• Allows the collection, in exploratory studies, of insightful information about a relatively unexplored problem area or subject.
• Can be completed at the leisure of respondents.
• Interview bias can be eliminated.

The disadvantage in using a questionnaire survey is that personal contact with survey respondents is lost, thus respondents cannot qualify their answers (Powell, 1997). The weaknesses inherent in using the questionnaire survey are strengthened by the collection of qualitative data gathered through interviews.

4.4.2 Interviews

In the second phase of the study, a face-to-face semi-structured interview was employed to gather qualitative data from students, academic staff, and library professionals. The data collected through this method was meant to supplement and enhance the data collected through the questionnaire survey. One of the advantages of using the interview method, according to Sekaran (1992), is flexibility. This method allows flexibility in the questioning process. It encourages probing for additional information and details.
An outline of the questions to be covered in the semi-structured interview was finalised during consultation with the supervisor. Two interview guides were prepared: 1) students and academic staff; and 2) librarians in-charge of end-user training. The interview guide for students and academic staff contained eleven main questions and was divided into four sections, each of which grouped together related questions (see Appendix 3A). The first section was concerned with electronic information resources, the second section was concerned with skills, the third section was concerned with training, and the fourth section was concerned with training needs. The interview guide for librarians contained ten main questions and was divided into three sections; each of which grouped together related questions (see Appendix 3B). The first section was concerned with electronic information resources, the second section was concerned with training programme, and the third section was concerned with training needs.

4.5 DEVELOPMENT OF THE MAIN SURVEY INSTRUMENT

The survey instrument developed for this study was designed to gather both descriptive as well as analytical responses from survey respondents. The pertinent issues for inclusion into the questionnaire survey were determined from a literature review, the researcher’s working experience as a librarian and as a user of electronic information resources, as well as discussion with the researcher’s supervisor. The questions were written based on previous studies (Cannon, 1994; Critchley, 1992; Steele, 1990) and reviewed by the researcher’s supervisor and research colleagues. During the process, criticisms and inputs from the supervisor and research colleagues were incorporated into the questionnaire.

The questionnaire consisted of both closed and open questions. The majority were closed questions in which the respondents were offered a choice of alternative replies including “other (please specify)”. Closed questions can
elicit factual as well as attitudinal replies and they are also easier and quicker to answer. Allowance was also made to include two open questions in order to allow respondents the freedom to answer in their own language and offer their own ideas. The two open questions were intended:

i) To elicit topics/areas that respondents would like to learn about electronic information resources; and

ii) To obtain respondents’ comments or suggestions regarding their training needs.

About twenty per cent of the questionnaire used ordinal scale measurement, that is, a 5-point Likert-type scale. For example, the scale for perceived knowledge of end-user for each category of electronic information resources was designed as follows:

1 = Very poor  
2 = Poor  
3 = Adequate  
4 = Good  
5 = Very good

The questions in the questionnaire were grouped into six sections as follows:

1) About You  
2) Electronic Information Resources  
3) The Internet  
4) Your Training  
5) Your Searching Skills  
6) Your Previous Skills
The reasoning behind the construction of the questions is summarised below.

About You

In this section, the questions asked were meant to collect data concerning the respondents' demography. This was very important for descriptive and analytical purposes. The data collected was very useful for showing the distribution of respondents by categories such as gender, institution, academic disciplines, status and others. In addition, it was also useful for comparing the different groups of respondents and for testing the relationships between demographic characteristics and certain important variables.

Electronic Information Resources

This was one of the core sections where the questions asked were very important to the objectives of this study. They were helpful in identifying the current knowledge and ability of end-users to use electronic information resources. Most questions in this section required respondents to rate on a scale of 1 to 5. The section contained a mixture of objective and subjective closed questions. For example,

- How would you rate your personal knowledge of the following electronic information resources? (Internet, online database, CD-ROM, OPAC)

- How would you rate your ability to use the following electronic information resources? (Internet, online database, CD-ROM, OPAC)

- How often do you use the following electronic information resources? (Internet, CD-ROM, OPAC, online database)
The answers to these questions helped to determine the respondents’ knowledge and ability in using electronic information resources and in what aspects of electronic information resources they needed training.

The Internet

This section was intended to explore further the respondents’ current knowledge and ability to use one of the most popular electronic information resources, namely, the Internet. The questions asked were closed questions which were intended to obtain factual responses. For example,

- Do you use the Internet for... (Email, searching information, entertainment, file transfer, listserv, and others.)

- Which Web browser do you use?

- What search engines do you use?

The answers to these questions helped to determine the respondents’ knowledge and skills about the Internet.

Your Training

This was also one of the core sections because it touches the basic element of this study, that is, training. The questions were meant to discover the important aspects of training. For example,

- Have you received training in any of the following?

- What type of training have you received?
Chapter 4

What were the training methods used?

Would you like more training on any of the following?

Ideally, how would you like to be trained to use the electronic information resources?

This section also allowed for additional comments and views concerning end-user's needs by asking an open question as below,

Are there any particular topics or areas related to the electronic information resources that you would like to learn?

The answers to these questions helped the researcher to determine the respondents' perceptions of their training needs as well as the training methods they had experienced, and the training methods that they preferred.

Your Searching Skills

This section was particularly relevant to one of the study's objectives, that is, identifying the problems faced by end-users in using electronic information resources. The questions asked were a mixture of objective and subjective closed questions. For example,

- Do you face problems when... (using Boolean operators, search engines, formulate search strategy, and others)

- Do you find what you need when searching the electronic information resources?
The answers to these questions helped to determine the areas or aspects of information seeking and use in which the respondents faced problems. The information contributed to determining what kind of training could be offered in the training programme.

**Your Previous Skills**

This section was particularly relevant to another of the study’s objectives, that is, identifying the previous skills held by end-users in relation to IT facilities. The questions asked were closed questions. For example,

- What skills did you have before joining this University?
- Prior to joining this university did you know how to... (use email, FTP, word-processing, spreadsheet, and others.)

The answers to these questions helped the researcher to determine the respondents’ knowledge of IT facilities and also what aspects of IT skills they already had. This section also allowed for additional comments and views concerning end-user’s training needs by asking an open question at the end. For example,

- Do you have any other suggestions or comments regarding your training needs?

This gave the respondents an opportunity to express freely in their own language their ideas and preferences about the kind of training that they would find beneficial.
From this array of questions a composite picture of users and their perceived needs could be developed.

4.5.1 Reliability and Validity

The issue of reliability and validity of a survey instrument (questionnaire) was taken into account and observed carefully in this study. Reliability means consistency and validity indicates the degree to which an instrument measures what it is supposed to measure (Oppenheim, 1992). To verify for content validity and reliability, the questionnaire was piloted by administering it to twenty respondents from a different sample. Details of the pilot study are discussed in the next section.

4.5.2 Pilot Study

It is widely acknowledged that pilot testing of the questionnaire before the actual survey is very crucial in order to confirm that it is easy to understand and, thus, avoid inconsistencies or misinterpretations. Oppenheim (1990, p.130) notes that,

"The way to check on the wording of questions and, where necessary, to make improvements, is through the pilot work."

A pilot study was conducted in order to field test the survey instrument, as recommended by Oppenheim (1990). It was carried out in December 1997 at Loughborough University, in the United Kingdom. Twenty respondents were selected to participate in the pilot study, due to their representativeness of the population to be surveyed. They consisted of ten undergraduates (from Malaysia) and ten research students (they were actually academic staff from various Malaysian public universities doing doctoral degrees at the Loughborough University).
The respondents were encouraged to give their comments and criticisms concerning the length, clarity and ease of answering the questionnaire. As a result of the pilot study, a few of the questions were reworded, the answer options for question number 17 (students questionnaire) was increased from two to three. Feedback derived from the pilot study was incorporated into the final draft of the questionnaire. Pilot testing resulted in the creation of a refined survey to gather information on the perceptions of library end-users concerning their training needs and preferred training method. In addition to the pilot test, expert advice was also sought from the Data Preparation Unit of the Loughborough University Computing Services on matters relating to coding and data inputting. A few changes were made concerning coding in the final version of the questionnaire.

### 4.6 POPULATION AND SAMPLING

#### 4.6.1 Target Population

The population for this study consisted of three groups. They are as follows:

- University Students - undergraduate and postgraduate
- University Academic staff
- University Librarians – in charge of training or instructions

Malaysia has a total of nine public universities (at the start of this research) funded wholly by the Malaysian Government (see Table 4.1). They are geographically scattered in terms of locations. West Malaysia has the most universities, with seven out of nine public universities located there. East Malaysia has only two public universities, which were established in the early 1990s. The nine public universities were divided into the following categories:
- Pre 1980 universities - established in the Sixties and Seventies.


- Post 1990 universities - established in the Nineties.

**TABLE 4.1**

*Public Universities in Malaysia*

<table>
<thead>
<tr>
<th>No.</th>
<th>Public universities in Malaysia</th>
<th>Year of Establishment</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>University of Malaya (UM)</td>
<td>1962</td>
<td>Kuala Lumpur</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(West Malaysia)</td>
</tr>
<tr>
<td>2.</td>
<td>University of Science Malaysia (USM)</td>
<td>1969</td>
<td>Penang</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(West Malaysia)</td>
</tr>
<tr>
<td>3.</td>
<td>National University of Malaysia (UKM)</td>
<td>1970</td>
<td>Selangor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(West Malaysia)</td>
</tr>
<tr>
<td>4.</td>
<td>University of Technology Malaysia (UTM)</td>
<td>1972</td>
<td>Johor Bahru</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(West Malaysia)</td>
</tr>
<tr>
<td>5.</td>
<td>Universiti Putra Malaysia (UPM)</td>
<td>1974</td>
<td>Selangor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(West Malaysia)</td>
</tr>
<tr>
<td>6.</td>
<td>International Islamic University Malaysia (IIUM)</td>
<td>1983</td>
<td>Selangor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(West Malaysia)</td>
</tr>
<tr>
<td>7.</td>
<td>Universiti Utara Malaysia (UUM)</td>
<td>1984</td>
<td>Kedah</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(West Malaysia)</td>
</tr>
<tr>
<td>8.</td>
<td>Universiti Malaysia Sarawak (UNIMAS)</td>
<td>1992</td>
<td>Sarawak</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(East Malaysia)</td>
</tr>
<tr>
<td>9.</td>
<td>Universiti Malaysia Sabah (UMS)</td>
<td>1994</td>
<td>Sabah</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(East Malaysia)</td>
</tr>
</tbody>
</table>
One university was selected for each category. Therefore a total of three (3) universities were selected for this study. They comprise two universities from West Malaysia and one university from East Malaysia. The three public universities selected for the study were as follows:

1. National University of Malaysia (UKM) - established in 1970
2. International Islamic University Malaysia (IIUM) - established in 1983
3. Universiti Malaysia Sabah (UMS) - established in 1994

The reasons for selection were:

- Universities characteristics - each category of universities differs in terms of their size, population, technologies (IT), library resources and date of establishment.

- Geographic location - East and West Malaysia. One university is located in East Malaysia (island of Borneo), and the two other universities are located in West Malaysia (peninsula). Hence, each region of the country was represented.

- Accessibility - the researcher was given official permission to conduct the study at these three public universities.

4.6.2 Sampling Methods

This study employed a non-probability sampling method. It used a stratified quota sampling method for the distribution of the questionnaire survey (quantitative) to the subjects in the three public universities. Quota sampling is a form of proportionate stratified sampling, in which a predetermined
proportion of people are sampled from different groups, but on a convenience basis (Sekaran, 1992). In this study, the sample was selected with care in order to get a proportionate number of respondents in terms of gender, subject disciplines and academic status. Shapiro and Marcus (1987) used this method in their study on library instruction and when they compared their sample to the actual university student population, they found very few differences. They decided against a probability sampling due to traditionally low response rates to mail surveys on campus and financial constraints.

The advantage of using the quota sampling is that there is no need to establish a sampling frame, which in this study could not practically be accomplished. The other reason for using a quota sample for this study was based on the experiences of the previous researchers who faced difficulties in getting the sampling frame and the cooperation of certain authorities in most universities in Malaysia. Even though the sample may not be totally representative of the population, it however, offers a practical solution in terms of effort, costs, and time.

4.6.3 Sampling Size

The sample size for the questionnaire survey was determined by using a formula developed by Krejcie and Morgan (quoted in Powell, 1991, p. 75; Sekaran, 1992, p. 253), which is called the Table for determining sample size from a given population (see Appendix 5). This table provides a general scientific guideline for determining a sample size for a given population. It is simple to use and requires no calculation. The sample size for this study (see Table 4.2) was derived from the aforementioned table.
### TABLE 4.2

Sample Size

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>UKM</td>
<td>21,804</td>
<td>377</td>
</tr>
<tr>
<td>2.</td>
<td>IIUM</td>
<td>8,571</td>
<td>367</td>
</tr>
<tr>
<td>3.</td>
<td>UMS</td>
<td>1,452</td>
<td>306</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>31,827</td>
<td>1,050</td>
</tr>
</tbody>
</table>

### 4.7 DATA COLLECTION PROCESS

Fieldwork was carried out to gather empirical data for this study at the beginning of March 1998 and completed in the last week of May 1998. The researcher visited three different sites in Malaysia: two sites were in West Malaysia; one site was in East Malaysia. The data collection method used in the study was self-administered questionnaires (quantitative) and face-to-face semi-structured interviews (qualitative).

Two sets of questionnaires were printed on different coloured paper and distributed to two different groups of respondents. One set of questionnaires for students (see Appendix 2A) was printed on pink paper and another set of questionnaires for academic staff (see Appendix 2B) was printed on blue paper. The reason for the different choice of colour is for easy identification of the questionnaires and also for attracting the respondent's attention.

¹ The students and academic staff population for the 1997/1998 academic sessions as taken from the official figures given by the Ministry of Education, Malaysia.
4.7.1 Questionnaire survey

The researcher personally delivered the questionnaires to the three-targeted public universities in Malaysia. The researcher sought cooperation from the relevant departments in each selected faculty in the three universities. Prior arrangements with the faculty and/or departments were made via telephone calls and personal contacts. The administrative staff of the relevant departments assisted the researcher in distributing the questionnaires. The faculty and/or departmental lists were used as a guide for identifying the potential respondents. Each respondent was selected systematically until the quota was filled. The completed questionnaires were later returned to the administration office of the respective departments for the researcher to collect them.

A total of 600 questionnaires were distributed to the student sample of the three universities. Almost all of the completed questionnaires were collected by hand. The remainder of the questionnaires were later posted to the researcher by the administrative staff. Questionnaires for academic staff were also delivered by hand, but each questionnaire was accompanied by a self-addressed stamped envelope for the respondents to return them directly to the researcher. Some of the academic staff sent the completed questionnaire by post, only a few returned them to their respective departments for later collection by the researcher personally. A total of 450 questionnaires were distributed to the academic staff of the three universities. Table 4.3 shows the breakdown of the questionnaires distributed and received from the three universities.
**TABLE 4.3**

Questionnaires Distributed and Received from the Three Universities.

<table>
<thead>
<tr>
<th>No</th>
<th>UNIVERSITY</th>
<th>STUDENTS</th>
<th>LECTURERS</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Sent</td>
<td>Received</td>
<td>Sent</td>
</tr>
<tr>
<td>1</td>
<td>UKM</td>
<td>200</td>
<td>159</td>
<td>180</td>
</tr>
<tr>
<td>2</td>
<td>IIUM</td>
<td>200</td>
<td>156</td>
<td>180</td>
</tr>
<tr>
<td>3</td>
<td>UMS</td>
<td>200</td>
<td>118</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>600</td>
<td>433</td>
<td>450</td>
</tr>
</tbody>
</table>

Although the questionnaire was pre-tested or piloted, it appeared that some respondents in the academic staff group encountered problems with question no. 23,

*Prior to joining this university did you know how to...*

*Use windows*

*Use a word processor*

Those academic staff that had joined the university more than 15 years ago said that most of the technologies were not available during that time, so they could not answer the question.

### 4.7.2 Interviews Survey

The second phase of data collection was carried out through interviews. Semi-structured interviews were chosen as they allow respondents to express themselves at some length, but also offer enough shape to the discussion to prevent aimless rambling. The researcher analysed the interviews by evaluating answers and picking out key comments and quotations, which
illustrate and substantiate the main findings. The main aim was to gather qualitative data in order to obtain a rich description of the respondents' perceptions of the impact of electronic information resources on their training needs and preferred training methods. In addition to this, the other aim was to gather librarians’ opinions concerning their end-users’ training needs. The idea was to supplement the data obtained via the questionnaire survey. In this combined approach Hakim (1997, p.32) states,

“The qualitative study is often carried out before the survey as an exploratory first step that paves the way as well as offering a greater depth of information to complement the quantitative survey results. Alternatively the qualitative study can be carried out after the main survey, which can then provide a rich sample for selecting particular types of respondent for depth interviews. This type of linkage greatly extends the survey results in a statistical context by directly linking the two sets of data”

In this case, the qualitative interview was undertaken after the questionnaire survey. Respondents for the in-depth interviews were selected based on their indications to participate in the interviews when they made known their intentions in the returned questionnaires. They were later contacted for confirmation and appointments for the interviews. The final number of respondents who were willing and able to spare their time for the face-to-face interviews was 18, comprising 9 students (7 undergraduates and 2 postgraduates) and 9 academic staff. This number rose to 23 when 5 professional librarians, who were in-charge of end-user training, were added to the 18 end-users. The interviews for academic staff and professional librarians were carried out in their offices. The interview sessions with the students were carried out in the library’s discussion rooms. During the interviews, the
languages used were English and Malay, and sometimes a mixture of both languages. The reason for using both languages was to allow both the interviewer and the interviewees the freedom to express and describe the points or issues in a clear manner.

Interviewees were informed that all responses would remain confidential. The interviews were tape-recorded (with the permission of the interviewees). This enabled the researcher to concentrate fully on asking questions and listening carefully to the answers given. The interviews were conducted in a relaxed atmosphere and each session lasted between 30 - 35 minutes on average. The interview guide was used informally in all interviews, but the questions were presented in the same order to each interviewee. The researcher followed up and clarified the meanings of the relevant aspects of the answers throughout the interview, as suggested by Kvale (1996). After each interview session the researcher thanked all the respondents for their time and cooperation.

Nevertheless, there were some problems encountered by the researcher in using the interview method. For example, a few students became reluctant to be interviewed even though they had earlier indicated their willingness to take part. Hence, some persuasion was needed in order to get their full cooperation. As for the academic staff, directives from their deans or heads of department were sought in order to obtain their cooperation. On a few occasions, the researcher had to wait for an hour or so for the academic staff to become available. Although prior appointments were made, a few academic staff did not keep their appointments. Other problems encountered were disruptions during the interviews caused by telephone calls and 'drop-in' visitors.

In summary it may be justifiably claimed that the data acquired through the interviews added considerably to an understanding of the situation. The interviews confirmed a great deal of the earlier empirical data acquired in the
questionnaire survey and reinforced some of the opinion gathered. For example, information discovered through the interviews about the previous skills held, the problems faced, and the training needed, as well as the training methods preferred by respondents, corresponds with the data gathered through the questionnaire survey.

In addition, the interview results provided further explanation and comment on various issues. Examples include: expansions on the problems of insufficient IT facilities in the selected universities, more detail on the skills and knowledge needed by students and academic staff, the earlier training attended, the training provided by the library and the level of training preferred by end-users. Another clear example is the librarians' opinions concerning students' training needs, which confirmed the problems faced by students.

In a very few instances, the interview data was used to correct some of the information gathered earlier in the survey. For example, with regard to the current training methods used by the selected university libraries, the librarians interviewed pointed out that computer-assisted instruction (CAI) had not yet been introduced; yet some of the respondents (mainly students) selected this option in the questionnaire survey. As a result it was possible to adjust the analysis of this data.

4.8 DATA ANALYSIS

The quantitative data collected via the questionnaire were analysed and summarised using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics (e.g., frequencies and percentages) were used to summarise the data. Comparisons were made between the two independent groups of end-users - students and academic staff - on areas pertaining to the research problems. The statistical test used for comparing two groups of end-users on variables measured on nominal scale was the two-sample chi-square
test. The Mann-Whitney $U$-test was used for comparing two groups of end-users on variables measured on an ordinal scale. The $k$-sample chi-square test was used for comparing the three universities (University Kebangsaan Malaysia, International Islamic University Malaysia, and Universiti Malaysia Sabah) on variables measured on a nominal scale.

Cross-tabulation was applied to look for relationships between two nominal variables. The chi-square test of significance was used in conjunction with Cramer’s $V^2$ for looking at the strength of associations between two nominal variables. The alpha level was set at 0.05 level of significance, and used as a basis for determining the significance level in all tests of significance.

The statistical techniques applied in this study were non-parametric. The choice of non-parametric techniques was related to the level of measurements applied in the questionnaire, which comprised of nominal (80 %) and ordinal (20 %) scales. Siegel (1956, p.26) advised social scientists to use non-parametric tests instead of parametric tests because most of the measurements made in social sciences culminate in nominal and ordinal scales. He mentioned that,

"When parametric techniques of statistical inferences are used with such data, any decisions about hypotheses are doubtful"  

Parametric tests (such as t-test and ANOVA) require that measurements be made with interval or ratio data. The disadvantage of non-parametric statistical techniques as compared to parametric statistical techniques is that they are not so powerful as the latter in rejecting a null hypothesis when it is indeed false. However, the loss of power can be compensated by a relatively larger size of sample, because when sample size increases, so does the statistical power.

---

2 Cramer’s $V$ represents chi-square-based adjustment and is used to measure the strength of the relationship between two nominal variables. Its values always fall between 0 and 1 (where 0 indicates no association and 1 perfect association). (Diamantopoulos and Schlegelmilch, 1997)
Figure 4.3 illustrates graphically the statistical techniques that could be applied in making comparisons. The path marked represents the techniques used by the researcher in this study.

The qualitative data gathered through the semi-structured interviews was analysed manually. The analysis process started with the transcription of the interviews and was followed by identifying the central theme using the 'meaning condensation' approach as described by Kvale (1996, p.192),

"Meaning condensation entails an abridgement of the meanings expressed by the interviewees into shorter formulations. Long statements were compressed into briefer statements in which
Meaning condensation thus involves a reduction of large interview texts into briefer, more succinct formulations."

4.9 CHAPTER SUMMARY

This chapter explained the theoretical framework and described the research design and methods used to gather empirical data for the study. It also explained the statistical techniques employed in the study. The next chapter will discuss the questionnaire survey data analysis.
CHAPTER 5
DATA ANALYSIS:
QUESTIONNAIRE SURVEY

5.1 INTRODUCTION

Data from the returned questionnaires were coded and analysed using the Statistical Package for the Social Sciences (SPSS) version 7.5 for Windows. Frequency counts were performed on the data to obtain the descriptive measures. The primary concern of this study is the two independent groups of end-users, namely, students and academic staff. Hence, the interest lies in identifying differences and similarities between them.

