

Utilization of Information Technology-Based Sources and Facilities among Medical Professionals in Malaysia

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Abstract. Information technology (IT) is an integral element in the process of information-seeking behaviour to fulfil research and clinical information needs due to pervasive access to information sources as well as facilities provided by libraries. The study aims to determine the frequency and level of importance of IT-based sources and facilities used among medical professionals in Malaysia. A cross-sectional study involving surveys with self-administered questionnaires was conducted among 336 medical professionals in ten medical institutions with libraries in Malaysia from November 2016 until April 2017. The respondents comprised medical officers, medical lecturers and postgraduate medical students. Medical practitioners who are legitimately registered with the Malaysian Medical Council and under professional training in the university were also included. The respondents were excluded if they were public members, general practitioners and dental practitioners. Descriptive analysis was used to present the findings. The mean (standard deviation) age of the respondents was 36.42 (7.98) years with their ages ranging from 24 to 71 years old. The majority of the respondents were of Malay ethnicity (72.5%), female (61.3%) and had a bachelor's degree (52.4%). The majority of the respondents utilised search engines and open access electronic journals to search for information. In response to IT-based sources and facilities, most of the respondents place a high level of importance on search engines (69.5%), followed by open access electronic journals (62.2%), library-subscribed databases (55.2%) and library websites (36.0%). Medical professionals in Malaysia are found to be frequent users of search engines, open access electronic journals and library subscribed databases to search for information for their research and clinical work. The study also found that search engines and open access electronic journals

were considered by medical professionals to be highly important sources for searching information, followed by library-subscribed databases and library websites. Recommendations are proposed to maintain effective access to health information.

Keywords: information technology, library resources, library facilities, library services, medical professionals

1 Introduction

Information behaviour involves people using various resources for information, various formats used in information seeking, information foraging, sense making, information use and information organizing (Sahu & Nath Singh, 2013). According to Mavodza (2011), interest in information-seeking behaviour was based on the premise that information-literate individuals are supposed to be able to determine if and when they need information, to retrieve it, evaluate it and use it effectively and ethically. That way, they have the potential to create new knowledge. The continuously advancing discipline of health science greatly contributes to the proliferation of medical information. Access to information is vital in responding quickly and effectively to the challenges and complexities of the health research environment. Consequently, information has become an integrated element to support medical research, teaching and clinical services (Zawawi & Majid, 2001).

This paper is part of a nationwide study that investigates the information needs and seeking behaviour of medical professionals in Malaysia. Davies (2007) stated that in such a study there are three elements to be considered: information needs, literature searching and resources that are interlinked and should not be addressed in isolation. In her narrative review of literature focusing on information-seeking behaviour of doctors spanning 10 years (1996-2006), Davies reported on emerging themes which include the use of electronic information resources by doctors. The development of the computer and the evolution of information technology (IT) have changed modern healthcare systems worldwide, particularly in the areas of communication, teaching, storage as well as retrieval of medical information. Technological advances and innovations also change the operation of organisations and academic institutions, including libraries. Academic libraries within universities have long been known as gateways to information. It is further substantiated that academic libraries play a supporting role in university research by not only storing books and journals and providing space for learning, but also through the provision of systematically digitized information to users (Rasul & Singh, 2017).

The Internet is regarded to have a profound impact on the medical profession by giving access to healthcare information, improving communication among colleagues in different continents and influencing the flow of medical decision-making. The Internet may satisfy medical professionals in their quest for information by 1) its vast amount of healthcare and scientific information that give adequate answers to their questions, and 2) efficient access to information through different search engines and outstanding information retrieval systems (Yu & Kaufman, 2007).

Electronic databases become a major part of library collections for learning, teaching and research activities as they contain digital collections of journal articles, newspaper articles, conference proceedings, reports, legal publications, theses, and e-books in various formats including bibliographic, full-text, directory and multimedia (Larson, 2017). Utilization of these databases is crucial to justify the amount of investment made by university libraries in subscribing to the databases, despite the strain of shrinking budgets in trying to meet user needs and demands.

The advantages of electronic databases compared to traditional print resources include lesser storage space, larger information capacity, stronger sharing ability and great potential for collection expansion (Zhang, Ye, Liu, & Rao, 2011). Furthermore, electronic databases are conveniently available and accessible to users anywhere and anytime. It was also discovered that the more frequent users of electronic resources are academics and students from the life and medical sciences, junior faculty members and those under the age of 40.

Due to the significance of IT in searching for clinical and medical information, the current study comes out with the objective to determine the level of usage frequency of IT-based sources and facilities as well as its perceived importance among medical professionals in Malaysia. From the literature search, it is discovered that most research concentrates on the general issue of information needs and information-seeking among specific groups of users. However, limited studies are conducted on the importance and utilization of IT-based sources and facilities in specific groups of users, in particular among medical professionals. As far as the research is concerned, these studies were executed in many parts of the world and only 2 studies have been carried out in Malaysia (Ong, Hassali, & Saleem, 2018; Zawawi & Majid, 2001). Therefore, this current study attempts to fill that gap.