Comparisons between the two groups were made using appropriate non-parametric statistical tests, such as the two-sample chi-square test for nominal variables and the Mann-Whitney U-test for ordinal variables. In certain cases the k-sample chi-square test was applied to determine the differences between three institutions, namely, Universiti Kebangsaan Malaysia (UKM), International Islamic University Malaysia (IIUM), and Universiti Malaysia Sabah (UMS). Measures of association using cross-tabulations with chi-square and Spearman’s rho correlation coefficient were also applied to explore the relationships between certain variable measures on nominal and ordinal scales. The significance level was set at 0.05, which means the null hypothesis will be rejected at 0.05 level of significance.
This chapter attempts to describe and analyse the data gathered through the questionnaire survey and is divided into the following main sections:

- Demographic characteristics of the respondents in terms of group, institution, gender, academic disciplines, status, year of study (students only), academic qualifications and work experience (academic staff only);

- Publicity concerning electronic information resources;

- Knowledge and skills;

- Training in electronic information resources;

- Using electronic information resources;

- Problems faced by end-users; and

- Looking at the relationships between certain variables.

5.2 DEMOGRAPHIC CHARACTERISTICS

The population under study is composed of two main groups, that is, students and academic staff. These two groups represent the end-users in this study. The distribution of respondents was illustrated using frequency tables (number and percentage) and figures.

5.2.1 Distribution of Respondents by Groups

Out of 1,050 questionnaires sent out, 671 questionnaires were returned. Out of this figure only 656 questionnaires were usable and this gives an actual response rate of 62.5%, which is satisfactory for data analysis. Table 5.1
shows the breakdown of respondents from the three public universities (UKM, IIUM and UMS).

**TABLE 5.1**
The Breakdown of Responses from the Three Public Universities (UKM, IIUM and UMS)

<table>
<thead>
<tr>
<th>Institutions</th>
<th>Students</th>
<th></th>
<th>Academic staff</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sent</td>
<td>Received</td>
<td>%</td>
<td>Sent</td>
</tr>
<tr>
<td>UKM</td>
<td>200</td>
<td>159</td>
<td>79.5</td>
<td>180</td>
</tr>
<tr>
<td>IIUM</td>
<td>200</td>
<td>156</td>
<td>78</td>
<td>180</td>
</tr>
<tr>
<td>UMS</td>
<td>200</td>
<td>118</td>
<td>59</td>
<td>90</td>
</tr>
<tr>
<td>Total</td>
<td>600</td>
<td>433</td>
<td>72.17</td>
<td>450</td>
</tr>
</tbody>
</table>

As shown in Table 5.2 out of the 656 respondents, 66% were students and 34% were academic staff.

**TABLE 5.2**
Distribution of Respondents by Groups

<table>
<thead>
<tr>
<th>Respondents</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students</td>
<td>433</td>
<td>66</td>
</tr>
<tr>
<td>Academic staff</td>
<td>223</td>
<td>34</td>
</tr>
<tr>
<td>Total</td>
<td>656</td>
<td>100</td>
</tr>
</tbody>
</table>
5.2.2 Distribution of Respondents by Institution

The three selected public universities vary in terms of size and date of establishment (see Table 5.3). UKM\(^1\) is the oldest amongst the three universities and UMS being the most recent university.

**TABLE 5.3**

Size and Date of Establishment of the Three Selected Universities

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Students</td>
<td>Lecturers</td>
</tr>
<tr>
<td>UKM</td>
<td>19,945</td>
<td>1,276</td>
</tr>
<tr>
<td>IIUM</td>
<td>7,700</td>
<td>642</td>
</tr>
<tr>
<td>UMS</td>
<td>1,373</td>
<td>144</td>
</tr>
</tbody>
</table>

Table 5.4 compares the distribution of responses between students and academic staff for the three selected public universities. The distribution of responding students was fairly even as there were 36.7% (159) from the Universiti Kebangsaan Malaysia (UKM), 36% (156) were from the International Islamic University Malaysia (IIUM), and 27.3% (118) were from the Universiti Malaysia Sabah (UMS). The response from students of the three universities was encouraging, as they were quite willing to participate in this survey. This was probably due to the fact that the topic of this study appealed to them. However, the proportion of responses from academic staff was not even: 45.7% (102) were from the Universiti Kebangsaan Malaysia (UKM), 35% (78) were from the International Islamic University Malaysia (IIUM), and only 19.3% (43) were from the Universiti Malaysia Sabah (UMS). The figure

---

\(^{1}\) UKM is the National University of Malaysia, and the medium of instruction is Malay.
for the Universiti Malaysia Sabah (UMS) is relatively low when compared to the other two universities. This is because it was a new public university during the time this study was undertaken and the first to be established in the state of Sabah (East Malaysia).

The academic staff population of the UMS during the period under study was around 144 (Malaysia Ministry of Education, 1998). Out of this figure, about one third of them (tutors/assistant lecturers) were pursuing their higher degrees (masters and doctorate) in the local universities as well as overseas. As for those who remain, some were engaged in projects outside the university campus and could not be contacted. These factors account for the very low figure of the UMS academic staff that responded to this survey. The figure for IIUM was also low. The reason for this is lack of co-operation from the IIUM academic staff, despite follow-up by telephone and personal visits.

### TABLE 5.4

<table>
<thead>
<tr>
<th>Institution</th>
<th>Students</th>
<th>%</th>
<th>Academic staff</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td></td>
<td>n</td>
<td></td>
</tr>
<tr>
<td>UKM</td>
<td>159</td>
<td>36.7</td>
<td>102</td>
<td>45.7</td>
</tr>
<tr>
<td>IIUM</td>
<td>156</td>
<td>36.0</td>
<td>78</td>
<td>35.0</td>
</tr>
<tr>
<td>UMS</td>
<td>118</td>
<td>27.3</td>
<td>43</td>
<td>19.3</td>
</tr>
<tr>
<td>Total</td>
<td>433</td>
<td>100.0</td>
<td>223</td>
<td>100.0</td>
</tr>
</tbody>
</table>
5.2.3 Distribution of Respondents by Gender

As shown in Table 5.5, the distribution of students’ gender is almost even: 49.2% were male students and 50.8% were female students. This pattern mirrors the present situation in most of the Malaysian public universities. As for the academic staff, there were more male (65.9%) than females (34.1%). This also mirrors the general scenario of the academic staff in the public universities in the country. According to the 1994 official statistics of the labour force, there were 64% male workers and 36% female workers in Malaysia (The World Guide 1997/98, p.372). The published figure is quite similar with the results of this survey with regard to gender composition of academic staff. The chi-square value\(^2\) (chi-square = 16.633, df = 1, \(p = 0.000\)) suggests that there is a significant difference in gender composition between students and academic staff at 0.01 level of significance. The findings suggest that there were fewer females in the faculty’s category and more females in the student’s category.

\[\text{Chi-square} = 16.633, \text{df} = 1, \ p = 0.000\]

\(^2\) Chi-square value indicates the difference between observed frequency and expected frequency.
5.2.4 Distribution of Respondents by Academic Disciplines

Respondents were also examined in terms of academic disciplines and the findings show that there were 59.6% students from the social sciences disciplines and 40.4% students from the sciences and engineering disciplines. As for academic staff, 63.2% were from the social sciences disciplines, 82 (36.8%) were from the sciences and engineering disciplines. The chi-square test was applied to determine if there were differences between students and academic staff in terms of academic disciplines. The result (chi-square = 0.0820, df = 1, p = 0.365) shows that there is no statistically significant difference between them at 0.01 level of significance (see Table 5.6).

| TABLE 5.6 |
| Distribution of Respondents by Academic Disciplines |
| \( n = 656 \) |

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Academic disciplines</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Social Sciences</td>
<td>Sciences &amp; Engineering</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Students</td>
<td>258</td>
<td>59.6</td>
</tr>
<tr>
<td>Academic staff</td>
<td>141</td>
<td>63.2</td>
</tr>
</tbody>
</table>

Chi-square = 0.820, df = 1, p = 0.365

The percentages of the academic disciplines as shown above differ very slightly from the official statistics of the three universities (UKM, IIUM, and UMS). The official statistics from the three universities are: (i) UKM had 61.8% social sciences and humanities student population, and 38.2% sciences and engineering student population (UKM Annual Report 1997); (ii) UMS had
61.7% social sciences and humanities student population, and 38.3% sciences and engineering students population (UMS Annual Report 1997); (iii) IIUM had 65% (estimated figure) social sciences and humanities student population, and 35% sciences and engineering student population (IIUM Prospectus 1997/98). The figure for the academic staff in terms of academic disciplines is normally proportionate with the students’ total figure.

5.2.5 Distribution of Student Respondents by Status and Year of study

The majority (92%) of students who responded were undergraduates, and about 8% were postgraduates (see Table 5.7). This is due to the fact that there were far more undergraduates than postgraduates students in the three selected universities at the time this study was carried out. The official statistics from these universities were compared to the data gathered through this survey. It was noted that they vary very slightly. For the 1997/98 academic sessions (the period under study), the UKM student population was 86% undergraduate, and 14% postgraduate (Universiti Kebangsaan Malaysia, 1999); IIUM student population was 90% undergraduate and 10% postgraduate (IIUM Prospectus 1998/99); UMS student population was 95% undergraduate and 5% postgraduate (UMS Prospectus 1998/99).

| TABLE 5.7                                      |
| Distribution of Students' status

<table>
<thead>
<tr>
<th>Students’ status</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate</td>
<td>399</td>
<td>92</td>
</tr>
<tr>
<td>Postgraduate</td>
<td>34</td>
<td>8</td>
</tr>
</tbody>
</table>

130
Figure 5.1 shows the distribution of students by the year of study. Almost half of the students (48% or 210) were in the first year. Twenty-one per cent (92) were in the second year, 19% (82) were in the third year, and 11.3% (49) were in the fourth year. The distribution is expected because in many public universities in the country there is significant 'drop-out' over the duration of a degree programme because of academic disappointment. There are more students in the first year than in subsequent years and this distribution is typical.

![Distribution of Students by the Year of Study](image)

**FIGURE 5.1**

**Distribution of Students by the Year of Study**

### 5.2.6 Distribution of Academic Staff Respondents by Status, Academic Qualifications and Work Experience

Almost half of the academic staff (46.6% or 104) held the position of lecturer, (19.3% or 43) held the position of associate professor, (17.9% or 40) that of senior lecturer, (10.8% or 24) that of professor, and (5.4% or 12) that of
assistant lecturer. The distribution of the academic staff as shown in Figure 5.2 varies slightly from that of the normal population of public universities in Malaysia. Taking UKM as the standard (UKM is the National University of Malaysia), lecturers and senior lecturers usually make up about half of the population. This is followed by the associate professors (about 20%), professors (10%), and the balance (20%) would consist of tutors or assistant lecturers and guru\(^3\) (Universiti Kebangsaan Malaysia, 1998, p.62).

\[\text{FIGURE 5.2} \]

**Distribution of Academic Staff Academic Positions**

In terms of academic qualifications, more than half (52.5\%) of the academic staff from the three universities had PhD degrees. Less than half (43\%) had Masters degrees, about 4\% had Bachelor degrees, and 0.5\% had professional qualifications.\(^4\) Table 5.8 provides the breakdown of the numbers.

---

\(^3\) Guru is a term used in all public universities in the country, which means language teacher.

\(^4\) Professional qualifications are those qualifications awarded by professional bodies, such as, ACCA, ICMA, MACPA and others.
TABLE 5.8
Respondents' Academic Qualifications (Academic Staff)

\( n = 223 \)

<table>
<thead>
<tr>
<th>Academic Qualification</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ph.D.</td>
<td>117</td>
<td>52.5</td>
</tr>
<tr>
<td>Master</td>
<td>96</td>
<td>43</td>
</tr>
<tr>
<td>Bachelor</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>Professional</td>
<td>1</td>
<td>0.5</td>
</tr>
</tbody>
</table>

With regard to the length of academic work experience (see Figure 5.3), almost half (45.3\% or 101) of the academic staff have had between 1-5 years work experience. Another 17.9\% (40) had between 6-10 years work experience. Around 14.8\% (33) had between 11-15 years work experience, 4.5\% (10) had 16-20 years work experience, and 17.5\% (39) had 20 years or more work experience. It can be said that the majority (63.2\%) of the academic staff have had ten years or less work experience, indicating that most of the academicians in the local public universities are young people.
5.3 PUBLICITY CONCERNING ELECTRONIC INFORMATION RESOURCES

In an attempt to gauge the most popular methods of publicising electronic information resources at the three selected universities, respondents were asked how they learned about electronic information resources. The result showed that the most popular mode of publicity was the library (64.9%), followed by the print media (64.5%), friends (63.7%), electronic media (60.8%) and others (7.9%). It is quite interesting to note that under ‘others’ the most common sources included seminar, workshops, conferences, lecturers or supervisors, and family members. Table 5.9 shows the distribution of responses on publicity concerning electronic information resources.
TABLE 5.9

Publicity Concerning Electronic Information Resources

<table>
<thead>
<tr>
<th>Publicity</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Library</td>
<td>426</td>
<td>64.9</td>
</tr>
<tr>
<td>Print media</td>
<td>423</td>
<td>64.5</td>
</tr>
<tr>
<td>Friends</td>
<td>418</td>
<td>63.7</td>
</tr>
<tr>
<td>Electronic media</td>
<td>399</td>
<td>60.8</td>
</tr>
<tr>
<td>Others</td>
<td>52</td>
<td>7.9</td>
</tr>
</tbody>
</table>

Note: Totals do not equal 100 per cent as more than one answer could be given.

Cross-tabulation was performed to find out whether students and academic staff differ in the mode of publicity concerning electronic information resources. The chi-square test results suggest that there is a statistically significant difference between students and academic staff in two modes of publicity, that is, the electronic media (chi-square = 8.867, df = 1, p = .003) and the library (chi-square = 4.431, df = 1, p = .035) at the 0.01 and 0.05 level of significance. But the correlation is weak (Cramer’s $V^5 = -0.116$ for electronic media; and Cramer's $V = 0.082$ for library), suggesting that there is little relationship between these two variables.

The test results of the study revealed that the libraries surveyed were quite successful in promoting new technologies to academic staff, but less successful with students. The results show that many students knew about electronic information resources from the electronic media. Hence, these libraries should utilise the Web to promote electronic information resources to students. A library homepage is seen as an ideal platform to use for promoting the library

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5 Cramer's $V$ measures the strength of the relationship between two variables.
electronic resources and services. This method has been used in many academic libraries in the United States and United Kingdom (Rhodes and Chelin, 2000; Tobin and Kesselman, 1999; Xiao, Mosley and Cornish, 1997).

Previous studies (Adam and Bonks, 1995; Clausen, 1997; Eager and Oppenheim, 1996; Fidzani, 1998; Hashim, 2000; Majid and Kassim, 2000; Majid and Mansor, 1996; Moyo, 1996) found that lack of awareness about electronic information resources is a barrier to its usage and this result in under-utilisation of electronic information resources. Lack of publicity lead to lack of awareness. Hence, more effort must be invested in publicising these new technologies to end-users.

5.4 KNOWLEDGE AND SKILLS

5.4.1 Previous Knowledge Held by Respondents in Using IT Facilities

Respondents were asked whether they know how to use IT facilities as shown in Table 5.10. The majority of respondents stated that they knew how to use word processing and Windows. About half said that they knew how to use spreadsheets and e-mail. However, less than half of the respondents had knowledge on how to use graphics (41.6%), databases (25.3%), listserv (22.6%) and FTP (15.6%). This indicates that the majority of respondents had no knowledge of the last four categories of IT facilities.
TABLE 5.10
Previous Knowledge in Using IT Facilities

<table>
<thead>
<tr>
<th>IT Facilities</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word Processing (n=655)</td>
<td>496</td>
<td>75.7</td>
</tr>
<tr>
<td>Windows (n=655)</td>
<td>489</td>
<td>74.7</td>
</tr>
<tr>
<td>Spreadsheets (n=654)</td>
<td>330</td>
<td>50.5</td>
</tr>
<tr>
<td>E-mail (n=655)</td>
<td>321</td>
<td>49.0</td>
</tr>
<tr>
<td>Graphics (n=654)</td>
<td>272</td>
<td>41.6</td>
</tr>
<tr>
<td>Databases (n=655)</td>
<td>166</td>
<td>25.3</td>
</tr>
<tr>
<td>Listserv/Discussion groups (n=654)</td>
<td>148</td>
<td>22.6</td>
</tr>
<tr>
<td>FTP (File Transfer Protocol) (n=652)</td>
<td>102</td>
<td>15.6</td>
</tr>
</tbody>
</table>

Note: Totals do not equal 100 per cent as more than one answer could be given.

The chi-square test was applied on the related variables to determine the differences between students and academic staff in terms of their previous knowledge in using these IT facilities. The test results indicate that out of eight categories, only three categories (see Table 5.11) are found to be statistically significant at 0.01 and 0.05 level of significance. The three categories are windows (chi-square = 23.856, df = 1, p=0.000, Cramer’s $V = 0.191$), spreadsheets (chi-square = 4.623, df = 1, p = 0.032, Cramer’s $V = 0.084$) and listserv/discussion group (chi-square = 6.826, df = 1, p= 0.009, Cramer’s $V = 0.102$). However, the correlations were found to be weak, thus suggesting that there is very little relationship between the related variables.
TABLE 5.11
Comparison of Previous knowledge in using IT facilities between Students and Academic staff

<table>
<thead>
<tr>
<th>IT facilities</th>
<th>Students %</th>
<th>Academic staff %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word Processing (n=655)</td>
<td>75.5</td>
<td>76.1</td>
</tr>
<tr>
<td>Windows (n=655)**</td>
<td>80.6</td>
<td>63.1</td>
</tr>
<tr>
<td>Spreadsheets (n= 654)*</td>
<td>53.5</td>
<td>44.6</td>
</tr>
<tr>
<td>E-mail (n=655)</td>
<td>49.2</td>
<td>48.6</td>
</tr>
<tr>
<td>Graphics (n=654)</td>
<td>42.8</td>
<td>39.2</td>
</tr>
<tr>
<td>Listserv/Discussion groups (n=654)**</td>
<td>25.7</td>
<td>16.7</td>
</tr>
<tr>
<td>Databases (n=655)</td>
<td>24.8</td>
<td>26.5</td>
</tr>
<tr>
<td>FTP (File Transfer Protocol) (n=652)</td>
<td>15.5</td>
<td>15.8</td>
</tr>
</tbody>
</table>

Note: Totals do not equal 100 per cent as more than one answer could be given.

** 0.01 Significance level
* 0.05 Significance level

For the three categories of IT facilities: windows; spreadsheets; and Listserv/discussion group, it appears that more students knew how to use them than the academic staff. The possible explanation could be that the older generation of academic staff probably had less exposure in using some of these IT facilities than their younger colleagues. This may account for the differences between students and academic staff in these categories of IT facilities. As for the other categories of IT facilities (such as word processing, e-mail, graphics, databases and FTP), the differences between them were statistically not significant (at 0.01 and 0.05 level of significance).
5.4.2 Previous Skills Held by Students and Academic Staff

When asked about their previous skills in connection with IT and information/library skills, the majority (78%) of respondents stated that they had computer skills; less than half (46%) had information/library skills; and about one third (32%) of the respondents had Internet skills. Table 5.12 shows the previous skills held by students and academic staff.

<table>
<thead>
<tr>
<th>Previous Skills</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer skills</td>
<td>78</td>
</tr>
<tr>
<td>Information/library skills</td>
<td>46</td>
</tr>
<tr>
<td>Internet skills</td>
<td>32</td>
</tr>
</tbody>
</table>

Note: Totals do not equal 100 per cent as more than one answer could be given.

To determine the differences between students and academic staff in terms of their previous skills, chi-square tests were performed. The test results as shown in Table 5.13 indicate that only two categories of skills - Internet skills and information/library skills - are found to be statistically very significant at the 0.01 level of significance. This suggests that students and academic staff differ in the Internet and information/library skills, but not computer skills.
TABLE 5.13
Chi-square test results on the respondents’ previous skills

\( n = 656 \)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Chi-square values</th>
<th>( p ) value (2 sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet skill</td>
<td>17.955</td>
<td>0.000</td>
</tr>
<tr>
<td>Information/library skill</td>
<td>99.563</td>
<td>0.000</td>
</tr>
<tr>
<td>Computer skill</td>
<td>0.727</td>
<td>0.394</td>
</tr>
</tbody>
</table>

With regard to the information/library skill, the majority (73.1%) of academic staff had this skill as compared to only one-third (32.1%) of the students (see Table 5.14). It appears that many Malaysian school leavers are not well equipped with information/library skills. This finding underpinned the findings from the previous study by Osman (1993) on the Malaysian school libraries, which found that primary school pupils in Malaysia were not properly equipped to use the library independently, and library skills taught in primary schools were inadequate.

As for the Internet skills, nearly half of the academic staff (42.6%) had this skill as oppose to one quarter (26.3%) of the students (see Table 5.14). This implies that a majority of students who enter higher institutions of learning has no Internet skills. This is not surprising because most of the secondary schools in the rural areas and also some in the urban areas still do not have access to the Internet. These students are exposed to the Internet only at the higher education level. Nevertheless, they learned about the Internet very quickly while at the university, usually through trial and error and from friends. The findings revealed that about three-quarter of students and more than half of academic staff lacked Internet skills.
### TABLE 5.14
Comparison between Students and Academic Staff on Previous Skills
Held on IT and Information/Library

<table>
<thead>
<tr>
<th>Previous skills</th>
<th>Students %</th>
<th>Academic staff %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Skills</td>
<td>76.9</td>
<td>79.8</td>
</tr>
<tr>
<td>Information/library skills</td>
<td>32.1</td>
<td>73.1</td>
</tr>
<tr>
<td>Internet skills</td>
<td>26.3</td>
<td>42.6</td>
</tr>
</tbody>
</table>

Note: Totals do not equal 100 per cent as more than one answer could be given.

The first research hypothesis of this study was stated in null form as below,

There is no difference between students and academic staff in terms of previous skills and knowledge of using IT facilities

Since the results of this study showed that differences and similarities exist between students and academic staff in terms of previous knowledge and skills of using IT facilities, the null hypothesis is not supported.

#### 5.4.3 Current Knowledge Held Concerning Electronic Information Resources

The level of the current knowledge of respondents concerning electronic information resources was encouraging. The majority of respondents had knowledge about Internet (85.8%) and CD-ROM (71%), which ranges from adequate to very good. More than half of respondents knew about OPAC (61.4%), which varies from adequate to very good. Slightly over half (51.7%) had knowledge of online databases, which again varies from adequate to very
good. Concerning the Internet, it is encouraging to note that the majority of respondents had knowledge about it. The Malaysian media such as radio, TV and newspapers have been active in promoting the idea of IT and the Multimedia Super Corridor (MSC) to the general public in the last couple of years. Their effort in instilling IT awareness among the people was quite successful. Table 5.15 summarises the respondents’ current knowledge of electronic information resources.

### TABLE 5.15

**Respondents’ Current Knowledge of Electronic Information Resources**

**n** = 656

<table>
<thead>
<tr>
<th>Electronic Information Resources</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of the Internet</td>
<td>563</td>
<td>85.8</td>
</tr>
<tr>
<td>Knowledge of CD-ROM</td>
<td>466</td>
<td>71.0</td>
</tr>
<tr>
<td>Knowledge of OPAC</td>
<td>403</td>
<td>61.4</td>
</tr>
<tr>
<td>Knowledge of online databases</td>
<td>339</td>
<td>51.7</td>
</tr>
</tbody>
</table>

*Note: Totals do not equal 100 per cent as more than one answer could be given.*

In order to determine whether students and academic staff differ in their knowledge of CD-ROMs, OPACs, Online databases and the Internet, the Mann-Whitney U-test was applied to these variables. The test results (see Table 5.16) suggest that students and academic staff differ very significantly on all four categories of knowledge of electronic information resources (at the 0.01 level of significance).
TABLE 5.16
Mann-Whitney U-Test Result Comparing the Two Groups of Respondents in Terms of Knowledge of Electronic Information Resources

<table>
<thead>
<tr>
<th></th>
<th>Knowledge of CD-ROMs</th>
<th>Knowledge of online databases</th>
<th>Knowledge of OPACs</th>
<th>Knowledge of the Internet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mann-Whitney U</td>
<td>35200.000</td>
<td>35877.500</td>
<td>42346.500</td>
<td>31741.000</td>
</tr>
<tr>
<td>Wilcoxon W</td>
<td>129161.000</td>
<td>129838.500</td>
<td>136307.500</td>
<td>125702.000</td>
</tr>
<tr>
<td>Z</td>
<td>-5.881</td>
<td>-5.625</td>
<td>-2.652</td>
<td>-7.585</td>
</tr>
<tr>
<td>p value (2-tailed)</td>
<td>.000</td>
<td>.000</td>
<td>.008</td>
<td>.000</td>
</tr>
</tbody>
</table>

Overall the academic staff were more knowledgeable than the students on these electronic information resources. This is expected as academic staff are often assumed to have better knowledge of information sources generally than their students. Table 5.17 compares the knowledge of students and academic staff concerning CD-ROMs, OPACs, Online databases and the Internet. It is obvious from this table that about one-third of academic staff lacked knowledge about OPACs and online databases. As for students, more than half lacked knowledge about online databases, almost half lacked knowledge about OPACs, and one-third lacked knowledge about CD-ROM. The libraries surveyed may need to step up their training programme for end-users on these electronic resources.
TABLE 5.17
Students and Academic staff Knowledge of Electronic Information Resources

<table>
<thead>
<tr>
<th>Electronic Information Resources</th>
<th>Academic staff %</th>
<th>Students %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet</td>
<td>94.2</td>
<td>81.6</td>
</tr>
<tr>
<td>CD-ROMs</td>
<td>82.9</td>
<td>64.9</td>
</tr>
<tr>
<td>OPACs</td>
<td>67.2</td>
<td>58.4</td>
</tr>
<tr>
<td>Online databases</td>
<td>63.7</td>
<td>45.5</td>
</tr>
</tbody>
</table>

Note: Totals do not equal 100 per cent as more than one answer could be given.

5.4.4 Ability to Use Electronic Information Resources

Overall the ability of the respondents to use electronic information resources was encouraging. Table 5.18 summarises the respondents’ ability to use electronic information resources. The majority of respondents had the ability to use the Internet (87.4%) and CD-ROM (74.5%), which ranges from adequate to very good. More than half of the respondents had the ability to use OPAC (66%) and online databases (56.9%) which varies from adequate to very good.

TABLE 5.18
Respondents’ Ability to Use Electronic Information Resources

\[ n = 655 \]

<table>
<thead>
<tr>
<th>Electronic Information Resources</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability to use the Internet</td>
<td>573</td>
<td>87.4</td>
</tr>
<tr>
<td>Ability to use CD-ROM</td>
<td>487</td>
<td>74.5</td>
</tr>
<tr>
<td>Ability to use OPAC</td>
<td>432</td>
<td>66</td>
</tr>
<tr>
<td>Ability to use online databases</td>
<td>373</td>
<td>56.9</td>
</tr>
</tbody>
</table>

Note: Totals do not equal 100 per cent as more than one answer could be given.
In order to determine whether students and academic staff differ in their ability to use the Internet, CD-ROMs, OPACs and Online databases, the Mann-Whitney U-test was applied to these variables. The test results (see Table 5.19) indicate that they differ statistically very significantly on three categories of electronic information resources at 0.01 level of significance. These are the Internet, CD-ROMs and online databases. As for the OPACs, there is a statistically significant difference at 0.05 level of significance.

**TABLE 5.19**

Mann-Whitney U-Test Result Comparing the Two Groups of Respondents in Terms of the Ability to Use Electronic Information Resources

<table>
<thead>
<tr>
<th>Ability to use</th>
<th>Mann-Whitney U</th>
<th>Wilcoxon W</th>
<th>Z</th>
<th>p value (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD-ROMs</td>
<td>36342.500</td>
<td>130303.5</td>
<td>-5.363</td>
<td>.000</td>
</tr>
<tr>
<td>Ability to use online databases</td>
<td>36011.500</td>
<td>129972.5</td>
<td>-5.508</td>
<td>.000</td>
</tr>
<tr>
<td>Ability to use OPAC</td>
<td>42526.00</td>
<td>136487.0</td>
<td>-2.567</td>
<td>.010</td>
</tr>
<tr>
<td>Ability to use the Internet</td>
<td>34048.00</td>
<td>128009.0</td>
<td>-6.487</td>
<td>.000</td>
</tr>
</tbody>
</table>

Overall the academic staff were better than students in their abilities to use electronic information resources. This is not surprising as academic staff have more experience than students do in using various information resources during the course of their work and also gained experience during their student days at the university. Table 5.20 compares the ability of students and academic staff in terms of using CD-ROMs, OPACs, Online databases and the Internet. This result is consistent with the result of the knowledge of electronic information resources. Again it should be emphasised that the libraries surveyed need to step up their training for end-users on these electronic resources.
TABLE 5.20
Comparison of the Ability to Use Electronic Information Resources between Students and Academic Staff

<table>
<thead>
<tr>
<th>Electronic Information Resources</th>
<th>Academic Staff %</th>
<th>Students %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet</td>
<td>91.9</td>
<td>85.2</td>
</tr>
<tr>
<td>CD-ROMs</td>
<td>82.1</td>
<td>70.5</td>
</tr>
<tr>
<td>OPACs</td>
<td>70.5</td>
<td>63.7</td>
</tr>
<tr>
<td>Online databases</td>
<td>66.3</td>
<td>52.1</td>
</tr>
</tbody>
</table>

Note: Totals do not equal 100 per cent as more than one answer could be given.

The second research hypothesis of this study was stated in null form as below,

There is no difference between students and academic staff in terms of current knowledge and ability to use electronic information resources.

Since the results of this study showed that statistically significant differences exist between students and academic staff in terms of current knowledge and ability to use electronic information resources, the null hypothesis as stated above is rejected.

5.5 TRAINING IN ELECTRONIC INFORMATION RESOURCES

5.5.1 Training Received

The respondents were asked whether they had received training in using the four established electronic information resources - CD-ROM, OPAC, Online databases and the Internet. The overall responses were quite disturbing because the majority of respondents stated that they had not received formal
training in using the electronic information resources. An earlier study by Kaczor and Jacobson (1996) shows a similar pattern when they found that the majority of respondents (students and staff) had not attended any Internet instruction sessions provided by the library or computing services. Majid (1998) also found that less than 10% of the total university population had attended CD-ROM training.

Training in using the electronic information resources in most university libraries in Malaysia is voluntary. Some university libraries offer training only when there is a demand for such training from the end-users. There are a few university libraries, which offer specialised training on electronic resources, for example, Internet training at a nominal fee. Perhaps this kind of environment (fee-based training) is not so encouraging for end-users to attend the training sessions offered by the library.

Table 5.21 shows the breakdown of electronic information resources and the percentages of respondents who had not received training in using them.

<table>
<thead>
<tr>
<th>Electronic Information Resources</th>
<th>No training received</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online databases (n = 645)</td>
<td>n = 471</td>
</tr>
<tr>
<td>OPACs (n = 646)</td>
<td>n = 458</td>
</tr>
<tr>
<td>CD-ROMs (n = 649)</td>
<td>n = 400</td>
</tr>
<tr>
<td>Internet (n = 652)</td>
<td>n = 339</td>
</tr>
</tbody>
</table>

Note: Totals do not equal 100 per cent as more than one answer could be given.
With regard to CD-ROMs, only 38.4% of students stated that they had received training, while 61.6% stated that they had not received training. As for academic staff, 36.4% stated that they had received training, while 63.6% stated that they had not received training. The figures are quite disturbing given the fact that CD-ROM training has been going on in the local academic libraries since the late 1980s.

Concerning OPACs, only 30.2% of students stated that they had received training as opposed to 69.8% who had not received training. As for academic staff, only 26.9% had received training as opposed to 73.1% who had not received training. These figures are again a disappointment because the OPAC is the key to finding library resources, and if end-users do not know how to use the OPAC that means they are missing out on one of the university’s fundamental guides to information resources. The local university libraries have been conducting OPAC training quite regularly for their end-users, either in group sessions or individual instruction.

With regard to online databases, 25.7% of students stated that they had received training, while 74.3% had not received training. As for academic staff, 29.5% stated that they had received training in using online databases as compared to 70.5% who had not received training. This is expected because some of the online databases available in the local university libraries, such as DIALOG, SIRIMLINK and NSTP online, are commercially subscribed and access to these electronic resources is mostly through a librarian who acts as an intermediary. Hence, end-users are rarely trained to use them, but they are usually guided by librarians in their search for information. Training is however offered for searching locally loaded databases.

With regard to the Internet training, more than half (53.5%) of students stated that they had received training. However, only 37.3% of academic staff stated
that they had received training. Table 5.22 compares the status of training for students and academic staff on all four categories of electronic information resources.

### TABLE 5.22

<table>
<thead>
<tr>
<th>Electronic Information Resources</th>
<th>Received Training</th>
<th>No Training Received</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Student (n=433)</td>
<td>Faculty (n=223)</td>
</tr>
<tr>
<td>CD-ROM</td>
<td>169 (39.4%)</td>
<td>80 (36.4%)</td>
</tr>
<tr>
<td>OPACs</td>
<td>129 (30.2%)</td>
<td>59 (26.9%)</td>
</tr>
<tr>
<td>Online databases</td>
<td>110 (25.7%)</td>
<td>64 (29.5%)</td>
</tr>
<tr>
<td>Internet</td>
<td>231 (53.5%)</td>
<td>82 (37.3%)</td>
</tr>
<tr>
<td></td>
<td>260 (60.6%)</td>
<td>140 (63.6%)</td>
</tr>
<tr>
<td></td>
<td>298 (69.8%)</td>
<td>160 (73.1%)</td>
</tr>
<tr>
<td></td>
<td>318 (74.3%)</td>
<td>153 (70.5%)</td>
</tr>
<tr>
<td></td>
<td>201 (46.5%)</td>
<td>138 (62.7%)</td>
</tr>
</tbody>
</table>

Chi-square tests of significant differences were applied on the four categories of electronic information resources against the respondents’ variable. Only the Internet was found to be statistically significant at 0.01 level of significance (chi-square = 15.325, df = 1, p = 0.000). This shows that more students than academic staff had received training in using the Internet. However, the correlation between the variables (Internet and respondents) is weak (Cramer’s $V = 0.153$).

The overall picture projected by this result is that students and academic staff do not differ in training received on three categories of electronic information resources (CD-ROMs, OPACs, and online databases), but they differ on the other category - the Internet. More than half of students had received Internet training as oppose to about one-third of the academic staff. Students might
have learned about the Internet informally, through “trial and error” and learning from friends. However, older members of the faculty, who are not frequent users of the computer may not want to learn the Internet through “trial and error” as they prefer things with which they are familiar. Ray and Day (1998) also found that students acquired the skills necessary to exploit the electronic information resources through “trial and error” and guidance from other students.

5.5.2 Type of Training Received

When asked about the type of training received in general, the most popular answer from both groups of respondents was “got help from friends”. This shows that almost half (45%) of the respondents had received informal training from friends and colleagues. The result is similar to the previous study by Kaczor and Jacobson (1996) who found that students and staff learned to use the Internet mostly by themselves and from friends.

As shown in Table 5.23, other types of training do not differ very much as they are fairly even in terms of percentage - attending library workshop (24.5%), classroom instructions (23.2%), computer-assisted instruction (20.6%), and one-to-one instruction from the librarian (19.7%).

<table>
<thead>
<tr>
<th>Type of training</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Got help from friends</td>
<td>295</td>
<td>45.0</td>
</tr>
<tr>
<td>Attending library workshops</td>
<td>161</td>
<td>24.5</td>
</tr>
<tr>
<td>Classroom instruction</td>
<td>152</td>
<td>23.2</td>
</tr>
<tr>
<td>Computer-assisted instruction</td>
<td>135</td>
<td>20.6</td>
</tr>
<tr>
<td>One-to-one instruction from librarian</td>
<td>129</td>
<td>19.7</td>
</tr>
</tbody>
</table>

Note: Totals do not equal 100 per cent as more than one answer could be given.
As shown in Table 5.24, except for ‘got help from friends’, the other four categories revealed very little differences in percentage between students and academic staff.

**TABLE 5.24**

Type of Training Received in General by Students and Academic staff

<table>
<thead>
<tr>
<th>Types of training received</th>
<th>Students %</th>
<th>Academic staff %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Got help from friends</td>
<td>49.7</td>
<td>35.9</td>
</tr>
<tr>
<td>Attending library workshops</td>
<td>23.3</td>
<td>26.9</td>
</tr>
<tr>
<td>Classroom instruction</td>
<td>24.9</td>
<td>19.7</td>
</tr>
<tr>
<td>Computer-assisted instruction (CAI)</td>
<td>21.9</td>
<td>17.9</td>
</tr>
<tr>
<td>One-to-one instruction from the librarian</td>
<td>19.2</td>
<td>20.6</td>
</tr>
</tbody>
</table>

Note: Totals do not equal 100 per cent as more than one answer could be given.

The chi-square tests performed on the five types of training against the respondents’ variable indicate that only one type - “got help from friends” - is found to be highly significant at 0.01 level of significance (chi-square = 11.293, df = 1, p = 0.001). However, the correlation is weak (Cramer’s $V = 0.131$), indicating very little relationship between the two variables.

5.5.3 Training Methods Used by the University Libraries

One of the objectives of this study was to determine the training methods practised by the university libraries in training end-users on how to use the electronic information resources. Table 5.25 shows the training methods practised by the surveyed university libraries (UKM, IIUM, and UMS) as indicated by the respondents.
The lecture-with-demonstration seems to be the most popular training method used by the three university libraries. One-to-one training was the next popular training method used, and followed closely by the group session. Computer-assisted instruction (CAI) and printed instruction were almost similar in terms of percentage, and they were ranked fourth and fifth of the training methods used by the three university libraries, as stated by the respondents. Sharif et al. (1994) also found that the training methods practised by the public university libraries in Malaysia when training end-users to use the CD-ROM databases, were classroom lecture, one-to-one instruction, library workshop and printed instruction. It needs to be stressed that these methods were the ones reported by end-users as being used and may be subject to some misconception.

As far as computer-assisted instruction (CAI) is concerned, this method of delivery was not yet offered by the three university libraries. The university librarians responsible for end-user training confirmed the lack of CAI method in their training programme during the interview sessions with the researcher. However, the researcher suspects that the respondents, particularly the students,
could have misinterpreted CAI as a learning experience they had with computers.

Concerning printed instructions, all the three university libraries had printed instruction guides available for end-users to use anytime they need. This point-of-use guide is very useful for end-users especially when there is no library staff available to assist them.

Table 5.26 compares the training methods reported by end-users in the three university libraries. Between the three university libraries, the lecture training method was prominent in IIUM (41.4%) and UMS (36.6%). However, it was less prominent in UKM (28.2%) as compared to the other two institutions. UKM seems to have fairly even distribution of all the training methods employed. IIUM and UMS appear to concentrate more on the lectures/demonstrations method, unlike UKM. As expected besides the lectures/demonstrations, there appears to be very little differences amongst the three universities pertaining to the other categories of training methods. Therefore, it can be inferred that the three universities do not differ very much in terms of the training methods practised.

<table>
<thead>
<tr>
<th>Training Methods</th>
<th>UKM</th>
<th>IIUM</th>
<th>UMS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Lectures/demonstrations</td>
<td>72</td>
<td>28.2</td>
<td>98</td>
</tr>
<tr>
<td>One-to-one</td>
<td>68</td>
<td>26.7</td>
<td>72</td>
</tr>
<tr>
<td>Group session</td>
<td>68</td>
<td>26.7</td>
<td>67</td>
</tr>
<tr>
<td>CAI</td>
<td>55</td>
<td>21.6</td>
<td>45</td>
</tr>
<tr>
<td>Printed instruction</td>
<td>52</td>
<td>20.4</td>
<td>49</td>
</tr>
</tbody>
</table>
In order to determine whether there is any statistical difference between the three institutions, a $k$-sample chi-square test was performed on the related variables. The results as shown in Table 5.27 indicate that the lecture/demonstration method (chi-square = 9.503, $p = 0.009$) is statistically very significant (at the 0.01 level of significance). This method was found to be more frequently reported in two university libraries, namely, IIUM and UMS. UKM had a more evenly spread of training methods used as compared to the other two university libraries. However, the relationship between variables (lecture/demonstration and institutions) is weak ($Cramer's V = 0.120$), thus, suggesting that there is little relationship between the two variables.

**TABLE 5.27**
Chi-square Test Results between Training Methods Used and University

<table>
<thead>
<tr>
<th>Training methods</th>
<th>Chi-square value</th>
<th>Df</th>
<th>$p$ value (2 sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture/Demonstration</td>
<td>9.503</td>
<td>2</td>
<td>0.009*</td>
</tr>
<tr>
<td>One-to-one</td>
<td>0.868</td>
<td>2</td>
<td>0.648</td>
</tr>
<tr>
<td>Group session</td>
<td>2.546</td>
<td>2</td>
<td>0.280</td>
</tr>
<tr>
<td>CAI</td>
<td>2.508</td>
<td>2</td>
<td>0.285</td>
</tr>
<tr>
<td>Printed instruction</td>
<td>0.157</td>
<td>2</td>
<td>0.925</td>
</tr>
<tr>
<td>Other</td>
<td>4.477</td>
<td>2</td>
<td>0.107</td>
</tr>
</tbody>
</table>

* Statistically very significant at 0.01 level.

### 5.5.4 Preferred Training Method

One of the research objectives was to determine the most preferred training method. As shown in Table 5.28, the most preferred training method was one-to-one instruction. This finding is inconsistent with the findings of previous studies by Allen (1990), Manzari (1998), and Steele (1990) who found that
respondents preferred one-to-one instruction in learning about CD-ROM databases.

**TABLE 5.28**

**Preferred Training Method**

<table>
<thead>
<tr>
<th>Preferred Training Method</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-to-one instruction</td>
<td>383</td>
<td>58.4</td>
</tr>
<tr>
<td>Computer-assisted instruction (CAI)</td>
<td>295</td>
<td>45</td>
</tr>
<tr>
<td>Classroom/group demonstrations</td>
<td>284</td>
<td>43.3</td>
</tr>
<tr>
<td>Library Workshop (hands-on)</td>
<td>278</td>
<td>42.4</td>
</tr>
<tr>
<td>Printed sheet/manual</td>
<td>187</td>
<td>28.5</td>
</tr>
</tbody>
</table>

Note: total do not equal 100 per cent as more than one answer could be given

The percentages for computer-assisted instruction (CAI), classroom/group demonstrations, and library workshop (hands-on) are fairly even. But the percentage for printed sheet/manual is the lowest, thus clearly indicating that it is the least preferred training method.

In order to find out the differences between students and academic staff in terms of the preferred training method, a chi-square test was performed on the related variables. The results indicated that out of five training methods, three were found to be statistically very significant at 0.01 level of significance. They are one-to-one instruction (chi-square = 8.269, df = 1, p = 0.004), computer-assisted instruction (CAI) (chi-square = 11.293, df = 1, p = 0.001) and classroom/group demonstrations (chi-square = 11.678, df = 1, p = 0.001). The result indicates that majority of students (62.4%) preferred one-to-one training as compared to half of academic staff (50.7%). Almost half of students preferred CAI and classroom/group demonstrations compared to about one-third of academic staff. Obviously there are differences between students and academic staff.
academic staff in terms of these three training methods. However, no statistical
difference was found between them in the other two training methods, that is,
library workshop and printed guides.

The third research hypothesis of this study was stated in null form as below,

There is no difference between students and academic staff in terms of the
training methods preferred

Since the test results showed that differences and similarities exist between
students and academic staff in terms of the preferred training methods, the null
hypothesis is rejected.

TABLE 5.29
Comparison of the Preferred Training Method between Students and
Academic staff
(Students = 433; Academic Staff = 223)

<table>
<thead>
<tr>
<th>Training methods</th>
<th>Students (%)</th>
<th>Academic staff (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-to-one instruction</td>
<td>62.4**</td>
<td>50.7**</td>
</tr>
<tr>
<td>Computer-assisted instruction (CAI)</td>
<td>49.7*</td>
<td>35.9</td>
</tr>
<tr>
<td>Classroom/group demonstrations</td>
<td>48.0</td>
<td>34.1</td>
</tr>
<tr>
<td>Library workshop (hands-on)</td>
<td>41.4</td>
<td>44.8*</td>
</tr>
<tr>
<td>Printed sheet/manual</td>
<td>26.8</td>
<td>31.8</td>
</tr>
</tbody>
</table>

** 1st choice; * 2nd choice

Note: total do not equal 100 per cent as more than one answer could be given
Overall it can be said that both students and academic staff preferred one-to-one instruction as their first choice of training method. However, they differ when it comes to the second choice of training method as shown in Table 5.29. Students seem to prefer computer-assisted instruction (CAI) as their second choice of training method, while the academic staff preferred library workshop (hands-on) as their second choice of training method.

5.6 USING ELECTRONIC INFORMATION RESOURCES

5.6.1 Frequency of Use of Electronic Information Resources

A comparison was made between students and academic staff in terms of their usage of electronic information resources. Table 5.30 shows the differences between students and academic staff in terms of usage concerning electronic information resources. Statistically significant differences were found between students and academic staff in three categories of electronic information resources: i) CD-ROM (chi-square = 21.028, df = 4, p = 0.000, Cramer’s V = 0.179); ii) online databases (chi-square = 41.934, df = 4, p = 0.000, Cramer’s V = 0.253); and iii) Internet (chi-square = 130.637, df = 4, p = 0.000, Cramer’s V = 0.447). Small differences were observed in OPACs (statistically not significant at 0.05 level of significant), while larger differences were observed in CD-ROMs, online databases and the Internet.
### TABLE 5.30

Comparison of Frequency of Use of Electronic Information Resources between Students and Academic staff

<table>
<thead>
<tr>
<th>Frequency of use</th>
<th>Internet</th>
<th>CD-ROMs</th>
<th>OPACs</th>
<th>Online databases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Students</td>
<td>Academic staff</td>
<td>Students</td>
<td>Academic staff</td>
</tr>
<tr>
<td>Daily</td>
<td>16.0</td>
<td>57.8</td>
<td>8.4</td>
<td>6.3</td>
</tr>
<tr>
<td>2/3 times week</td>
<td>47.7</td>
<td>31.8</td>
<td>28.3</td>
<td>35.0</td>
</tr>
<tr>
<td>Once a month</td>
<td>18.5</td>
<td>5.8</td>
<td>23.4</td>
<td>28.3</td>
</tr>
<tr>
<td>Once a semester</td>
<td>10.9</td>
<td>2.2</td>
<td>17.9</td>
<td>22.0</td>
</tr>
<tr>
<td>Never use</td>
<td>6.9</td>
<td>2.2</td>
<td>22.0</td>
<td>8.5</td>
</tr>
</tbody>
</table>
As for the Internet, the academic staff used it more frequently than the students did. This is no surprise because access to the Internet is more widely available to the academic staff as compared to students. In fact during the fieldwork the researcher noticed that most of the academic staff have a computer on their desk in their office. As for students, they have to use computers with Internet connection available in the library or computer laboratories. Both of these places have limited numbers of computers as compared to the total number of students on campus. Obviously students’ access to the Internet were limited because of this reason. This is probably why students’ usage of the Internet was low when compared to the academic staff.