2 Materials and Methods

A cross-sectional study was conducted among medical professionals in selected institutions with medical libraries throughout Malaysia from November 2016 until April 2017. Feedbacks from library users were obtained through a survey as it is deemed more appropriate for observational study involving descriptive statistics. Although survey is less rigorous than experimental research, it is more suitable for studying a large amount of cases which are geographically dispersed, encompassing personal factors and engaging analysis of exploratory relationships (Connaway & Powell, 2010). Other advantages of using questionnaires to collect survey data includes encouraging frank answers from respondents, reassuring respondents to answer questions in a relaxed state, and reducing interviewer bias as well as variation in the questioning process. Bourque and Fielder (2003) implied that self-administered survey enables researchers to contact a substantial proportion of respondents as it allows for wider geographic coverage, larger samples and wider coverage within a sample population.

By using the cluster sampling method, a total of ten out of twenty institutions with medical libraries were included in the study. They were four research universities, four non-research public universities and two private universities respectively.

Table 1. Population of medical professionals in institutions or universities with medical libraries

N o.	INSTITUTI ON	TYPES	TOTAL MEDICAL PROFESSIONAL
1	UKM	Research University (RU)	356
2	UPM	Research University (RU)	286
3	USM	Research University (RU)	484
4	UM	Research University (RU)	450
5	IMR	Public University (Non- RU)	48
6	UIA	Public University (Non- RU)	100
7	UiTM	Public University (Non RU)	148
8	UMS	Public University (Non- RU)	66
9	UNIMAS	Public University (Non RU)	56
10	UniSZA	Public University (Non RU)	68
11	UPNM	Public University (Non- RU)	55
12	USIM	Public University (Non- RU)	83
13	AIMST	Private University	28
14	Cyberjaya	Private University	55
15	IJN	Private University	80
16	IMU	Private University	100
17	MSU	Private University	45
18	Newcastle	Private University	48
19	PU	Private University	52
20	USCI	Private University	40
TOTAL			2,648

The table above listed the possible population for the study which totalled an estimated number of 2,648 medical professionals. Using the Raosoft Sample Size Calculator (<http://www.raosoft.com/samplesize.html>) with a 5% margin of error and a confidence level of 95%, it is recommended that this study has a minimum of 336 respondents to subsequently get the critical value for normal distribution.

The respondents comprised medical officers, medical lecturers and postgraduate medical students. The medical professionals who were legitimately registered with the Malaysian Medical Council and were under professional training in the university were included whereas public members, general practitioners and dental practitioners were excluded from the study. This study was granted ethical approval by the Human Research Ethics Committee of Universiti Sains Malaysia [Reference No: USM/JEPeM/15040147].

A total number of 594 self-administered questionnaires were distributed to the medical libraries of the selected institutions. Librarians at the respective institutions assisted with the distribution of questionnaire to respondents based on predetermined selection criteria. Once completed, the questionnaires were collected and submitted to the researcher. Ultimately 396 responded, giving a response rate of 66.66%.

The questionnaire was divided into four sections: section A detailed demographic profiles, section B investigated on information and research needs, section C on methods for acquiring needed information and section D on satisfaction with information services.

Data entry and analysis were conducted using the Statistical Package for Social Sciences version (SPSS) version 24 (IBM, 2016). Descriptive analyses were applied to present the findings. For numerical data, the results were presented by mean and standard deviation (SD) while for categorical data, the results were presented using frequency (n) and percentage (%).

3 Results

The collected sociodemographic profile of 336 medical professionals included age, ethnicity, gender, highest academic qualification and job position held in their institutions, as summarised in Table 2. The mean (SD) age of the respondents was 36.42 (7.98%) years with the age range between 24 and 71 years old. The majority of the respondents were of Malay ethnicity (72.5%), female (61.3%) and had a bachelor's degree (52.4%). Out of 336 respondents, 161 (48.6%) were medical officers, 121 (36.6%) were medical lecturers and the rest were postgraduate medical students (14.8%). It is noted that the mean (SD) length of working experience was 5.94 years. The highest number of respondents were from research universities (52.7%), followed by public universities (30.1%) and private universities (17.3%).

As the study intends to explore the information needs and information-seeking behaviour of medical professionals in Malaysia, one of its main objectives was to verify the methods used by these groups of people when acquiring needed information. Respondents were asked to indicate their preferred point of reference when finding information related to their research or clinical work. It is found that Malaysian medical professionals prefer to search the World Wide Web (WWW) (mean score 4.54) and the library website (mean score 4.28) rather than visiting the physical library or referring to professional institutes and research organizations.

Table 2. Profile of medical professionals (n=336)

	Frequency (%)
Age (years)*	36.42 (7.98)
Gender	
Male	129 (38.7)
Female	204 (61.3)
Ethnicity	
Malay	243 (72.5)
Chinese	45 (13.4)
Indian	34 (10.1)
Other	13 (3.9)
Academic Qualification	
Bachelor	175 (52.4)
Master	135 (40.2)
Doctorate	24 (7.2)
Job Position	
Medical officer	161 (48.6)
Lecturer	121 (36.6)
Postgraduate student	49 (14.8)
Length of working (years)*	5.94 (5.36)
Institution	
Research university	177 (52.7)
Non-research public university	101 (30.1)
Private university	58 (17.3)

*mean (standard deviation)

Table 3. Where do you prefer to find information related to your research or clinical work?

Variables	Mean
Library (physical/building)	3.36
Library (website)	4.28
Professional institutes	3.41
Research organizations	3.38
World Wide Web / Internet	4.54

The views of respondents concerning their action when in need of information on a certain topic related to research or clinical work is shown in Table 4. Surfing the Internet is considered as the most preferred action by 64.8% of the respondents compared to other