With regard to the OPACs, the students used them more regularly than the academic staff on daily basis. This is expected, as students need to refer to this electronic source more frequently in order to get the library materials they need for their coursework. On the other hand, the need to use the OPAC is less frequent for academic staff as most of them have their own private collections in their office or in their department.

Searching the commercial online databases as mentioned earlier in this chapter was mostly undertaken through the librarians, so it was a mediated access. In-house databases were less frequently used, and for that reason, training was rarely provided unless it is requested by the end-users. If training is given, it is usually individual instruction or point-of-use instruction.

5.6.2 Usage of the Internet

Respondents were asked what they used the Internet for and the results revealed that majority of them used it to find information (89.6%) and sending/receiving e-mail (82%). Ladner and Tillman (1993) also found in their study that e-mail was the most often reported use of the Internet. Besides using
the Internet for searching information and e-mail, it was also found that 60% of the students used the Internet for entertainment/amusement and nearly half (47.5%) of the academic staff used it for preparing their lectures. A small number of respondents used it for transferring files (FTP) (25%), and joining electronic discussion groups or listserv (23.5%).

5.6.3 Searching the Electronic Information Resources

Respondents were asked if they find what they need when searching the electronic information resources. The majority (64.3%) of them stated that they found what they were searching for when using electronic information resources. However, about 32.4% of the respondents answered that they “sometimes” got what they were searching for, and 3.3% stated that they “never” got what they were looking for during their information searching sessions (see Table 5.31).

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Usually</th>
<th>Sometimes</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number (n)</td>
<td>65</td>
<td>344</td>
<td>206</td>
<td>21</td>
</tr>
<tr>
<td>Percentage (%)</td>
<td>10.2</td>
<td>54.1</td>
<td>32.4</td>
<td>3.3</td>
</tr>
</tbody>
</table>

The Mann-Whitney U-test was performed to determine whether students and academic staff differ in their information searching success using electronic information resources. The test result (p = 0.237, mean rank for students = 324.16, mean rank for academic staff = 307.94) suggests that there is no statistically significant difference between students and academic staff in their
searching success. Table 5.32 compares the status of search success of students and academic staff. Generally, it can be concluded that students and academic staff do not differ in their information searching success using electronic resources.

**TABLE 5.32**

**Comparison between Students and Academic staff on their Success of Searching the Electronic Information Resources**

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Always</th>
<th>Usually</th>
<th>Sometimes</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students</td>
<td>9.9</td>
<td>52.4</td>
<td>34.8</td>
<td>2.9</td>
</tr>
<tr>
<td>Academic staff</td>
<td>10.8</td>
<td>57.2</td>
<td>27.9</td>
<td>4.1</td>
</tr>
</tbody>
</table>

Respondents were also asked if they ask for assistance during searching the electronic resources. About 64% of the respondents stated that they asked for assistance, while 36% did not ask for assistance when searching electronic resources. Probably, they search the databases by just experimenting with the tools. This means that the libraries should provide some kind of 'point-of-need' guides at the computer workstations for those users that avoid asking for help when searching the databases.

### 5.7 PROBLEMS FACED BY END-USERS

Eleven variables relating to the problems faced by the end-users in using electronic information resources were applied in this study. Many of these variables were identified from the literature review. These variables are as follows:
- Boolean Logic (AND, OR, NOT)
- Formulate search strategy
- Selecting suitable CD-ROM databases
- Executing file transfer protocol (FTP)
- Subject headings.
- Fields search (author, title, year, etc.)
- Keywords search
- Interpret and evaluate search results
- Search engines (Yahoo, AltaVista, etc.)
- Downloading search results
- Print search results

The results of this study indicate that out of the eleven variables, four variables were found to be most critical. They are “execute file transfer protocol” (FTP), “formulate search strategy”, “Boolean logic” and “selecting suitable CD-ROM database”. These are the areas where the majority of end-users stated that they faced difficulties when using electronic information resources. The areas where they faced fewer difficulties were subject headings, interpreting and evaluating search results, fields searching (author, title, year, etc.); search engines; keywords’, downloading and printing search results. The areas where respondents stated that they ‘sometimes’ faced problems were using subject headings’, interpret and evaluate search results, using keywords search, formulate correct search strategy and Boolean logic. Figure 5.4 illustrates graphically the problems faced by end-users when using electronic information resources.
FIGURE 5.4

Problems Faced by End-users in Using Electronic Information Resources

<p>| | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>10</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 = Boolean logic (AND, OR, NOT)  
2 = Select suitable CD-ROM databases  
3 = Download search results  
4 = Fields search (author, title, year, etc.)  
5 = Execute file transfer (FTP)  
6 = Interpret and evaluate search results  
7 = Keywords search  
8 = Print search results  
9 = Search engines (Yahoo, etc.)  
10 = Formulate correct search strategy  
11 = Subject headings

In order to determine the differences between the two groups of end-users, chi-square test was performed on the related variables and the results showed that out of eleven variables, seven were found to be statistically significant at the 0.01 and 0.05 level of significance. As shown in Table 5.33, the seven variables are fields search (author, title, and year), interpret and evaluate search results, keywords search, print search results, search engines (such as Yahoo and AltaVista), selecting suitable CD-ROM database, and subject headings.
TABLE 5.33
Chi-square Test Results on the Problems Faced by the Two Groups of End-Users

<table>
<thead>
<tr>
<th>Variables</th>
<th>Chi-square values</th>
<th>( p ) value (2 sided)</th>
<th>Cramer's ( I^{'} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fields search (author, title, year)</td>
<td>10.619</td>
<td>0.005**</td>
<td>0.127</td>
</tr>
<tr>
<td>Interpret and evaluate search results</td>
<td>9.707</td>
<td>0.008**</td>
<td>0.122</td>
</tr>
<tr>
<td>Keywords search</td>
<td>7.078</td>
<td>0.029*</td>
<td>0.104</td>
</tr>
<tr>
<td>Print search results</td>
<td>10.878</td>
<td>0.004**</td>
<td>0.129</td>
</tr>
<tr>
<td>Search engines (Yahoo, AltaVista)</td>
<td>7.112</td>
<td>0.029*</td>
<td>0.104</td>
</tr>
<tr>
<td>Selecting suitable CD-ROM databases</td>
<td>6.277</td>
<td>0.043 *</td>
<td>0.099</td>
</tr>
<tr>
<td>Subject headings</td>
<td>13.094</td>
<td>0.001**</td>
<td>0.141</td>
</tr>
</tbody>
</table>

** 0.01 level of significance
* 0.05 level of significance

In all the seven variables mentioned above, students experienced more difficulties than academic staff in executing these activities. However, the correlations between these variables and the respondent’s variable (as shown in Table 5.33) are weak, suggesting that there are very few relationships between them.

The fourth research hypothesis was stated in null form as below,

There is no difference between students and academic staff in terms of the problems faced in using electronic information resources

Since there were more differences than similarities between the two groups of end-users, the null hypothesis is rejected.
5.8 LOOKING AT THE RELATIONSHIPS BETWEEN CERTAIN VARIABLES

5.8.1 Relationships between Certain Demographic Characteristics and Claimed Ability to Use Electronic Information Resources

Crosstabulations were performed to determine if correlation exists between certain demographic characteristics (such as academic staff work experiences, academic qualifications, students' year of study and status, gender and subject disciplines) and the ability to use electronic information resources. The test results revealed that:

- There is no correlation between the work experience of academic staff and their ability to use electronic information resources (at the 0.05 level of significance);

- There is no correlation between academic qualifications of academic staff and their ability to use electronic information resources (at the 0.05 level of significance);

- There is no correlation between the gender of academic staff and their ability to use electronic information resources (at the 0.05 level of significance); and

- There is no correlation between subject disciplines of the academic staff and their ability to use electronic information resources (at the 0.05 level of significance).

In the case of students, significant correlations exist between their year of study and their ability to use three categories of electronic information resources as follows:
• CD-ROM (at the 0.01 level of significance);
• Internet (at the 0.05 level of significance); and
• Online databases (at the 0.05 level of significance).

The majority of the third and fourth year students were able to use the three categories of electronic information resources as mentioned above and they were better able to do so than the first and second year students. This is as might be expected because senior students have been exposed to these resources much longer than their juniors.

Comparison was made between undergraduate and postgraduate students in terms of their ability to use electronic information resources. It was observed that significant differences existed between them on three categories of electronic resources – CD-ROM, online databases and OPACs (at the 0.01 level of significance). Many more postgraduate students were able to use these electronic resources than the undergraduate students. No significant difference was observed for the Internet between the two groups of students. This suggests that increasing familiarity with Internet is a general phenomenon where access is available.

A significant relationship existed between students' subject disciplines and their abilities to use certain electronic information resources as follows:

• OPAC (at the 0.01 level of significance); and
• CD-ROM (at the 0.05 level of significance).

With regard to OPAC, many more students from the social sciences discipline have the ability to use OPAC (ranging from 'adequate' to 'very good') as compared with students from the sciences and engineering. Conversely, it was observed that many more students in the sciences and engineering were better
than students from the social sciences in their ability to use CD-ROM. However, both correlations were found to be weak.

Concerning student’s gender, significant correlation was observed in one category of electronic resources, that is, CD-ROM (at 0.01 level of significance). The result showed that more male students than female students claimed the ability to use CD-ROM.

5.8.2 Relationship between Knowledge of and Ability to Use Electronic Information Resources

Computation of Spearman’s rank-order correlation coefficient was performed to determine if a significant correlation exists between the ability to use electronic resources and knowledge of electronic resources. The results of the Spearman’s rank-order correlation coefficients and the two-tailed probability ($p$ value) revealed that strong positive correlation existed between the two variables on all four categories of electronic information resources at the 0.01 level of significance. This means that the two ordinal variables: i) knowledge of electronic information resources; and ii) ability to use electronic information resources are positively correlated (at 0.01 level of significance).

5.9 CHAPTER SUMMARY

The findings from the questionnaire survey reveals that majority (more than 50 %) of respondents have not attended any formal training in using electronic information resources. For those who had received training, it was through informal training with almost half of the respondents receiving “help from friends”. With regard to the formal training received, both students and academic staff did not contrast very much in terms of training they had on OPACs, CD-ROMs and online databases. Although the majority (78%) of
respondents indicated that they had computer skills, this skill alone is not sufficient for them to identify, retrieve, evaluate and use the electronic information resources. As for the academic staff, even though many of them (73%) had information skills, this alone may not be adequate to access and use electronic information resources. With regard to students, the majority (68%) do not have information/library skills. Lacking this skill puts them at a disadvantage when handling electronic information resources. The results clearly indicate that both groups of end-users required additional skills in order to be competent information users.

The results also revealed that both students and academic staff preferred one-to-one training methods in learning about electronic information resources. All the three university libraries employed similar training methods in their training programme.

Both students and academic staff faced problems when using electronic information resources. However, differences and similarities existed between them in terms of the problems faced in relation to using electronic information resources. Students varied in terms of their ability to use electronic information resources according to certain demographic characteristics. However, academic staff did not vary in their ability to use electronic information resources in terms of certain demographic characteristics. Hence, training programmes for students need to consider demographic factors.
CHAPTER 6

DATA ANALYSIS: INTERVIEWS

6.1 INTRODUCTION

A face-to-face semi-structured interview was undertaken immediately after the questionnaire survey to gather qualitative data for the second phase of this study. The interviews were carried out in March 1998 until May 1998, involving twenty-three respondents (details are given in the next section). The interview data was meant to supplement the quantitative data gathered through the questionnaire survey undertaken in the first phase of this research. Face-to-face interviews with the end-users were particularly effective in providing insights into what they think, perceive and have experienced about electronic information resources and also what their training needs and preferred training methods are. The groups interviewed were all volunteers and as such may be regarded as being in many instances more motivated to use information technology, and more willing to demonstrate their knowledge and skills.

The face-to-face interviews with the professional librarians in-charge of training from the three targeted universities were intended to seek their opinions and perceptions regarding their library end-users’ training needs, current end-user training programmes, and related issues. The perceptions of the professional librarians were considered to be very relevant for this kind of study because they represent independent, but not entirely disinterested observations about the end-users’ training needs.
In addition to the interview data, some responses to the open-ended questions from the questionnaire survey were analysed together with the interview data and incorporated into this chapter. Together they provide rich qualitative data for the study.

6.2 INTERVIEWEE CHARACTERISTICS

The total number of people interviewed in the second phase of this study was 23. Out of this number, 18 were end-users: 9 students, and 9 academic staff. The remainders (5) were professional librarians from the three selected public university libraries. Students and academic staff were the main focus of this study. Table 6.1 provides the breakdown of both students and academic staffs by university, gender, status, and subject discipline.

<table>
<thead>
<tr>
<th>Institution</th>
<th>Gender</th>
<th>Status</th>
<th>Subject Discipline</th>
</tr>
</thead>
<tbody>
<tr>
<td>UMS</td>
<td>Male</td>
<td>Academic staff</td>
<td>Biotechnology</td>
</tr>
<tr>
<td>UMS</td>
<td>Female</td>
<td>Academic staff</td>
<td>Business and Economics</td>
</tr>
<tr>
<td>UMS</td>
<td>Female</td>
<td>Academic staff</td>
<td>Education &amp; Social development</td>
</tr>
<tr>
<td>UMS</td>
<td>Male</td>
<td>Student</td>
<td>Biology</td>
</tr>
<tr>
<td>UMS</td>
<td>Female</td>
<td>Student</td>
<td>Industrial relations</td>
</tr>
<tr>
<td>UMS</td>
<td>Male</td>
<td>Student</td>
<td>Business and Economics</td>
</tr>
<tr>
<td>UKM</td>
<td>Female</td>
<td>Academic staff</td>
<td>Chemistry</td>
</tr>
<tr>
<td>UKM</td>
<td>Male</td>
<td>Academic staff</td>
<td>Psychology</td>
</tr>
<tr>
<td>UKM</td>
<td>Female</td>
<td>Academic staff</td>
<td>Linguistics</td>
</tr>
<tr>
<td>UKM</td>
<td>Male</td>
<td>Student</td>
<td>Biology</td>
</tr>
<tr>
<td>UKM</td>
<td>Female</td>
<td>Student</td>
<td>Information technology</td>
</tr>
<tr>
<td>UKM</td>
<td>Female</td>
<td>Student</td>
<td>Mechanical engineering</td>
</tr>
<tr>
<td>IIUM</td>
<td>Female</td>
<td>Academic staff</td>
<td>Law</td>
</tr>
<tr>
<td>IIUM</td>
<td>Male</td>
<td>Academic staff</td>
<td>Library &amp; Information science</td>
</tr>
<tr>
<td>IIUM</td>
<td>Male</td>
<td>Academic staff</td>
<td>Economics &amp; Management</td>
</tr>
<tr>
<td>IIUM</td>
<td>Male</td>
<td>Student</td>
<td>Education</td>
</tr>
<tr>
<td>IIUM</td>
<td>Female</td>
<td>Student</td>
<td>Economics &amp; Management</td>
</tr>
<tr>
<td>IIUM</td>
<td>Male</td>
<td>Student</td>
<td>Education</td>
</tr>
</tbody>
</table>
The five professional librarians comprised of two reference librarians from UKM, two public services librarians from UMS, and one reference librarian from IIUM. All of them were involved in the training of end-users in their respective university libraries. Table 6.2 presents the profile of professional librarians involved in this investigation.

**TABLE 6.2**

Profile of Interviewees (Librarians)

<table>
<thead>
<tr>
<th>Institution</th>
<th>Gender</th>
<th>Division/Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>UMS</td>
<td>Male</td>
<td>Public services</td>
</tr>
<tr>
<td>UMS</td>
<td>Female</td>
<td>Public services</td>
</tr>
<tr>
<td>UKM</td>
<td>Female</td>
<td>Reference</td>
</tr>
<tr>
<td>UKM</td>
<td>Female</td>
<td>Reference</td>
</tr>
<tr>
<td>IIUM</td>
<td>Female</td>
<td>Information</td>
</tr>
</tbody>
</table>

### 6.3 ORGANISATION OF DATA

The interview transcripts were examined and analysed using the research objectives as the guidelines (see Appendix 4A and 4B). The rest of the chapter is divided into five broad sections as follows:

- Knowledge and skills held
- Problems faced
- Knowledge and skills needed
- Current training programme
- Preferred training methods
6.4 KNOWLEDGE AND SKILLS HELD

All the academic staff interviewed have basic computer skills. As stated by some of the respondents:

"I have basic computer skills" (Academic staff – IIUM)

"I have the Internet and computer applications skills, such as Power point, word processing, and spreadsheets" (Academic staff – UMS)

This confirmed the fact established by the questionnaire data which found that the majority of the academic staff had computer skills (80%). However, the figure differs when it comes to Internet skills where the interview data showed that all of the academic staff had this skill. On the other hand, the questionnaire data indicate that less than half (43%) of the academic staff had this skill. Those who volunteered to be interviewed were clearly better informed and skilled in IT matters. As such it may have influenced their motivation for volunteering.

As for the information/library skills, slightly over half of the academic staff (56%) interviewed mentioned that they had information/library skills. The figure compares with the questionnaire data which showed that 73% of academic staff had this skill. Given their enthusiasm for IT, as noted earlier, it is likely that some of the academic staff in the interview sample did not consider information/library skills as their top priority and it may explain the lower percentage. Without this skill they can still use their own private collections or consult their colleagues to get needed information. This attitude is apparent in one lecturer’s comments:
"I have the Internet and computer skills, but I have not learned the information/library skills yet. The most important thing for me is I know where to get the information." (Academic staff - UKM)

With regard to the students interviewed, it seems that all of them have basic computer skills and Internet skills. Typical student responses illustrate the point:

"I have Internet skills" (Student – UMS)

"I have computer application skills – word processing, Lotus and the Internet" (Student – IIUM)

However, with regard to information/library skills, about one-third (33%) of the students interviewed mentioned that they have information/library skills. This corresponds closely to the questionnaire data which showed that 32% of students have information/library skills. The same can also be implied concerning computer skills where the majority (77%) of students surveyed via questionnaire reported having this skill.

When it comes to the Internet skills a difference is observed. About a quarter of students in the questionnaire survey reported having Internet skills as compared to all students in the interview exercise. It seems that the students who volunteered for the interview exercise represented a group with better awareness of IT.

The skills that the interview respondents have, particularly computer and Internet skills, can also be linked to how they regard electronic information resources, such as OPAC, CD-ROM and Internet. Some of them reported as follows,
"I have basic skills in using OPAC and CD-ROM" (Academic staff - UKM)

"I have Internet skills; however my knowledge on using OPAC and CD-ROM is little" (Student - UMS)

"At the moment I am doing a course on Computer in Educational Administration dealing with different programs like Power Point, Microsoft and Excel. This gives me an opportunity to learn IT skills and to search for information using CD-ROM" (Student - IIUM)

Although all of the interview respondents have basic IT skills, however, not many of them have information/library skills. There could be several reasons for this and two possible explanations can be offered here. Firstly, it may be that information/library skills are not taken seriously by the students. As one student commented,

"In my opinion the library should play an active role in promoting their services, as students generally do not consider library as very important to their daily activities." (Student - IIUM)

This raises the issue of whether libraries are doing enough to promote library use and skills.

Secondly, some evidence from the interviews emerges that the libraries concerned do not proactively promote training programmes to their end-users. As one librarian confirmed,

"Training is based on requests from both students and academic staff." (Librarian - UMS)
6.5 PROBLEMS FACED

One of the problems faced by interview respondents is related to information retrieval skills. Some of the students interviewed experienced difficulties in using CD-ROM and online databases. They were confused and had insufficient knowledge in selecting the appropriate electronic information sources for their assignments and term papers. They were in dilemma in retrieving the right information from the Web for their assignments. As one student commented,

"Sometimes I retrieved too many hits from the Web; I don't know which one to take." (Student - UMS)

This kind of Web problem is acknowledged in the literature (Abbas, 1997; Harmon, 1996; Koutnik, 1997; Massey-Burzio 1998).

As for the academic staff, although a majority of them claimed to have information/library skills, a few complained that they retrieved too little information from the Web on their particular subjects. As one Law lecturer put it,

"Even though Internet is easy, I spend the whole day searching for information and get only one or two materials. It takes so much of my time." (Academic staff – IIUM)

Problem of both retrieving too much information and not being able to refine searches are encountered by some, whilst others believe that they have not found enough. The need to improve skills in a variety of ways is apparent. The above examples show that a lack of information/library skills can affect the information retrieval process. Earlier studies by McCarthy, Krausse and Little (1997), Ray and Day (1998), and Hashim (2000) also found that lack of
effective information retrieval skills form the main barriers to using electronic information resources. The interview data in this study shows that students and academic staff who lacked information/library skills faced problems in using electronic information resources even though they may have had computer and Internet skills.

The questionnaire data revealed a range of almost similar problems to those reported by the interviewees, in relation to information/library skills. In either set of results, areas where end-users faced most difficulties include: formulating a search strategy, using Boolean operators, and selecting suitable databases.

Interview respondents also volunteered opinions about library facilities such as computer workstations. As one lecturer and one student point out,

"Libraries should provide more online search facilities and computer workstations so that users can use them after training, or else they will forget what they learned" (Academic staff – UKM)

"Provide more computer workstations as we need more practice than lectures. It is useless to have knowledge but no device to practice." (Student - IIUM)

In some cases, the librarians responsible for training echoed users' views. Some examples are:

"One problem faced by our library users is not enough facilities. The library has 19 computers for public use, but only 4 computers have Internet connections." (Librarian - UMS)
"Not enough computer workstations for public Internet usage. Library has 20 workstations with Internet connections for training and public use." (Librarian - UKM)

Previous studies (Hashim, 2000; Moyo, 1996; Ray and Day, 1998) also found that the provision of insufficient computer workstations impedes library users from using electronic information resources.

Another problem faced by respondents is related to the capacity of IT servers in their universities. According to the interviewees their universities' IT servers were very slow. Illustrative comments are:

"Computer server at my university is very slow and time consuming."
(Academic staff - UKM)

"Internet is slow and time consuming, and sometimes the server breaks down" (Student - UMS)

It is quite worrying that all the librarians interviewed claimed to be unaware of the problems faced by their end-users, except for the lack of facilities in their libraries. None of them mentioned anything on end-user problems associated with actually using information sources. They had the impression that their end-users do not face many problems in using electronic information resources in their libraries. The reality, as this study revealed is that, their end-users do face a range of problems in using electronic information resources.

6.6 KNOWLEDGE AND SKILLS NEEDED

Two-thirds (67%) of the academic staff interviewed had no formal training on using electronic information resources and related IT skills. This figure is in
consistent with the questionnaire data which showed that a majority (more than 60%) of the academic staff has not received any formal training concerning electronic information resources. Thus, the interview data and the questionnaire data support each other.

Appropriate training is very important, both in order to stimulate library users to use electronic information resources, and to equip them with a reasonable level of skills and knowledge to do so. The academic staff interviewed revealed that they had had no formal training on using electronic information resources. However, the questionnaire data indicated that the majority (more than 60%) of them had knowledge about electronic information resources. The possible explanation for this is that they may have learnt about electronic information resources through informal methods such as reading and asking friends or colleagues. Perry (1995) also found that most of the respondents in his online survey carried out in 1994, learned about the Internet through self-study by reading books and periodicals, and by consulting their colleagues.

Nevertheless, the data from this interview indicate that the academic staff wanted to learn more about electronic information resources through formal training. Selected comments referring to these perceptions are:

"I learned through trial and error as well as reading about this subject. I would prefer to undergo a formal training in searching electronic information resources." (Academic staff - UMS)

"Library should offer formal training sessions (with hands-on) every semester on different aspects of electronic and networked information resources." (Academic staff - IIUM)
It is very likely that these respondents were not aware of the training provided by the university libraries surveyed. These libraries have been providing formal training on using electronic information resources for quite sometime already (Majid, 1998). Perhaps the university libraries concerned should promote or market their training programme more energetically.

Moreover, users have clear ideas about what training they need. Some academic staff interviewed wanted training in certain areas like OPAC, CD-ROM, e-journals and research publications. Comments referring to these are:

"I need a comprehensive training in using the Internet, Online public access catalogues (OPAC), and CD-ROMs." (Academic staff - UMS)

"I would like to have more training on searching for information, especially reference sources and journals." (Academic staff - UKM)

"I need training in lots of areas, especially in searching for latest research publications." (Academic staff - IIUM)

In the case of students, slightly more than half (56 %) had no formal training on using electronic information resources and related IT skills. The data is also consistent with the questionnaire data, which found that over 60 per cent of students had no training in using electronic information resources (except for the Internet - 47%). Any informal training that they had experienced is linked to being mainly self-taught (through trial and error) and learning from their friends. Many expressed a desire for formal and comprehensive training on using electronic information resources and IT skills. Moreover, the comments from them suggested how very important this training would be. Examples include:
"I need more training on every aspect of electronic information resources because my knowledge is not formal and the more I know the more I think I do not know." (Student - UMS)

"I am still weak in mastering all the skills needed to get the information. If possible, I hope there would be more training and courses provided by the library to help the students. I hope I will not be a step behind the other students especially from other local universities." (Student - UMS)

"At the moment, I do not have any formal Internet training. Therefore, I would suggest that the institution provide one since we are paying them great amount of money. Another thing is to increase the number of PCs and time allowed to use them." (Student - IIUM)

Concerning the areas of training, students interviewed wanted training on all aspects of electronic information resources, especially, Internet, CD-ROM and basic computer skills. Students like the academic staff, were aware of what training they needed. Some illustrative comments are:

"I would like to have more training on Internet, word processor and electronic information tools." (Student - UKM)

"We need more training on computer and Internet because it is very important for our assignments." (Student - IIUM)

"More training is needed especially on Internet and CD-ROM." (Student - UKM)
From the above discussion and illustrations it is clear that both academic staff and students wanted training in using electronic information resources. Both groups of respondents have many similarities in their previous training experiences and the training areas needed pertaining to electronic information resources.

6.6.1 Advanced IT Skills

It is also interesting to note here that the responses from the open-ended questionnaires contained in the questionnaire survey shed more light on the kind of training the respondents felt that they needed. These responses (Question number 14 - students; and Question number 16 - academic staff) revealed that many students wanted to learn advanced IT skills such as HTML and JAVA language, creating a Web page, and FTP. Similarly, the academic staff also wanted to learn about creating a Web page, FTP and electronic journals. These areas of training are not really basic but advanced skills. The design of end-user training programmes should therefore take into accounts both basic and advanced levels so as to accommodate different existing skills of end-users.

6.6.2 Reference Librarians' views of End-users' Training Needs

Five reference librarians were asked their views on end-users' training needs. As noted earlier, they appeared to have little knowledge of end-users' problems. Their responses to the questions were based on their perceptions of what training might be appropriate rather than on a considered response to solving users' problem through training. The skills needed by end-users as perceived by the librarians are computer skills, Internet skills and information/library skills. Illustrative comments are as follows:
"They need to learn computer skills. Some know how to handle the computer, but do not know how to get to the information straight away. They should know the technique to get the right search engine for the Internet resources. When we first had the Internet we gave training to all students upon request at the beginning of the semester. Some of them ask their lecturers how to go about it, and some maybe learnt from their colleagues. "(Librarian - UMS)

“They need to learn computer skills, search strategy, Boolean, and truncation” (Librarian - UMS)

“They need to learn search strategy and advance OPAC searching techniques” (Librarian - IIUM)

However, it is of some concern that one reference librarian responsible for training was unable to identify what end-users needed or lacked. To quote:

“Cannot single out what end-users really need “(Librarian - UKM)

In brief, according to the librarians interviewed the skills that end-users need can be broadly classified into three areas as follows:

- Computer skills
- Internet skills
- Information/library skills

Some of these skills are needed at the basic level and some also at advanced level. The perceptions of the librarians from the two university libraries (IIUM and UMS) were broadly comparable to the training needs expressed by the users during the interviews. Furthermore, these training needs are almost identical with the end-users’ training needs as discovered in the literature
review (Chapter 3). The literature reviewed indicated that end-users require skills in basic computer applications, information retrieval, Internet or networks, and critical evaluation of electronic information resources.

6.7 CURRENT TRAINING PROGRAMME

All the three university libraries provided some form of training to their end-users. It was found that two university libraries (UKM and IIUM) offered separate Internet training classes. However, one university library (UKM) charged a fee for the Internet training classes. According to the librarian of that university,

"Internet classes started full swing in 1997 and there is a fee charged – RM10.00 per class. There is no charge for other electronic classes (CD-ROM, OPAC and online database)" (Librarian - UKM)

The other two university libraries did not charge their users for training. This is confirmed by the librarians involved,

"All classes are free-of-charge. Our objective is to teach them so that they can utilise the electronic information resources available." (Librarian - IIUM)

"No special Internet classes. Training incorporates all electronic mediums. Classes are free for all users" (Librarian - UMS)

Charging end-users is a recent phenomenon in the local Malaysian public universities. The Government allows local public universities to generate their own income to cover some of the overhead costs of certain services rendered by the universities to their clients. Public university libraries, as one of the
departments within the universities, are also encouraged to generate income to cover some of their operating costs. However, charging library end-users for any kinds of training is not really a good idea as it threatens to discourage library users from attending library sponsored training.

6.7.1 Training Methods Used in the Three University Libraries

The librarians responsible for training confirmed that the training methods used in the three university libraries were classroom lectures accompanied by hands-on practice, library workshops (with hands-on), group training and one-to-one training methods. Typical comments are:

"Lecture with hands-on, one-to-one, course-integrated instruction, and workshop method." (Librarian - IIUM)

"Classroom lectures (assisted by computer applications software, such as PowerPoint), library workshop (hands-on), and one-to-one method." (Librarian - UKM)

"Group training session and at the same time one-to-one training is given to students all the time. We also do the demo during meetings (with academic staff), showing them how to use electronic journals in the meeting room. Students training are based on requests and we inform them if they want to come in for group sessions, but they have to make an appointment. So far we have not offered any library workshop." (Librarian - UMS)

None of the librarians interviewed mentioned computer-assisted instruction (CAI). In fact CAI had not been practised at the time of this study. This result confirms an earlier study conducted in Malaysia in 1994 which found that none
of the public university libraries surveyed had any experience in using CAI (Sharif, et al, 1994).

The interview data differ from the questionnaire data concerning CAI and illustrate how respondents can misinterpret what CAI is. In the questionnaire the users reported that CAI was one of the training methods used in the three university libraries (UKM, UMS and IIUM). In reality CAI has not been practised yet. Thus, the interview data served to correct the questionnaire data and justified using more than one data gathering method.

There is a certain uniformity about the extent of training provided by libraries. When asked about the schedule and frequency of providing training to their end-users, the librarians replied:

"Four times per week (during semester) from Monday to Thursday, 2 hours per session" (Librarian - UKM)

"Daily from Monday to Saturday (during semester), One hour per session" (Librarian - IIUM)

"Four times per week (during semester). Tuesday and Thursday - 2 sessions per day (one hour per session)." (Librarian - UMS)

6.7.2 Effectiveness of the Current Training Programme

Most of the librarians interviewed felt that their training programmes were able to fulfil the training needs of their end-users. Although two of them disclosed that they have not carried out any actual evaluation concerning their training programmes. The effectiveness of training is therefore only subjectively judged. An example that illustrates this opinion is:
"I think yes. So far there has been no real evaluation of training programme being done yet." (Librarian - UKM)

However, one library had carried out the training evaluation and the result was satisfactory. The librarian involved claimed:

"Yes, the library has carried out the training evaluation and found to be satisfactory." (Librarian - IIUM)

Nevertheless, one librarian was uncertain about the effectiveness of his training programme. He commented:

"Not sure, so far there is no feedback from the users. No evaluation on the training programme has been conducted." (Librarian - UMS)

If training is to be properly and consistently organised and delivered, effective evaluation is very necessary.

6.8 PREFERRED TRAINING METHODS

About half of the academic staff interviewed said that they preferred workshops (with hands-on) as their training method. The other half preferred a one-to-one training method. Illustrative comments are:

"I prefer workshop training method, more practical and also it includes hands-on. I can remember better." (Academic staff - UMS)
"I prefer one-to-one training method, if I have problem I can ask the instructor immediately." (Academic staff - UKM)

As for students, the majority (two-third) preferred a one-to-one training method. Some quotations that illustrate this point are:

"I prefer one-to-one" (Student IIUM)

"I prefer one-to-one training method because I can easily ask the instructor if I have problem." (Student - UMS)

"Small group, but one-to-one is better" (Student - UKM)

About one-third preferred small group sessions or workshop training method. Typical comments include:

"Workshop is more practical." (Student - UMS)

"Workshop is more interesting. Not based on theory only, but with hands-on." (Student - UKM)

Nevertheless, the respondents perceived that whatever training method must include practical aspect. As one student commented,

"It should include more practice on whatever we learn especially the Internet, CD-ROM and online public access catalogues (OPAC). A student should be given all the opportunity to practise it by herself." (Student - IIUM)
It is also interesting to know what the librarians think about their end-users preferred training method. According to one librarian interviewed, the training method most preferred by his end-users was hands-on training. It also reflected his preferred mode of teaching. For example,

"Hands-on training. I also like to teach hands-on." (Librarian - UMS)

It is obvious from the above descriptions that both students and librarian share common ground pertaining to training - the preference for hands-on training. The interview data concerning end-users' preferred training method did not differ from the questionnaire data. In the questionnaire data the most preferred training method of both students and academic staff was one-to-one training method. Basically, both students and academic staff have a common interest pertaining to their first choice of training method. Hence, it can be said that both the interview data and questionnaire data validate each other.

In summary, this chapter has revealed some useful information, which will add a lot to later discussion. It is interesting to note how little the information providers, in this context the librarians, really know about end-users' needs, preferences and problems faced in using electronic information resources (and how little work has been put into finding out!). Overall the interviews were successful in gathering additional in-depth data about end-users' perceptions and librarians' views on the research topic. The information collected via this approach complements, corrects, and reinforces data collected through the questionnaire survey (as discussed in the previous chapter - Chapter five). In the next chapter these outcomes are discussed along with the questionnaire results and other evidence gathered from the literature review.
CHAPTER 7

DISCUSSION OF RESULTS

7.1 INTRODUCTION

The aims of this study, as stated in the first chapter are to investigate the library end-users' perceived training needs and their preferred training methods in using electronic information resources in the public university libraries in Malaysia. This research used both quantitative (questionnaire) and qualitative (interview) methods to collect the relevant data. Questionnaires were self-administered by both students and academic staff in the targeted universities. In-depth interviews were also conducted on a small sample of respondents to gather qualitative data in order to complement the quantitative data collected through the questionnaires. In addition, the librarians responsible for training were also interviewed in order to gather their opinions about end-users' training needs and also to verify the information gathered through the questionnaire concerning their end-user training programmes.

This chapter integrates the results of the questionnaires and interviews as presented in Chapter 5 (Questionnaire) and Chapter 6 (Interviews) and provide explanations of the findings in light of the previous research findings taken from Chapter 3 (literature review). The results are presented according to the research objectives of this study. For some of the issues discussed here background data on Malaysia as presented in Chapters 1 and 2 are taken into account. Prior to the main discussion, some comments on certain demographic variables are presented first.
7.2 DIFFERENCES AND SIMILARITIES IN RESPONDENTS' BACKGROUND

7.2.1 Gender distribution

The two groups of end-users in this study are students and academic staff. Differences have been found relating to gender amongst these two groups. In the student group, the distribution was fairly even with the female category slightly larger than the male category. The pattern reflects the gender situation in many public universities in Malaysia. The more recent statistics showed that overall there was 42% male and 58% female students in the public universities in Malaysia (Kaur and Choo, 2000). The policy of the Government has been always equal opportunity in education regardless of gender. As for the academic staff, there were more male than female staff, and this reflects the actual composition in many public universities in the country. This pattern may change in a few years time in view of the fact that more female students are graduating from local universities and joining the local academic job market.

7.2.2 Academic disciplines distribution

In this study two broad academic disciplines were chosen. They were (a) social sciences; and (b) sciences and engineering. Similarities were observed between the two groups of end-users. The majority of both students and academic staff were from the social sciences. The pattern reflects the situation in many local public universities in the country. Nevertheless, this pattern is slowly changing due to the Government policy presently, which places more emphasis on science and technology subjects. With the establishment of the country's Multimedia Super Corridor (MSC), the emphasis is now on technology-related subjects (Rahman, 1997). Many new private universities and colleges are now offering courses in science and technology. The public universities are also urged by the Government to increase their intake of
students in science and technology courses (Najib Abdul Razak, 1998). Malaysia needs an IT-literate workforce to carry out the MSC mission and objectives; presently it is facing a shortage of IT-literate and knowledge workers and it has to employ foreign knowledge workers to work in the MSC (Reid, 1998).

7.2.3 Relationships between certain demographic characteristics and ability to use electronic information resources

Correlation results showed that there were no statistically significant relationships between certain academic staff demographic characteristics (work experience, academic qualifications, gender and subject disciplines) and their ability to use electronic information resources (at the 0.05 level of significance). Hence, demographic factors need not influence the planning and design of training programmes for academic staff. By contrast, significant correlations exist between students’ demographic characteristics (year of study, status, gender and subject disciplines) and their ability to use electronic information resources (at the 0.05 level of significance). These factors need to be considered when planning and designing training programme for students.

7.3 PREVIOUS SKILLS AND KNOWLEDGE IN USING INFORMATION TECHNOLOGY (IT) FACILITIES

One of the objectives of this study is to determine the differences and similarities between students and academic staff in terms of their previous skills and knowledge in connection with IT facilities. These have a direct relationship with the current skills and knowledge needed to use the electronic information resources. As Watson (1998, p. 396) argues, “many students at present need to be taught basic IT skills before they can begin to take
advantage of the new resources…students need to be computer literate and information literate.”

The results of this study revealed that both students and academic staff claimed to have Internet skills. However, a statistically significant difference was observed between the two groups. The percentage is higher for the academic staff in terms of Internet skills than the students. This is to be expected as the academic staff have been exposed to the Internet far longer than the students, and generally they have better and easier access to the Internet than the students. The proportion of academic staff that possessed Internet skills (42.6%) is not encouraging, however.

In the case of students, about a quarter possessed Internet skills. This means that about three-quarters of them had not been exposed to the Internet either at schools (both primary and secondary) or at home. This is not surprising as many schools in the rural areas in Malaysia still do not have access to computers and the Internet. As mentioned in the earlier chapter (Chapter 2), computer literacy was only introduced in selected secondary schools (sixty schools) in the rural areas in 1994. Students were then taught how to use some computer applications programmes such as word processing, databases and spreadsheets. In 1995 the Ministry of Education introduced the Jaringan Pendidikan or National Education Network, a pilot project involving fifty (50) secondary schools throughout the country that provides access to educational information within and outside the country via the Internet. However, the pilot project did not cover every secondary school in the country, particularly schools from the rural areas.

The government’s idea of “smart schools” only started in 1996, but its implementation was delayed due to several factors; the most significant being the East Asia economic crisis, which hit the country between 1997 and 1998.
The impact of the economic crisis on the country's development has been discussed earlier in Chapter 2.

With regard to computer skills held previously by students and academic staff, the survey results showed that similarities exist between them. The majority of students (77%) and academic staff (80%) claimed that they had computer skills. Earlier findings concerning the use of CD-ROM resources in Malaysian academic libraries (Majid, 1998) found that end-users had low computer skills. The current study did not seek to measure the degree of computer skills; it simply investigated whether respondents have computer skills. The earlier findings by Majid (1998) are not therefore, directly comparable.

The majority of students and academic staff in this study may have computer skills; however, having computer skills is one thing and knowing how to use electronic information resources is another. It takes more than just having the computer skills in order to access and use electronic resources effectively and efficiently. This point is emphasised by Dupuis (1997 p. 98) as she describes the situation in an American university library,

"Although college students may arrive at our libraries with increased computer skills, their knowledge of electronic information may be lacking...as more people gain computer skills at an early age, they will be more familiar with the keyboard and general use of computers leads some people to falsely believe that they also know how to effectively use all the electronic resources accessible through that medium."

Having computer skills alone is not enough for students to make effective and efficient use of electronic information resources available; however, the possession of such skills is an important preliminary to exploiting these
electronic resources. Previous studies (Koohang, 1986; Majid and Abazova, 1999; Ochs et al., 1991; Perry, 1995; Vander Meer, Poole and Van Valey, 1997) support this argument. In addition to having computer skills, end-users also need to possess information and library skills.

With regard to information and library skills, the results showed that there is a statistically significant difference between academic staff and students. The majority (73%) of academic staff had information and library skills as compared to about one-third of the students. The possible explanation for this could be that academic staff had gone through many stages of education and training before embarking on their present career and they may have, over the years, acquired information and library skills at their colleges and universities.

As for the students, they had only experienced school education where they may not have been adequately trained in these skills. This view is supported by a previous study (Osman, 1993) concerning Malaysian school libraries which found that primary school pupils were not adequately trained to use school libraries or resource centres.

It is expected that when primary school pupils entered secondary schools they would have acquire these skills. However, the results of this study showed that this was not the case as the majority of students still lacked information and library skills. There are three possible explanations. Firstly, secondary school pupils had not received adequate training in information and library skills (as described by Osman, 1993). Secondly, secondary school pupils may not have been able to recall the information and library skills taught to them earlier in schools. Thirdly, the university library environment is different to the school library, so the students might think that what they had learned earlier does not apply in the new environment. With regard to the second and third explanations, Malley (1984) makes similar observations in his work concerning
information skills teaching. Hence, it can be concluded that students may need a whole range of information and library skills training at the university level.

Respondents had a range of IT skills. The majority of respondents in this study had knowledge of using word processing and Windows. About half of the respondents had knowledge of using spreadsheets and e-mail. However, more than half did not have knowledge of using graphics, databases, Listserv (discussion lists) and FTP. This suggests that the majority of respondents may require comprehensive training in handling and using some of these IT facilities.

There were some variations in the levels and types of skills in different groups. Statistically there was no significant difference between students and academic staff in terms of their previous knowledge in using IT facilities such as word processing, e-mail, graphics, databases, and FTP. However, significant differences were observed in three other categories of IT facilities - Windows, Listserv and spreadsheets (at 0.01 and 0.05 level of significance). The percentage of students who knew how to use these three categories of IT facilities is larger than the academic staff. Many students revealed that they had learned to use these IT facilities through trial and error (self-learning) and also from their friends. A previous study by Wee (1999) tends to support this finding. She found that many secondary school pupils in Kuala Lumpur, Malaysia learned how to use the Internet through self-teaching and learning from friends.

### 7.4 KNOWLEDGE AND ABILITY TO USE ELECTRONIC INFORMATION RESOURCES

The reported level of current knowledge and skills is encouraging. The results reported here are based upon respondents own evaluation of their knowledge,
skills and abilities. They need to be viewed in that light since the research did not entail any verification of their assessments of themselves.

Out of four categories of electronic information resources, knowledge and ability to use the Internet were highest, and then followed by CD-ROM, OPAC, and online databases. The Internet was very popular among students and academic staff in the three public universities. The majority of respondents used the Internet for searching information and sending/reading their electronic mail (e-mail) as indicated by the questionnaire data. The results match findings by Ray and Day (1998), who found that the Internet and CD-ROM were the two most popular electronic information resources among students in the UK universities. The current knowledge and ability to use OPAC were found to be good among respondents, especially academic staff (above 67%). This confirmed the findings by Majid and Abazova (1999) concerning knowledge of OPAC of academic staff in the International Islamic University Malaysia (IIUM).

The results also revealed that students and academic staff differ very significantly in terms of their current knowledge and ability to use electronic information resources. Overall, academic staff were more knowledgeable and better (ranges from 'adequate' to 'very good') than students in all four categories of electronic information resources. It may be that academic staff read more widely and explore more information resources in the course of their work. Moreover, there is an expectation that they will do so. On the other hand, the reading habits of Malaysian students, especially undergraduates are still lacking.

Another reason for students' poorer knowledge of electronic resources may be lack of awareness. Students can hardly develop competence in areas in which they have no experience or awareness. Previous studies (Adam and Bonks,
1995; Clausen, 1997; Eager and Oppenheim, 1996; Fidzani, 1998; Hashim, 2000; Majid, 1998; Majid and Kassim, 2000; Majid and Mansor, 1996; Moyo, 1996) have all identified lack of awareness about electronic information resources as a barrier to usage.

Making end-users aware of the electronic resources available in the library is therefore very important. Greater effort must be made in publicising and promoting them to new and existing library users. Electronic information resources represent a significant investment in many academic libraries (Fecko, 1997) and libraries must justify this investment by ensuring that the electronic resources are being utilised fully by the library users.

The findings of this study revealed that the libraries surveyed were quite successful in promoting new technologies to the academic staff, but less successful in doing so to students. The findings showed that what most students knew about electronic information resources had been gathered from the media such as radio, television and the Internet, rather than libraries. Hence, libraries must find new ways to reach out to students within and outside the campus. One possible way is by utilising the library Web page to promote electronic information resources to students, since they (students) reported that they learned about electronic information resources from the electronic media. Fecko (1997) notes that the library Web page is an ideal platform for promoting and marketing the library electronic resources and services. This technique has been used in many academic libraries in the West, such as the United States and United Kingdom (Rhodes and Chelin, 2000; Tobin and Kesselman, 1999; Xiao, Mosley and Cornish, 1997).
7.5 END-USER SEARCHING OF ELECTRONIC INFORMATION RESOURCES

The majority (64.3%) of respondents claimed that they obtained what they needed when searching electronic information resources, and this is quite gratifying. Slightly more than one-third of the respondents however, reported that they “sometimes” and “never” got what they were looking for when searching electronic information resources. This number is quite worrying and deserves serious attention. It raises the question of whether library staff should be doing more to guide and instruct users to search for information more effectively and efficiently.

It is however suspected that many searches carried out by end-users are incomplete, inefficient and excessively time-consuming (Peters, 1996). This point is demonstrated in a study carried out by Lancaster et al. (1994), which found that end-users’ searches of CD-ROM databases retrieved only one-third of the items retrieved by a highly experienced searcher on the same topic. Ray and Day (1998) cautioned that the issue of users’ opinions of satisfactory results must be approached with care, as satisfactory may have a different connotation in the mind of users, than the mind of the librarians. Brophy (1993) argues that electronic information resources are deceptively easy to use but more complex than most users realise. Further discussion about the problems faced by end-users appears in the next section.

7.6 PROBLEMS FACED IN USING ELECTRONIC INFORMATION RESOURCES

The questionnaire results showed that the areas where most respondents (students and academic staff) faced problems are executing file transfer protocol (FTP), formulating correct search strategy, selecting suitable CD-
ROM databases, and using Boolean operators (AND, OR, and NOT). In these four areas, the proportion of respondents having problems is noticeable (from about one-third to almost half).

Other areas in which they also faced difficulties are: downloading search results, using subject headings, interpreting and evaluating search results, using search engines, using keywords, and using field searching. However, the percentage of respondents having problems in these areas is relatively low (not more than one-quarter). The areas in which a number of respondents (almost half) ‘sometimes’ faced problems are interpreting and evaluating search results, using subject headings and using keywords. Even though they did not face these problems frequently, the percentage of those that experienced difficulties in these areas is of concern.

The interview results revealed that students encountered problems pertaining to CD-ROM and online databases, the selection of appropriate CD-ROM databases and information retrieval via the Web. Some academic staff also encountered problems pertaining to information retrieval via the Web. Bao’s (1998) survey of the Internet users in one university library in the USA also found that students and faculty members encountered problem of too many hits when searching the Web. The problem could be overcome if end-users know how to narrow their searches by using certain advanced features embedded inside the search engines.

The IT infrastructure came in for criticism. Both students and academic staff interviewed complained about the lack of sufficient workstations in the libraries. The librarians interviewed confirmed that insufficient computer facilities for end-users in their libraries was an issue. In addition, the respondents also claimed that the universities’ servers were very slow. Mathews (1997) also found that her respondents encountered the same problem
during training in using the Internet in the UK. The students also complained about the time allowed by the libraries to use the Internet workstations, which is rationed to half an hour per person. They (students) wanted more time for using the Internet.

The librarians interviewed claimed to be unaware of other problems faced by end-users. They thought that their library users do not face problem in using the available electronic information resources. Clearly the findings of this study demonstrate otherwise. This lack of awareness of end-users’ problems pertaining to electronic information resources needs to be addressed. There is a need for librarians to become more attentive to end-user issues. It may be appropriate for instance, for library professionals to conduct user studies in order to determine end-users’ problems and training needs as recommended in the literature (Anwar, 1998; Luban, 1974; Lwehabura, 1999). Lack of knowledge about end-user training needs and problems may result in poor decision making when designing a training programme. The end result could be a programme that is not based on the actual end-users’ needs, but based on the librarians’ perceptions of users’ needs (Tiefel, 1995). This could lead to a misdirection of efforts and resources.

The results of this study also revealed that many respondents lack the knowledge of formulating a correct search strategy. The results are similar to the findings of previous studies by Allen (1990), Bruce (1992) and McCarthy, Krausse and Little (1997), who found that end-users lacked basic knowledge of search strategies. Mischo and Lee (1987) in their review of literature concerning problems that end-users usually encountered when searching remote online databases and CD-ROM databases also noted issues about the search strategy formulation. This problem becomes more serious when end-users are faced with a diversity of software interfaces used by different database publishers or vendors. The specific techniques learnt in searching one
interface may not be transferred easily to another interface unless the user is aware of the underlying principles involved in formulating a search strategy (Day, 1994). Knowledge of search strategy is, therefore, very important and should be acquired by every end-user in order to use electronic information resources effectively.

Both the interview and questionnaire data revealed that end-users, especially students, faced problem in selecting appropriate sources (databases) for doing their assignments. The finding is parallel with previous studies by Critchley (1992), Diaz (1997), and McCarthy, Krausse and Little (1997). Critchley (1992) found that most end-users do not know what information the CD-ROMs contain and as a result they find it difficult to select appropriate sources and may search the wrong disk. Diaz (1997) stated that one of the factors that is most significant in enhancing or deterring user success in a networked environment is the selection of an appropriate database. McCarthy, Krausse and Little (1997) concluded that end-users lacked the basic knowledge to choose the right databases. Mischo and Lee (1987) also acknowledged this problem in their review of library literature entitled 'end-user searching of bibliographic databases' in the Annual review of information science and technology (ARIST). Librarians can assist end-users in making well-informed decisions concerning electronic information resources by making available to users all necessary information pertaining to these resources either through face to face support, library exhibitions or library notice boards. For example, library staff could produce a complete list of titles of CD-ROM available for end-users to view. Displaying the titles, subjects and brief contents of the CD-ROM would help end-users to select from a wide variety of CD-ROM databases available in the library.

Some of the problems concerning end-users could be overcome by making the library systems easier to use, for example, by having proper documentation and
description of information sources as well as clearer signage in the library. This might decrease the need to have to ask simple questions on the part of the end-users. The result of the questionnaire survey suggested that about one-third of the respondents did not ask for assistance when searching for information. They either knew how to search or simply did not want to ask questions.

Another difficulty faced by end-users in connection with using electronic information resources is executing file transfer (FTP). FTP is one of the Internet tools that allow moving files from one computer to another via the networks. In the early period of the Internet, end-users need to know FTP in order to transfer or download files from remote sites on the Internet. The procedure involved in executing FTP is quite complex for novice users; hence, many of them faced difficulties in executing it. However, file transfer or downloading has now been made simpler by using the Web browsers such as Microsoft Internet Explorer or Netscape. These Web browsers allow end-users to access and download information or transfer files from any remote computers connected to the Internet. Nevertheless, knowledge of how to use the browsers is needed before end-users can perform any file transfer or download files from remote sites on the Internet. Today there are various Web-based user-friendly software packages that can perform the task of file transfer or FTP. The knowledge of executing file transfer is still relevant and important for end-users when they need to transfer very large files from remote websites or databases to their computers in an efficient way.

Not all issues relating to IT resources demand training. Some problems that are not directly related to information retrieval such as insufficient workstations, limited time allowed for using the Internet facilities and the problem with the university’s server, require no training at all because these problems can be resolved through other ways. For example, the problems of insufficient workstations and the slow speed of the university’s server can be tackled by the
library managers or the relevant university authorities. The problem of limited time allowed for students to use the Internet can be resolved by the library professionals by amending their in-house usage policies. Although these problems are administrative, they impinge on the way in which end-users develop their skills. It can be argued that poor access impairs the build up of experience in using electronic information resources and removed end-users' confidence in the system.

The results of the interviews corroborate the results of the questionnaire survey, and both results taken together provide a clear picture of the situation. From the findings of this study it is apparent that both groups of end-users needed guidance and training in handling electronic information resources, and also need to be well informed about new changes and developments concerning electronic resources.

### 7.7 TRAINING IN USING ELECTRONIC INFORMATION RESOURCES

From both the questionnaires and interviews it was found that the majority of respondents did not receive formal training in using electronic information resources. About three-quarter of the respondents did not receive training on online databases and OPAC. More than half did not receive training on CD-ROM and the Internet. The result is consistent with earlier findings by Majid (1998) who found that less than 10% of the total university population in Malaysia had attended CD-ROM training. Since attendance at the training offered by most libraries is voluntary, this could be a reason for these low figures.

According to the data gathered from the interviews, some of the training provided by the library was based on requests from the academic staff and
individual students or group of students. In addition, the libraries also provide regular training sessions for users, normally students. It was also observed that one of the libraries charged end-users for the Internet training. It may be argued that charging end-users for any kind of library training may not be a good idea, as it may discourage them from attending library training that is likely to benefit them. Even the “free training” provided by the library is poorly attended. The attendance is likely to degrade further if users are asked to pay for training provided by the library. On the other hand, the library’s idea of asking end-users to pay for training may make users (students) value the library training session and not take things for granted. A lot of staff time and other resources are being invested in providing the training sessions.

Many student respondents learn to use the electronic information resources from their friends. Kaczor and Jacobson (1996) and Ray and Day (1998) discovered similar practices in earlier studies. Learning from friends may have its drawbacks because learners get a second hand and inadequate account of how to use the resources and services from somebody who probably has had no better introduction to the resources and systems themselves.

7.8 CURRENT TRAINING METHODS USED IN THE THREE SELECTED UNIVERSITIES

The questionnaire survey showed that the training methods used for training end-users in the three selected university libraries (UKM, IIUM, and UMS) were classroom lectures/demonstrations, one-to-one instruction, group sessions, computer-assisted instruction (CAI), and printed instructions or guides.

The information gathered from the interviews with the librarians (responsible for training) from the three university libraries revealed that the training
methods used were classroom lectures (followed by hands-on practices), library workshops (with hands-on), group training sessions and one-to-one training methods. The results are generally in line with the results of the questionnaire survey except for computer-assisted instruction (CAI). According to the librarians interviewed computer-assisted instruction (CAI) has not been used in their libraries yet. This raises the question of why did the respondents in the questionnaire survey select this option? The possible explanation for this is that they (respondents) might have misconstrued CAI as learning experience they had with computers, either on their own or with friends.

The findings showed that classroom lectures, followed by hands-on practical exercises were the principal training method used in the three university libraries. This finding is almost similar with the findings by Hopkins (1999) who found that the most popular delivery methods for user education in 61 academic institutions in the UK were verbal presentations followed by demonstrations of electronic sources and library tours.

It is suggested that the training methods currently practised in the three university libraries be maintained. This is because each individual user has different style of learning, it is therefore, appropriate and sensible to offer a variety of methods to cater for individual preferences. To this end, an innovative training method based on current technology can be added to supplement and diversify the current training methods so that end-users have a wider option of training methods. Some authors in the literature advocate that the most successful training solution for end-users is an integrated solution, which employ both people and technology (Henley, 1992; Wielhorski, 1998).
7.9 PREFERRED TRAINING METHODS

The questionnaire survey results revealed both similarities and differences between the two groups of end-users (students and academic staff) in terms of the preferred training methods. Similarities were found in their preferences for one-to-one training method as their first choice. The majority (58.4%) of the respondents preferred one-to-one instruction. This finding supports earlier findings by Allen (1990) and Manzari (1998) who also found that one-to-one instruction was the most preferred method by the library users.

Evidence in the literature indicates that the one-to-one training method is the most widely used and popular method of instruction (Barrett, 1995; Steele and Tseng, 1992; Tenopir and Ennis, 1998; Wielhorski, 1994). Mischo and Lee (1987) reviewed LIS literature in ARIST and they reported that earlier studies showed that one-to-one training and computer-assisted instruction (CAI) appeared to be the most effective for teaching online database searching.

One-to-one instruction may offer a flexible, immediate, interactive and effective method of instruction especially when teaching CD-ROM and online database searching (Barrett, 1995). Novice users may feel comfortable asking questions and the training session may be tailored to meet individual needs. However, this method of training is very resource intensive and time-consuming for the library staff and is not very practical all the time. Day (1994) claims that it is not very cost-effective.

Differences were found between students and academic staff in the second choice of training method. Students preferred CAI, while academic staff preferred library workshops. CAI reflects an 'individual' mode of learning and it has similar characteristic to one-to-one instruction. Previous studies (Adams and Bonk, 1995; Cannon, 1994) concerning academic staff use of electronic
information resources found that workshop or hands-on training was the most preferred training method by this group of end-users. The interview results showed that about half of the academic staff preferred workshop with hands-on training.

Overall in terms of percentage, other preferred training methods such as CAI (45%), classroom/group demonstrations (43.3%) and workshop with hands-on (42.4%) show very little differences and statistically not significant. This means that all these methods have a valid place in training of end-users. It is therefore, most appropriate for libraries to provide a variety of training methods so that end-users can choose the one that suits them. Several studies in the past (Hopkins, 1995; 1999; Kaplowitz and Contini, 1998; Levy, Fowell and Worsfold, 1996; Rhodes and Chelin, 2000) have shown that a combination of training methods works best for academic libraries.

If resources allow, it is clearly desirable that libraries continue to provide one-to-one training to their end-users as this is their first choice of training method. At the same time the libraries should try to design and develop other training methods that have the quality of one-to-one instruction to supplement the present one-to-one training with librarian. This can be accomplished by utilising the existing information technology and networking facilities to create an individualised and interactive training for end-users such as Web-based training.

Web-based training can be an effective training tool for training end-users to use electronic information resources in an academic library. This method has been practised in many academic libraries in the West, such as the USA, UK, Europe and Australia. Some of the examples of the Web-based training include, the Teaching with Independent Learning Technologies (TILT) Library project at Glasgow University (Creanor and Durndell, 1994), EDUCATE -
Networked end-user education programme at Chalmers University in Sweden (Thomasson and Fjällbrant, 1996), and the Ohio State University Gateway system in the USA (Tiefel, 1995).

It is also appropriate to continue the present methods of training to accommodate the different learning styles of individual user. These include: classroom lectures, library workshop, one-to-one instruction, group sessions and printed instructions. Moreover, the present training methods can accommodate the needs of library users that have no experience in using the Internet or have no Internet connections at home or in the office. These people are not in a position to take advantage of a Web-based training method.

7.10 TRAINING NEEDED BY END-USERS

The findings from the interviews (Chapter 6) and the questionnaire survey (Chapter 5) revealed that students and academic staff wanted training in the following areas:

- Electronic information resources (OPAC, CD-ROM, online database, Internet, and electronic journals/publications)
- Basic computer skills (including word processing)
- Advanced IT skills (including HTML, Java language, FTP, create a Web page, and Web search engines)

The librarians interviewed perceived that end-users needed training in three broad areas as follows:

- Computer skills
- Internet skills (include search engines)
Chapter 7 Discussion of Results

- Information and library skills (include search strategy, Boolean, truncation, and advance OPAC search techniques)

The types of training needed by the end-users as revealed by this study are almost identical with the skills required by end-users in using electronic information resources indicated in the literature review (Chapter 3). These skills are:

- Basic computer applications,
- Information retrieval,
- Internet or networks, and
- Critical evaluation of electronic information resources.

The main problems faced by students and academic staff as identified earlier in Section 7.6 were:

- Executing file transfer protocol (FTP),
- Formulating correct search strategy,
- Selecting suitable CD-ROM databases, and
- Using Boolean operators (AND, OR, and NOT).

The opinions and judgments made by the librarians interviewed concerning students’ training needs correspond with the problems faced by students and to some extent with the students’ own perceptions of their training needs.

As discussed earlier in Sections 7.3 and 7.4, the majority of students and academic staff lacked Internet skills. Besides, their working knowledge of certain IT facilities such as FTP, Listserv/discussion group, databases, graphics, and e-mail was poor. The students, particularly, lacked information and library skills. With regard to the knowledge and ability to use electronic information
resources, even though a majority of the respondents have the knowledge and ability to use them, quite a substantial of respondents lacked knowledge and ability to use OPACs and online databases. This deficiency needs to be addressed, as there should not be any user being disadvantaged due to lack of knowledge or ability to use these electronic resources.

On the whole, it can be concluded that students and academic staff needed training in three broad skills as follows:

- Computer skills (example, using word-processor)
- Internet skills (example, using Web search engines)
- Information and library skills (example, formulate a search strategy)

The three broad skills mentioned above can be further classified to match individual level of knowledge and skill required. These skills can be divided into two levels: i) basic; and ii) advanced. This approach has been discussed and suggested by many authors in the LIS field (Henley, 1992; Hu, 1996; Majid, 1998; Moyo, 1996). Detailed discussion of this approach is given in the next section.

The earlier sections have discussed the skills and knowledge concerning IT previously held by respondents, their knowledge and ability to use electronic information resources, the problems faced in using electronic information resources, the training methods used in the libraries surveyed, the training methods preferred by respondents, and the training needed as perceived by both groups of respondents. Sufficient information has been gathered from this study concerning end-users training needs and preferred training methods. Based on this information, it is therefore, appropriate to suggest a general framework of end-user training programme in the next section.
7.11 GENERAL FRAMEWORK OF TRAINING PROGRAMME

The findings of this study showed that students differ in their abilities to use electronic information resources. They vary according to certain demographic characteristics such as year of study, status, subject disciplines and gender. Because of these differences it is practical to design a training programme (especially for students) that takes into account these factors. By contrast, data regarding academic staff do not vary according to demographic characteristics, so their training programmes can be designed more generally. Both groups of respondents indicated that they wanted training at both basic and advanced levels in relation to IT skills and electronic information resources. It is therefore, appropriate to suggest that the contents of the training programme be designed and developed at both basic and advanced levels. This is consistent with the suggestions made in previous studies (Majid, 1998; Moyo 1996), which mentioned that end-user training programmes should have more than one level to accommodate different users' training needs.

The following describes a general framework for end-user training programme. It is presented in two parts: i) Programme content; and ii) Training methods.

7.11.1 Programme Content

Based on the respondents' training needs identified earlier, it is suggested that the content of the training programme should consists of a basic programme and an advanced programme. The contents for both levels - basic and advanced - are described as follows:

**Basic programme**

The contents of the basic programme may include the followings:

- How to construct a search strategy;


- How to search OPACs;
- How to search online databases;
- How to select a suitable CD-ROM databases;
- How to search CD-ROM databases;
- How to use Web browsers, e-mail and Listserv;
- How to search the Internet using search engines, ‘URL address’, and subject directories;
- How to manage computer files (open, save, close); and
- How to evaluate critically the information retrieved.

Advanced programme

The contents of the advanced programme may include the followings:

- Information retrieval skills using Boolean and Proximity operators;
- Undertake complex searches for information on the Internet;
- Downloading files using FTP;
- Advanced computer skills - for examples, HTML and Java;
- Using applications software such as Microsoft Access (database), Excel (spreadsheets), and PowerPoint (graphics); and
- Advanced Internet skills - Create Web pages using applications software such as Microsoft FrontPage.

The programme content as outlined above involves two aspects: i) Knowledge of electronic information resources; and ii) Skills needed to locate, select, evaluate and use those electronic information resources. These two aspects - knowledge and skills - are highlighted in the literature by several authors (Henley, 1992; Lancaster and Sandore, 1997; Tenopir, 1995).
Hu (1996) describes knowledge of electronic information resources as follows:

- Knowing the range and uses of electronic information resources;
- Understanding the role and use of electronic information resources in problem solving; and
- Knowing and understanding the system, by which electronic information resources are created, managed and made available.

While skills in using electronic information resources may include:

- Computer skills - to understand and operate computers which are interfaces between electronic information resources and end-users;
- Internet skills - to navigate networked information resources, using Web browsers, email, FTP, Telnet, and so forth; and
- Information and library skills - to locate, select, evaluate and use electronic information effectively.

These three skills are very essential for end-users to acquire in order to use electronic information resources effectively and efficiently. Library instructors must take into account both aspects - knowledge and skills - when conducting training programme concerning electronic information resources.

7.11.2 Training Method

The content of the training programme prescribed earlier in Section 7.11.1 can be delivered in a number of ways, such as classroom lectures, workshops/seminars, one-to-one, point of use (printed guides) and computer-assisted instruction. A new approach can be prescribed to complement and enhanced these methods that is Web-based training (WBT). WBT shares attributes with one-to-one and point of use (printed guides) training method, but the nature of the medium is distinct from these two methods. It is free from
time and space constraints, and it is well adapted to the needs of end-users who prefer an individual learning style whether at home or on campus (Kaye, 1989). WBT is interactive and flexible and can be structured to provide information at different levels of detail to meet particular situations (Kirby, Liddiard and Moore, 1998). The benefits and drawbacks of WBT have been discussed earlier in Chapter 3.

The reason for suggesting WBT is that the present one-to-one training with librarian is not cost-effective and very demanding on the library resources, especially when there are very few librarians available. This is particularly acute in the case of the Malaysian public universities where most university libraries have very few librarians in-charge of end-user training. For example, one of the libraries surveyed - UMS - has only one librarian in-charge of user training.

As new students enter the universities they require lots of support and training in locating the information resources needed for their coursework. It has already been pointed out that school leavers who enter public universities are not well equipped with IT skills and information skills, therefore they need assistance from the librarians in searching and locating the needed information for their assignments and term papers. Hence, library staff are faced with the challenge of providing support and training to new students, but with the same amount of resources. The library staff are under great pressure to provide the best services to their clients. By using Web-based training, it is possible to train a large number of students at any one time without incurring any extra cost on the part of the library (Xiao, Mosley and Cornish, 1997). However, it is recognised that the initial set up cost of WBT is substantial, which include the cost of courseware or authoring tools, hardware, staff time and expertise; but the investment will produce benefits in the long run. Moreover, it can be claimed that students would readily take to this method of training as evidenced
in this study when they selected CAI as their second choice of training after one-to-one training method.

### 7.11.3 The Appropriateness of Web-based Training (WBT) in the Context of Malaysian University Libraries

The proposed general framework of end-user training programme can be practically implemented and use in the Malaysian public university libraries. This can be made possible by looking at two broad issues - people and facilities. As regard to people, particularly the end-users, the findings of this study revealed that a majority (78%) of the respondents has computer skills. This skill is a prerequisite to learning how to use WBT. Furthermore, the majority of respondents has the knowledge and ability to use Internet resources as indicated by the questionnaire results. Although the respondents, especially students may have never experienced training via the Web, it may be argued that they will easily and quickly learn the new method since they like to experiment with new technology on their own.

The responsibility of providing WBT can be shared between the library staff and the computing centre personnel of the respective universities. The collaboration of libraries with other technology units on campus has been a trend in academic libraries in many developed countries such as the USA (Daghita, et al., 2000; Vander Meer, Poole, and Van Valey 1997), the UK (Creanor, Durndell and Primrose, 1996) and Sweden (Fjallbrant, et al., 1997). Academic libraries are increasingly adopting new technologies; therefore it is appropriate for librarians to collaborate with computer professionals in the university to deliver the training to the end-users.

With regard to facilities, the infrastructures for campus-wide networks are already in place for these three universities - UKM, IIUM, and UMS. Within
the university campuses the Web is already available at various access points, including the library, computer laboratories, offices, and, to a limited extent the students' residences. Those who have Internet access at home can also use WBT. It is clear from the above discussion that WBT is feasible and could be designed and developed by making use of this network facility.

Prior to the implementation of WBT, local public universities need to address several issues highlighted in the findings of this study. Firstly, the quantity of computer workstations need to be increased within the campuses (including offices, computer laboratories, and students' hostels) and inside the libraries to enable wider and better access to WBT; and secondly, the university network servers need to be upgraded so that they have higher or bigger bandwidth that will enable digital images, texts, audio, and video to be downloaded or uploaded at a faster rate.

The libraries can offer WBT in various ways that are deemed suitable for their end-users. For example, the local library homepage can provides linkages to other ready-made training materials or modules from other locations on the Web as suggested by Begum and Wong (1999). Preferably the local university libraries should develop their own training resources that are tailored to their local users' needs rather than outside training resources. They can also add outside training resources to offer greater choice of resources to their end-users.

Local university libraries can design and develop modular training programmes that would enable end-users to learn according to their chosen modules. This type of training programme can allow users to select the module that they wish to learn and pass by modules that they already know. It also provides users with some flexibility in learning, and this may suit their learning needs and styles. Local university libraries can develop specialised training modules concerning electronic information resources at two different levels - basic and
advanced - and offer them to their end-users. End-users can choose to go straight to the advanced level if they have already covered the basic level. This approach would be more appealing and could motivate them to learn further. Some examples of the modules that library can develop are given below:

- how to search OPACs
- how to search CD-ROM
- how to search online databases
- how to search the Internet
- how to construct search strategy
- how to evaluate electronic resources

7.11.4 Maintaining Current Training Practices

Web-based training is a good alternative to the present one-to-one training method, but it should be borne in mind that one-to-one instruction with a librarian is still needed, especially by those who lack IT skills. Furthermore, it is beneficial for the libraries to maintain direct contact with their library users in order to maintain public rapport. It also facilitates acquiring immediate face-to-face feedback on matters concerning library services and problems that are faced by end-users.

It is worth continuing existing training methods such as classroom lectures, library workshop (hands-on training), group sessions and printed instructions to accommodate the different learning styles of individual user. Existing training methods can accommodate library users who have no access to campus networks from home and are therefore unable to take advantage of Web-based training methods.
7.12 CHAPTER SUMMARY

This chapter has discussed important issues about end-users' training needs, the problems that they face, and their preferred training methods. A general framework of end-user training programme based on the results of the study has been proposed. The next chapter will present the summary, conclusions, recommendations and suggestions for further research.
CHAPTER 8

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter contains a summary of the study, conclusions, recommendations based on the findings of the study, and suggestions for further research.

8.1 SUMMARY OF THE STUDY

The growth of electronic information resources in most academic libraries in Malaysia today increases the importance of, and the need for training to enable library end-users to take full advantage of the new opportunities available to them. Electronic information resources are a significant investment in many libraries; it is therefore, imperative that library end-users are able to access and use them effectively and efficiently. In order to achieve this, library end-users need information skills training. Prior to conducting end-user training, the questions raised are: i) what are their training needs? and ii) what training methods do they prefer? The answers to these questions are very important and can lead to the proper planning and design of a training programme that meet end-users’ training needs.

8.1.1 Objectives of the Study

The summary of the research findings is presented according to the research objectives of this study as follows:
The first objective of this study was to identify the perceived knowledge and skills concerning IT facilities held previously by end-users (students and academic staff). This study found that generally both groups of end-users possessed knowledge in using certain IT facilities such as Windows, word processing and spreadsheets. However, many of them (more than half) do not have knowledge of how to use other IT facilities such as e-mail, graphics, databases, Listserv (discussion group), and FTP (file transfer protocol).

With regard to the skills previously held by both groups of end-users, it was found that the majority (more than 70%) of respondents claimed having computer skills. However, the majority of students (more than 70%) do not possess Internet skills, and slightly less than half of academic staff possessed Internet skills. Concerning information/library skills, about three-quarter of the academic staff have information/library skills and one-third of the students have information/library skills.

The second objective of this study was to identify end-users' current knowledge and ability to use electronic information resources (the Internet, CD-ROMs, OPACs and online databases). Overall the results showed that the majority of respondents claimed having the knowledge and ability to use electronic information resources. However, the questionnaire results revealed that more than one-third of respondents lacked the knowledge and ability to use OPACs and online databases. About one-third of the students lacked the knowledge and ability to use CD-ROMs.

The third objective of this study was to identify the problems and issues faced by end-users in using electronic information resources. The study found that the areas where most respondents faced problems when using electronic information resources are formulating correct search strategy, using Boolean logic, selecting appropriate CD-ROM databases, executing FTP, using CD-
ROM and online databases, as well as using Internet search engines. Other issues identified are concerned with IT facilities in the three targeted public universities. The students highlighted the problems of insufficient workstations and insufficient time allocated for using the Internet. Both students and academic staff expressed dissatisfaction concerning their universities' network servers. They claimed that the network servers were too slow, and this discouraged end-users from accessing the Internet at the universities.

The fourth objective of this study was to assess the training needs of end-users in connection with using electronic information resources. The study found that both groups of end-users lacked certain knowledge and skills concerning IT and they also faced problems when using electronic information resources. Generally, both groups of end-users needed training in three broad areas as follows:

- Computer skills;
- Internet skills; and
- Information/library skills.

The fifth objective was to identify the training methods preferred by end-users in learning electronic information resources. The study found that more than half of the respondents preferred one-to-one training method. It was the first choice of training method by both students and academic staff. However, academic staff preferred the library workshop as their second choice of training method, while the students preferred computer-assisted instruction (CAI) as their second choice of training method.

The sixth objective of this study was to determine the current training methods practised by the three university libraries surveyed. The study found that all the
three university libraries employed similar methods of training, which are as follows:

- Classroom lectures (with hands-on);
- Library workshop (with hands-on);
- One-to-one training; and
- Printed guides.

The seventh objective of this study was to propose a general framework of end-user training programme. A general framework of end-user training programme is proposed based on the research findings and the literature review. The proposed training programme as discussed in the previous chapter (Chapter 7- section 7.11) consists of two components as follows:

- Programme content
- Training methods

8.1.2 Hypotheses

Four null hypotheses were tested in this study and the results are summarized in tabular form as shown in Table 8.1.
### TABLE 8.1
**A Summary of the Research Hypotheses of this Study**

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hypothesis 1</strong></td>
<td>The test result shows that differences and similarities exist between students and academic staff in terms of previous knowledge and skills of using IT facilities. Hence, the null hypothesis is rejected.</td>
</tr>
<tr>
<td>There is no difference between students and academic staff in terms of previous skills and knowledge of using IT facilities.</td>
<td></td>
</tr>
<tr>
<td><strong>Hypothesis 2</strong></td>
<td>The test result shows that statistically significant differences exist between students and academic staff in terms of current knowledge and ability to use electronic information resources. Hence, the null hypothesis is rejected.</td>
</tr>
<tr>
<td>There is no difference between students and academic staff in terms of current knowledge and ability to use electronic information resources.</td>
<td></td>
</tr>
<tr>
<td><strong>Hypothesis 3</strong></td>
<td>The test result shows that differences and similarities exist between the two groups of end-users in terms of the problems faced in using electronic information resources. Hence, the null hypothesis is rejected.</td>
</tr>
<tr>
<td>There is no difference between students and academic staff in terms of the problems faced in using electronic information resources.</td>
<td></td>
</tr>
<tr>
<td><strong>Hypothesis 4</strong></td>
<td>The test result shows that differences and similarities exist between students and academic staff in terms of the preferred training methods. Hence, the null hypothesis is rejected.</td>
</tr>
<tr>
<td>There is no difference between students and academic staff in terms of the training methods preferred.</td>
<td></td>
</tr>
</tbody>
</table>
8.2 CONCLUSIONS

A detailed perspective of end-users training needs and preferred training methods concerning electronic information resources has been gained from this study. The general conclusions of the study are as follows:

1. Generally, both groups of respondents (students and academic staff) lacked certain knowledge and skills in using electronic information resources. Therefore, they need to acquire relevant skills and knowledge in order to be a competent user of electronic information resources;

2. Demographic factors (work experience, academic qualifications, gender and subject disciplines) of academic staff had no statistically significant relationship to their ability to use electronic information resources. Therefore, these factors need not be taken into consideration when planning and developing training programme for academic staff. Conversely, in the case of students, significant correlations existed between the demographic factors (year of study, student status, gender and subject disciplines) and their ability to use electronic information resources. Hence, they should be taken into consideration when developing training programme for students;

3. The current end-user training methods practised by the three university libraries and a newly suggested training method - Web-based training (WBT) - could all be continued and adopted in future training programme;

4. A newly proposed general framework of training for end-users can be developed (as detailed in Chapter 7 - section 7.11); and
5. The general framework of training incorporates all the training methods preferred by the end-users, and it also provides a layout of programme content for the training programme.

8.3 RECOMMENDATIONS

The following recommendations are made:

1. The findings of this study can be used as a guide in the planning and development of end-user training programme in the three university libraries surveyed and also other university libraries in Malaysia.

2. The university libraries surveyed should increase the number of computers or workstations to accommodate the growing demand in usage of networked resources. Lack of facilities will surely impede skill acquisition on the part of end-users.

3. More time should be given to library users who wanted to use networked workstations inside the library for searching information. This would encourage library users to use electronic resources available in the library.

4. In view of the varying levels of knowledge and skills amongst students, librarians responsible for training should accommodate the differences among students and resist the temptation to think of them as a single homogeneous group. Accordingly, training programme that takes into account different levels of knowledge and skills will has to be developed. In addition to providing lectures and workshops in formal training programmes, library professionals will also need to continue to
offer more individualised support at the point of need, whether in person or electronically.

5. In view of the differences that existed between students and academic staff, a separate training programme for students and academic staff should be provided at both basic and advance levels.

6. All public universities in Malaysia should offer information skills training as part of the core credit course, such as “information literacy” to all new students irrespective of academic programmes. The “information literacy” course can be an integration of various elements such as computer skills, information skills, Internet skills, reading/writing skills and statistical skills. This course should be made obligatory for all undergraduates during their first year of academic studies. The skills that they acquire in the first year of their studies will be beneficial to them throughout the later academic years, or even in their working life. However, this endeavour requires the collaboration of the relevant parties, such as academic staff, librarians and other university’s support staff (for example, computer personnel) to design, structure and teach the course. Most importantly the university authorities must provide full support and backing for this endeavour to succeed.

7. Besides providing training, libraries can assist end-users in making well-informed decisions through awareness programmes. This can be carried out by having regular exhibitions in the library about new technologies available in the library. Libraries can produce and display prominently lists of titles about electronic resources available in their collections. Librarians can make use of their libraries home pages to relay current information concerning electronic resources to their end-users.
8. Library professionals should ensure that library systems are easy to use; it should not have complicated instructions, either in print or on help screens. Librarians could collaborate with the systems personnel in developing user-friendly interfaces and online help screens. User-friendly library systems will minimise the need for user instruction. Libraries can make access to electronic resources and services much easier for end-users by standardize their resources and services and making their OPACs accessible through their library home pages. Library home page can be used as a gateway to the OPACs and other electronic resources subscribed by the library such as networked CD-ROMs and commercial online services. The Web enables end-users to access different forms of media on computer networks in a consistent way, and addresses a variety of software and hardware standardization problems by offering access across different computer platforms.

8.4 CHALLENGES AND EXPECTATIONS

It is expected that in the near future the “smart schools” students will enter higher education institutions equipped with IT skills and knowledge. As library users are increasingly becoming IT-literate, they are starting to appreciate the potential of electronic information resources. Consequently, their expectations of the library resources and services are becoming more sophisticated and posing a greater challenge to the library professionals. In response to this challenge academic libraries and information professionals in Malaysia will have to adapt to the changes brought about by the IT environment and IT-literate end-users.

Besides keeping abreast with changes in the skills and expectations of incoming students, library professionals in Malaysia need to update and upgrade their information skills in handling electronic information resources,
and also improve their knowledge and skills concerning IT in order to provide the technical supports and training needed by the library users.

Future intakes of students to higher education institutions in Malaysia may possess IT skills after completing their schooling at the “smart schools”. This however, does not mean that the instructional and training role of the academic libraries will cease; instead it will continue to grow. New students will still need guidance and support from the academic librarians when faced with the considerable amount of both electronic and non-electronic information that is available in academic libraries. These new students will need information skills training at the higher level. It was reported in the LIS literature that new students who entered university in the United States were found to lack information skills even though they possessed IT skills (Dupuis, 1997). This evidence supports the argument that new students at the higher education institutions still need further training in handling new information resources. Students who possessed basic IT skills would make the work of the librarians much easier. Librarians could then concentrate on teaching information skills, instead of spending time and effort in teaching basic computer skills.

Furthermore, not all new students are fresh from schools; some of them are mature students (studying full-time or part-time) who may not have prior experience in using computers and IT facilities. Academic librarians will have to provide these students with intensive training in both IT skills and information retrieval skills.

8.5 LIMITATION AND DELIMITATION OF THE STUDY

8.5.1 Delimitation

The subjects and population of the study is confined to students and academic staff from two major disciplines: i) social sciences; and ii) sciences and
engineering. It is not feasible to study all disciplines in the three targeted Malaysian public universities due to limited time (three months) allowed by the sponsor to conduct the field work, and also due to limited financial resources.

8.5.2 Limitation

The main data collection method used in this study was a questionnaire, which has both advantages and disadvantages. For example, in any questionnaire survey interested end-users are more likely to reply than negative or neutral end-users, thereby possibly skewing the results. Another limitation is that a non-probability sampling method (quota sampling) was used in this study, which also has both the advantages and disadvantages. The limitation and delimitation are highlighted so that readers can judge the extent to which generalisations can be made from this study.

8.6 SUGGESTIONS FOR FURTHER RESEARCH

As a result of this research, a number of related issues came to the fore for future research.

- Future research should study how to develop a prototype of a Web-base training (WBT) system and evaluate it in a different context.

- Duplicating this study at private universities would provide an interesting comparison concerning end-users training needs and preferred training methods between private and public universities.

- Future research should also include other groups of end-user, namely, administrative staff. For example, administrators, technicians, and clerical
staff who also need skills in order to use electronic information resources to perform their daily tasks.

- Further research may study the training needs from the third party observations or perceptions. For example, academic staff perceptions of their students' training needs and head of departments' or deans' perceptions of their academic staff training needs.

- Future research may use different research methods, such as focus group interviews, observations and examining users' transaction logs.

- This research is a cross-sectional study of end-users' training needs and preferred training methods in three selected public university libraries in Malaysia. The research presented here needs to be repeated periodically. The benefit of studying this phenomenon longitudinally would be to evaluate any changes that have occurred in training needs over a specified period.

8.7 CONCLUDING REMARKS

Electronic information resources are a significant investment in many libraries today. It is imperative that library end-users get a good return on this investment. It is also crucial for librarians to know what types of training are needed by end-users in order to use these electronic resources, how such training should be carried out, and what training methods are preferred. Feedback from end-users would help librarians to design and develop a suitable end-user training programme.

Generally there were very few studies that explored how end-users think and feel about electronic information resources and services. Previous studies on
electronic information resources have approached the issues from different perspectives; for example, usage patterns and different types of electronic resources. Thus, there exists a shortage of empirical studies focusing on training needs of end-users following the introduction of new technologies in academic libraries. This study therefore attempts to fill the gap and hopefully will add to the body of literature in this area.


Bernama (1999). Available at
http://www.bernama.com/bernama/lnewslink/content.htm (15/6/1999)


Bibliography


Bibliography


Lancaster, F.W. et al. (1994). Searching databases on CD-ROM: comparison of the results of end-user searching with results from two modes of searching by skilled intermediaries, RQ, 33, 370-386.


APPENDIX 1

Letters Concerning the Survey
To Whom It May Concern


Mr. Hassan is conducting his fieldwork in Malaysia to collect data for his thesis. He will need your kind assistance and co-operation in order to carry out his research smoothly. In light of this matter, I shall be grateful if you would assist him in any possible way you can to make his research successful.

Your kind co-operation and assistance is very highly appreciated.

Thank you.

Yours sincerely,

Dr J. E. Davies
Research Supervisor
14 March 1998

Dear Sir/Madam,

A Survey On End-User Training Needs

I am seeking information on end-user training needs in accessing and using the electronic information resources in university libraries in Malaysia. I need your assistance and co-operation in this study and I should be grateful if you could spare a few minutes of your time to fill out the enclosed questionnaire.


The data collected will not be used for any other purpose other than my thesis and I guarantee that it will be treated with strict confidentiality. Your assistance is highly essential and important to the success of this study.

I hope that you will be able to help and I thank you for your time, effort and co-operation.

Yours sincerely,

Basri Hassan

encl.
Tuan

ENCIK BASRI BIN HASSAN - PENSYARAH DI JABATAN SAINS PERPUSTAKAAN DAN MAKLUMAT, UNIVERSITI ISLAM ANTARABANGSA

Adalah saya dengan hormatnya merujuk kepada perkara yang tersebut di atas.


Sungguhpun usaha kajian yang akan dijalankan oleh Encik Basri Hassan adalah merupakan suatu 'academic exercise' sahaja, namun begitu saya percaya hasil kajiananya dapat dimanfaatkan kepada bidang sains maklumat di Malaysia. Justeru itu saya amat berterima kasih sekiranya pihak tuan dapat memberi izin kepada beliau untuk mengendalikan tinjauan ini di fakulti tuan. Bersama-sama ini disertakan borang kaji selidik untuk tindakan dan tatapan tuan.

Di atas bantuan dan kerjasama tuan diucapkan dengan setinggi-tinggi penghargaan. Sekian, wassalam.

Yang benar

Dr. Ahmad Bakri Abu Bakar
Ketua, Jabatan Sains Perpustakaan dan Maklumat
APPENDIX 2

Questionnaires
Appendix 2 Questionnaire for students

A survey of end-user training needs and methods in using the electronic information resources in the public university libraries in Malaysia

Questionnaire for students

ALL INFORMATION GIVEN WILL BE TREATED WITH STRICT CONFIDENTIALITY.

ABOUT YOU

a. Your university

b. Your Faculty/Dept.

c. Are you... (Please CIRCLE the appropriate numbers)
   Undergraduate 1 Postgraduate 2

   Year of study: 1 2 3 4

d. Are you a...
   Male 1 Female 2

ELECTRONIC INFORMATION RESOURCES

Electronic information resources refer to information available in electronic format such as the Internet, CD-ROMs, online databases, and online public access catalogues (OPACs).

1. How did you know about the existence of the electronic information resources? (Please TICK as many as appropriate)

   Library   Print media (e.g., Magazine, Journal)
   My friend Electronic media (e.g., TV, Radio)
   My lecturer Other...........................................

   (Please specify)
2. **How would you rate your personal knowledge of the following electronic information resources?** *(Please rate on a scale of 1 to 5)*

<table>
<thead>
<tr>
<th>Resource</th>
<th>1= Very poor</th>
<th>2= Poor</th>
<th>3= Adequate</th>
<th>4= Good</th>
<th>5= Very good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Online databases (eg., DIALOG, NSTP, LEXIS)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>CD-ROMs</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Online Public Access Catalogue (OPAC)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

*(Please CIRCLE the appropriate numbers)*

3. **How would you rate the importance of the following electronic information resources to your study/research?** *(Please rate on a scale of 1 to 5)*

<table>
<thead>
<tr>
<th>Resource</th>
<th>1= Not important at all</th>
<th>2= Not very important</th>
<th>3= Average</th>
<th>4= Important</th>
<th>5= Very important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Online databases (eg., DIALOG, NSTP, LEXIS)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>CD-ROMs</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Online Public Access Catalogue (OPAC)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

*(Please CIRCLE the appropriate numbers)*

4. **How would you rate your ability to use the following electronic information resources?** *(Please rate on a scale of 1 to 5)*

<table>
<thead>
<tr>
<th>Resource</th>
<th>1= Never use</th>
<th>2= Poor</th>
<th>3= Adequate</th>
<th>4= Good</th>
<th>5= Very good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Online databases (eg., DIALOG, NSTP, LEXIS)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>CD-ROMs</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Online Public Access Catalogue (OPAC)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

*(Please CIRCLE the appropriate numbers)*

5. **How often do you use the following?** *(Please CIRCLE the appropriate numbers)*

<table>
<thead>
<tr>
<th>Resource</th>
<th>Daily 2/3 times a week</th>
<th>Once a month</th>
<th>Once a semester</th>
<th>Never use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>CD-ROMs</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>OPAC</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Online databases (eg., DIALOG, NSTP, LEXIS)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

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6. **Do you use the Internet for...**
(Please **TICK** as many as appropriate)

- E-mail
- Searching information
- Entertainment/Amusement
- File transfer (FTP)
- Discussion lists/listserv
- Other

7. **Which Web browser do you use?** (Please **TICK** as appropriate)

- Internet Explorer
- NCSA Mosaic
- Netscape Navigator
- Other

8. **What search engines do you use?** (Please **TICK** as many as appropriate)

- Lycos
- Infoseek
- AltaVista
- Yahoo!
- Excite
- Magellan
- HotBot
- Other

9. **Have you received training in any of the following?**
(Please **CIRCLE** as appropriate)

- Using OPAC
- Searching CD-ROMs
- Searching on-line databases
- Searching the Internet

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using OPAC</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Searching CD-ROMs</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Searching on-line databases</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Searching the Internet</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

If you answer ‘No’ to all, please go to Q.14

10. **What type of training have you received?** (Please **TICK** as many as appropriate)

- Attending a library workshop
- Computer-assisted instruction
- Received one-to-one instruction from a librarian
- Received instruction in a class
- Got help from a friend
- Other

(Please specify)
Appendix 2

Questionnaire for students

11. **What were the training methods used? (Please TICK as many as appropriate)**

   - One-to-one  
   - Computer-based  
   - Group sessions  
   - Printed instruction/manual  
   - Lecture/demonstrations  
   - Other .................................................................

(Please specify)

12. **How good was the training? (Please rate on a scale of 1 to 5)**

   1= Very Poor  2= Poor  3= Average  4= Good  5= Very Good

(Please CIRCLE the appropriate numbers)

   Using OPAC  
   Searching CD-ROMs  
   Searching on-line databases  
   Searching the Internet

13. **Would you like more training on any of the following? (Please CIRCLE as appropriate)**

<table>
<thead>
<tr>
<th>Using OPAC</th>
<th>Searching CD-ROMs</th>
<th>Searching on-line databases</th>
<th>Searching the Internet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

14. **Are there any particular topics or areas related to the electronic information resources that you would like to learn?**

   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

15. **Ideally, how would you like to be trained to use the electronic information resources? (Please TICK as appropriate)**

   - Library workshops (hands-on)  
   - Computer-assisted instruction  
   - One-to-one instruction  
   - Printed instruction sheet/manual  
   - Classroom/group demonstrations  
   - No training necessary  
   - Other (please specify) .................................................................

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Appendix 2

Questionnaire for students

YOUR SEARCHING SKILLS

16. **Do you find what you need when searching the electronic information resources?** (Please **CIRCLE** one number only)

   Always 1  Usually 2  Sometimes 3  Never 4

17. **Do you face problems when...** (Please **CIRCLE** as appropriate)

   - Using **subject headings** to search for information
   - Using **keywords** (search terms) to find information
   - Using **fields searching** (title, author, year) to find articles
   - Using **AND, OR, NOT** (Boolean logic) to combine terms
   - Selecting suitable CD-ROM database to conduct a search
   - Trying to formulate correct search strategy
   - Executing file transfer (FTP)
   - Using Internet **search engines** (e.g., AltaVista, Lycos)
   - Downloading (copying) your search results to a disk
   - Printing your search results
   - Interpreting and evaluating your search results

<table>
<thead>
<tr>
<th>Problem</th>
<th>Yes</th>
<th>No</th>
<th>Sometimes</th>
</tr>
</thead>
<tbody>
<tr>
<td>subject headings</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>keywords</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>fields searching</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>AND, OR, NOT</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>selecting suitable database</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>formulating search strategy</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>executing file transfer</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Internet search engines</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>downloading search results to a disk</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>printing search results</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>interpreting and evaluating search results</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

18. **Have you ever asked for assistance during searching?** (Please **CIRCLE** one number only)

   Yes 1  No 2

   If yes, whom do you ask?.................................

19. **Overall how competent do you consider yourself on the following?** (Please rate on a scale of 1 to 5)

   1= Not competent at all  2= Less competent  3= Average
   4= Competent  5= Very competent

   (Please **CIRCLE** the appropriate numbers)

   - Using OPAC
     | Competence Level | 1 | 2 | 3 | 4 | 5 |
     |------------------|---|---|---|---|---|
     |                  | 1 | 2 | 3 | 4 | 5 |
   - Searching CD-ROMs
     |                | 1 | 2 | 3 | 4 | 5 |
     |                | 1 | 2 | 3 | 4 | 5 |
   - Searching on-line databases
     |                | 1 | 2 | 3 | 4 | 5 |
     |                | 1 | 2 | 3 | 4 | 5 |
   - Searching the Internet
     |                | 1 | 2 | 3 | 4 | 5 |
     |                | 1 | 2 | 3 | 4 | 5 |
YOUR PREVIOUS SKILLS

20. What skills did you have before joining this University?
(Please TICK as many as appropriate)

- Computer skills (e.g., using keyboard, mouse, knowledge of operating system)
- Information/library skills (e.g., using library catalogues, Abstracts, Indexes)
- Internet skills (surfing the Internet, email, FTP)
- Other

(Please specify)

21. Prior to joining this university did you know how to...
(Please CIRCLE as appropriate)

<table>
<thead>
<tr>
<th>Skill Description</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>use windows (e.g., Windows 3.11, Windows '95)</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>use word processor (e.g., MS Words, Word Perfect)</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>use spreadsheet (e.g., Lotus 123, Excel)</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>use graphics software (e.g., PowerPoint, Harvard Graphic)</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>use textual databases (e.g., dBase, Access, Inmagic)</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>use e-mail (e.g., using Eudora, Pine, Netscape mail)</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>use FTP (file transfer protocol)</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>join discussion groups/listserv</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

22. Do you have any other suggestions or comments regarding your training needs?

________________________________________________________________________

23. Would you like to take part in a brief follow-up discussion (face to face interview)? (Please CIRCLE one number only)

Yes 1  No 2

If yes, please provide your particulars as below:
Name...........................................................................................................
E-mail........................................................................................................
Telephone..............................................................................................

Please return the completed questionnaire by:..........................................

TO:  BASRI BIN HASSAN
Department of Library & Information Science,
International Islamic University Malaysia,
P.O. Box 70, Jalan Sultan, 46700,
Petaling Jaya, Selangor Darul Ehsan.

THANK YOU VERY MUCH FOR COMPLETING THIS QUESTIONNAIRE
A survey of end-user training needs and methods in using the electronic information resources in the public university libraries in Malaysia

Questionnaire for academic staff

ALL INFORMATION GIVEN WILL BE TREATED WITH STRICT CONFIDENTIALITY.

ABOUT YOU

a. Your university______________________________

b. Your faculty/dept.__________________________

c. Are you a... (Please CIRCLE the appropriate numbers)

Professor 1 Lecturer 4
Associate Professor 2 Assistant lecturer 5
Senior Lecturer 3 Other .......................................... 6

(Please specify)

d. Number of years in service..............................

e. Your highest academic qualification...

(Please CIRCLE the appropriate numbers)

Doctorate (e.g., Ph.D, LLD) 1 Bachelor (e.g., B.A., B.Sc.) 3
Master (e.g., M.A., M.Sc.) 2 Professional (e.g., ACCA, ICSA) 4
Other (Please specify) ............................................ 5

f. Are you...

Male 1 Female 2

ELECTRONIC INFORMATION RESOURCES

Electronic information resources refer to information available in the electronic format such as the Internet, CD-ROMs, online databases, and online public access catalogues (OPACs).

1. How did you know about the existence of the electronic information resources? (Please TICK as many as appropriate)

Library Print media (e.g., Magazine, Journal)
My colleague Electronic media (e.g., TV, Radio)
My students Other ............................................

(Please specify)
2. **How would you rate your personal knowledge of the following electronic information resources?** (Please rate on a scale of 1 to 5)

- Internet: 1 (No idea) 2 (Poor) 3 (Adequate) 4 (Good) 5 (Very good)
- Online databases (e.g. DIALOG, NSTP, LEXIS): 1 (No idea) 2 (Poor) 3 (Adequate) 4 (Good) 5 (Very good)
- CD-ROMs: 1 (No idea) 2 (Poor) 3 (Adequate) 4 (Good) 5 (Very good)
- Online Public Access Catalogue (OPAC): 1 (No idea) 2 (Poor) 3 (Adequate) 4 (Good) 5 (Very good)

(Please **CIRCLE** the appropriate numbers)

3. **How would you rate the importance of the following to your work or research?**

- Internet: 1 (Not important at all) 2 (Not very important) 3 (Average) 4 (Important) 5 (Very important)
- Online databases (e.g. DIALOG, NSTP, LEXIS): 1 (Not important at all) 2 (Not very important) 3 (Average) 4 (Important) 5 (Very important)
- CD-ROMs: 1 (Not important at all) 2 (Not very important) 3 (Average) 4 (Important) 5 (Very important)
- Online Public Access Catalogue (OPAC): 1 (Not important at all) 2 (Not very important) 3 (Average) 4 (Important) 5 (Very important)

(Please **CIRCLE** the appropriate numbers)

4. **How would you rate your ability to use the following electronic information resources?** (On a scale of 1 to 5)

- Internet: 1 (Never use) 2 (Poor) 3 (Adequate) 4 (Good) 5 (Very good)
- Online databases (e.g. DIALOG, NSTP, LEXIS): 1 (Never use) 2 (Poor) 3 (Adequate) 4 (Good) 5 (Very good)
- CD-ROMs: 1 (Never use) 2 (Poor) 3 (Adequate) 4 (Good) 5 (Very good)
- Online Public Access Catalogue (OPAC): 1 (Never use) 2 (Poor) 3 (Adequate) 4 (Good) 5 (Very good)

(Please **CIRCLE** the appropriate numbers)

5. **How often do you use the following?** (Please **CIRCLE** the appropriate numbers)

- Internet: Daily 2/3 times a week Once a month Once a semester Never use: 1 2 3 4 5
- CD-ROMs: Daily 2/3 times a week Once a month Once a semester Never use: 1 2 3 4 5
- OPAC: Daily 2/3 times a week Once a month Once a semester Never use: 1 2 3 4 5
- Online databases (e.g. DIALOG, NSTP, LEXIS): Daily 2/3 times a week Once a month Once a semester Never use: 1 2 3 4 5

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THE INTERNET

6. Do you use the Internet for...
(Please TICK as many as appropriate)

E-mail □ File transfer (FTP) □
Searching information □ Discussion lists/listserv □
Preparing lectures □ Other...□

(Please specify)

7. Which Web browser do you use? (Please TICK as appropriate)

Internet Explorer □ Netscape Navigator □
NCSA Mosaic □ Other...□

(Please specify)

8. What search engines do you use? (Please TICK as many as appropriate)

Lycos □ Infoseek □ Alta Vista □ Yahoo! □
Excite □ Magellan □ Hot Bot □ Other...□

(Please specify)

9. Do you cite Internet resources’ references in your reading list?
(giving URL address, e.g., http://efdu.lis.uiuc.edu/review/5/abbas.html)
(Please CIRCLE one)

Yes 1  No 2

10. Do you have a Web home page? (Please CIRCLE one)

Yes 1  No 2

YOUR TRAINING

11. Have you received training in any of the following?
(Please CIRCLE as appropriate)

Using OPAC Yes 1  No 2
Searching CD-ROMs 1  2
Searching on-line databases 1  2
Searching the Internet 1  2

If you answer ‘No’ to all, please go to Q.16
Appendix 2 Questionnaire for academic staff

12. **What type of training have you received?** *(Please TICK as appropriate)*

- Attending a library workshop
- Computer-assisted instruction
- Received one-to-one instruction from librarian
- Received group instruction
- Got help from colleague
- Others (Please specify)

13. **What were the training methods used?** *(Please TICK as appropriate)*

- One-to-one
- Computer-based
- Group sessions
- Printed instruction/manual
- Lecture/demonstrations
- Other (Please specify)

14. **How good was the training?** *(Please rate on a scale of 1 to 5)*

- 1= Very Poor
- 2= Poor
- 3= Average
- 4= Good
- 5= Very Good

*(Please CIRCLE the appropriate numbers)*

- Using OPAC
- Searching CD-ROMs
- Searching on-line databases
- Searching the Internet

15. **Would you like more training on any of the following?** *(Please CIRCLE as appropriate)*

- Yes
- No

- Using OPAC
- Searching CD-ROMs
- Searching on-line databases
- Searching the Internet

16. **Are there any particular topics or areas related to the electronic information resources that you would like to learn?**

...........................................................................................................................
...........................................................................................................................
...........................................................................................................................
...........................................................................................................................
17. Ideally, how would you like to be trained to use the electronic information resources? 
(Please TICK as appropriate)

Library workshops (hands-on) ☐  Printed instruction sheet/manual ☐
Computer-assisted instruction ☐  Classroom/group demonstrations ☐
One-to-one instruction ☐  No training is necessary ☐
Other (please specify) .................................................................

18. Do you find what you need when searching the electronic information resources? 
(Please CIRCLE one)

Always 1  Usually 2  Sometimes 3  Never 4

19. Do you face problems when... (Please CIRCLE as appropriate)

Using subject headings to search for information 1 2 3
Using keywords (search terms) to find information 1 2 3
Using fields searching (title, author, year) to find articles 1 2 3
Using AND, OR, NOT (Boolean logic) to combine terms 1 2 3
Selecting suitable CD-ROM database to conduct a search 1 2 3
Trying to formulate correct search strategy 1 2 3
Executing file transfer (FTP) 1 2 3
Using Internet search engines (e.g., AltaVista, Lycos) 1 2 3
Downloading (copying) your search results to a disk 1 2 3
Printing your search results 1 2 3
Interpreting and evaluating your search results 1 2 3

20. Have you ever asked for assistance during searching? (Please CIRCLE one)

Yes 1  No 2

If yes, whom do you ask? ..........................................................

21. Overall how competent do you consider yourself on the following? 
(Please rate on a scale of 1 to 5)

1= Not competent at all 2= Less competent 3= Average
4= Competent 5= Very competent

(Please CIRCLE the appropriate numbers)

Using OPAC 1 2 3 4 5
Searching CD-ROMs 1 2 3 4 5
Searching on-line databases 1 2 3 4 5
Searching the Internet 1 2 3 4 5

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YOUR PREVIOUS SKILLS

22. What skills did you have before joining this University?
(Please TICK as many as appropriate)

- Computer skills (e.g., using keyboard, mouse, knowledge of operating system)
- Information/library skills (e.g., using library catalogues, Abstracts, Indexes)
- Internet skills (email, FTP, etc.)

Other... (Please specify)

23. Prior to joining this university did you know how to...
(Please CIRCLE as appropriate)

- use windows (e.g., Windows 3.11, Windows '95) 1 2
- use word processor (e.g., MS Words, Word Perfect) 1 2
- use spreadsheet (e.g., Lotus 123, Excel) 1 2
- use graphics software (e.g., PowerPoint, Harvard Graphic) 1 2
- use textual databases (e.g., dBase, Access, Inmagic) 1 2
- use e-mail (e.g., using Eudora, Pine, Netscape mail) 1 2
- use FTP (file transfer protocol) 1 2
- join discussion groups/listserv 1 2

24. Do you have any comments or suggestions regarding your training needs?
..........................................................................................................................
..........................................................................................................................

25. Would you be prepared to take part in a brief follow-up discussion (face to face, or by telephone)? (Please CIRCLE one)

Yes 1  No 2

If yes, please provide your particulars as below:
Name...................................................................................................................
E-mail.................................................................................................................
Telephone...........................................................................................................

Please return the completed questionnaire by: .........................................

TO: BASRI BIN HASSAN
Department of Library & Information Science,
International Islamic University Malaysia,
P.O. Box 70, Jalan Sultan, 46700,
Petaling Jaya, Selangor Darul Ehsan.

THANK YOU VERY MUCH FOR COMPLETING THIS QUESTIONNAIRE
APPENDIX 3

Interview Guides
Semi-structured interview questions
For students and academic staff

Electronic information resources

1. What is your opinion about electronic information resources?
   Internet, CD-ROM databases, online databases, Online public access catalogue (OPAC)

2. Which electronic information resources do you use most often?

Your skills

3. Do you have computer skills?
   Example, knowledge and skills in using word processing, windows, and other applications, i.e., spreadsheets, graphics, textual databases, etc.

4. Do you have library/information skills?

5. Do you have Internet skills?

6. What problems do you face when using electronic information resources?

Your Training

7. Have you attended any training (formal and informal) on accessing and using electronic information resources?
   a. How good was the training?
   b. Would you like more training?

8. What aspects of training do you think are most important?
   - Contents, delivery/methods, etc.

9. Which training methods do you prefer?

Your Training needs

10. What skills and knowledge do you need in order to access and use electronic information resources?

11. What level of training (basic or advance training) do you prefer pertaining to these skills?

Thank you very much for your time.
Semi-structured interview questions
For librarians (in-charge of end-user training)

Electronic information resources

1. What sort of electronic information resources do your library has?
   - Does your library have access to the Internet?
   - If yes, how many Internet workstations are available to your end-users?
   - Are your CD-ROMs databases put on network?
   - What library systems does your library use?

2. How do you promote your electronic information resources?
   - Does your library have a Web page?

Training programmes

3. Does your library provide training for the end-users?
4. How often do you conduct training?
5. What training methods do you use?
   e.g., library workshops, one-to-one, CAI, group session, etc.
6. Which training methods are preferred by end-users?
7. How many professional librarians are involved in the training programme?

Training needs

8. What are the problems faced by your end-users in accessing and using the electronic information resources?
9. What do you think are the real training needs of your end-users concerning electronic information resources?
10. Do you think your training programme is able to fulfil those training needs?

Thank you very much for your time.
APPENDIX 4

Analysis of the Interviews
## Analysis of Students’ Interviews

<table>
<thead>
<tr>
<th>Research questions</th>
<th>UKM</th>
<th>IIUM</th>
<th>UMS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Opinions about electronic Information resources</strong></td>
<td>Internet - easy to use and get information (respondent 1)</td>
<td>Useful because it is fast, especially Internet and CD-ROMs. (respondent 1)</td>
<td>Easy to find information (respondent 1)</td>
</tr>
<tr>
<td></td>
<td>OPAC - easy to search (respondent 2)</td>
<td></td>
<td>Easy to search for information, fast and abundance of information (respondent 2)</td>
</tr>
<tr>
<td></td>
<td>Internet and CD-ROM - have some knowledge. Easy to access OPAC &amp; CD-</td>
<td>Internet and OPAC - access in library and Computer lab (respondent 1)</td>
<td>Good if search for information. Waste of time if use for ‘Chat’ (respondent 3)</td>
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<tr>
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<td>ROM - no problem (respondent 1)</td>
<td>Internet and CD-ROM - use it daily. (respondent 2)</td>
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<tr>
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<td>Internet and OPAC. CD-ROM - do not know how to use. Use Email for faster communication (respondent 2)</td>
<td>Internet and OPAC (respondent 3)</td>
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<tr>
<td></td>
<td>Internet - accessible from the Computer Lab (respondent 3)</td>
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<td><strong>Electronic information resources most often used</strong></td>
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<td>Internet and OPAC. CD-ROM - do not know how to use. Use Email for faster communication (respondent 2)</td>
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<td>Internet - accessible from the Computer Lab (respondent 3)</td>
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<tr>
<td><strong>Skills held</strong></td>
<td>Basic computer skills and Internet skills (respondent 1)</td>
<td>Computer application skills and Library information skills – know how to use OPACs (respondent 1)</td>
<td>Computer applications skills and Internet skills. Library skills - very little knowledge (respondent 1)</td>
</tr>
<tr>
<td></td>
<td>Basic computer skills - also know programming, and Internet skills (respondent 2)</td>
<td>Computer application skills (respondent 2)</td>
<td>Computer skills - Word processing (respondent 2)</td>
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<tr>
<td></td>
<td>Internet skill (e.g. email, FTP), Computer application skills and some Information skills (little knowledge about Boolean) (respondent 3)</td>
<td>Computer applications skills and computer hardware maintenance (respondent 3)</td>
<td>Some basic skills about using computer (respondent 3)</td>
</tr>
<tr>
<td><strong>Problems faced</strong></td>
<td>Do not know how to use CD-ROM and Online databases (respondent 2)</td>
<td></td>
<td>Internet - sometimes server too slow. Only 1/2 hour per person for searching Internet in the library. (respondent 1)</td>
</tr>
<tr>
<td></td>
<td>Too much information - quite difficult to choose from Internet (respondent 3)</td>
<td></td>
<td>Sometimes too many hits, I do not know which one to take (respondent 2)</td>
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<tr>
<td></td>
<td>Which one do we use? How to select the appropriate source. (respondent 3)</td>
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<tr>
<td>Important aspects of training</td>
<td>All aspects (respondent 3)</td>
<td>Content and method (respondent 2) method (respondent 3)</td>
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<td>----------------------------------------</td>
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<td>Preferred training methods</td>
<td>Workshops (with hands-on) (respondent 1)</td>
<td>One-to-one with hands-on (respondent 1)</td>
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<td>Small group and one-to-one method. (respondent 2)</td>
<td>One-to-one, because if got problems easy to ask for help (respondent 2)</td>
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<td>Workshop (with hands-on) (respondent 3)</td>
<td>One-to-one and workshop (respondent 1)</td>
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<td>One-to-one (respondent 2)</td>
<td>Hands-on (Workshop) (respondent 3)</td>
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<td>Hands-on (Workshop) (respondent 3)</td>
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<tr>
<td>Training attended</td>
<td>No formal training. Internet - self-learning (respondent 1)</td>
<td>Formal classroom lecture on IT. Never attended library organised training. Yes, still lacking in knowledge on IT and related areas (respondent 1)</td>
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<td></td>
<td>OPAC – formal training</td>
<td>Learn Internet from friends. (respondent 2)</td>
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<tr>
<td></td>
<td>Internet - self-learning</td>
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<td></td>
<td>If have problems, sometimes ask lecturer (respondent 2)</td>
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<tr>
<td></td>
<td>Learned from friends - and through trial and error. I like it this way (respondent 3)</td>
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<td>Formal training - Workshop given by the faculty. It is very effective. (respondent 1)</td>
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<td>No formal training. (respondent 2)</td>
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<tr>
<td></td>
<td>Computer Lab provides training. Also learned through trial and error, and also asking friends. (respondent 3)</td>
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<td>Skills and knowledge needed</td>
<td>Internet searching skills (respondent 1)</td>
<td>How to link-up WebPages (respondent 1)</td>
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<tr>
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<td>Boolean searching and Searching strategy (respondent 2)</td>
<td>Computer skills and Internet skills, also CD-ROM. (respondent 2)</td>
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<td>How to select the appropriate Information sources. (respondent 3)</td>
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<td>Level of training preferred</td>
<td>Depend on knowledge and time (respondent 2)</td>
<td>Advance training (respondent 1)</td>
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<td>Advance training (respondent 1)</td>
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### Analysis of Academic Staff Interviews

<table>
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<tr>
<th></th>
<th>UKM</th>
<th>IIUM</th>
<th>UMS</th>
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</table>
| **Opinions about electronic information resources** | Internet easy for searching information and quick (lecturer 1). Knows how to use Internet and CD-ROM (lecturer 2) | Good (lecturer 1) 
Online databases - less popular. 
CD-ROM - good for developing countries, like Malaysia. 
Internet - there is problems of authenticity & reliability (lecturer 2) | Convenient, save time, but has both advantages and disadvantages (lecturer 1) 
Good (lecturer 2) 
Wonderful - Internet (lecturer 3) |
| **Electronic information resources most often used** | Internet (lecturer 1) 
Internet, CD-ROM, OPAC (lecturer 2) 
Internet (lecturer 2) | CD-ROM (MLJ), Online databases (LEXIS) and Internet (lecturer 1) 
Internet, CD-ROM and OPAC (lecturer 2) | Internet (lecturer 1) 
Internet (lecturer 2) 
Internet (lecturer 3) |
| **Skills held**                    | Internet skills and Computer skills (lecturer 1) 
Internet skills computer skills (lecturer 2) 
Library & information skills, Internet skills and Computer skills (lecturer 3) | Basic computer skills, Some Internet skills and Library & information skills (lecturer 1) 
Computer skills, Library & Information skills and Internet skills (lecturer 2) | Computer skills, Internet skills and Library & Information Skills (lecturer 1) 
Computer application skills and Internet skill (lecturer 2) 
Internet skills and Computer skills (lecturer 3) |
| **Problems faced**                 | So far none, if got problems ask friends (lecturer 1) 
Server at UKM very slow (lecturer 2) 
Server too slow at UKM (lecturer 3) | Too little hits retrieved on my subjects. Also time consuming. (lecturer 1) 
None so far (lecturer 2) | None so far (lecturer 1) 
Can downloading from Internet but cannot open the file (lecturer 2) |
| **Important aspects of training**  | Teaching methodology (lecturer 2) |                                                                                    | Environment & people (lecturer 1) 
All aspects (lecturer 2) |
| Preferred training methods | One-to-one (lecturer 1)  
Hands-on (workshop) (lecturer 2)  
One-to-one (lecturer 3) | One-to-one (with hands-on)  
(lecturer 1)  
Hands-on (lecturer 2) | Human approach. Dislike CAI  
(lecturer 1)  
Workshop (hands-on)  
(lecturer 2)  
One-to-one and/or workshop  
(lecturer 3) |
|----------------------------|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------|
| Training attended          | OPAC training from library  
(lecturer 1)  
Has attended computer applications course given by the university computing centre. (lecturer 2)  
No formal training - all informal training (lecturer 3) | Informal training (lecturer 1)  
Both formal and informal training (lecturer 2) | Learn through trial & error  
(lecturer 1)  
Yes. Formal course on Internet  
(lecturer 2)  
Self-study and learn through trial & error (lecturer 3) |
| Skills and knowledge needed | How to install software.  
(lecturer 2) | Advance Internet skills (lecturer 1)  
None so far (lecturer 2) | Operating system (lecturer 1)  
How to do homepage. and advance computer skills (lecturer 2) |
| Level of training preferred | Advance training for Internet  
Basic training for OPAC (lecturer 1)  
More training on computer  
(lecturer 2)  
Advance training (lecturer 3) | Advance training (lecturer 1) | Advance training (lecturer 2)  
Both basic and advance training (lecturer 3) |
APPENDIX 5

Table for Determining the Sample Size
Table for Determining Sample Size from a Given Population

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N is population size. S is sample size. Degree of accuracy = 0.05

Table formulated by: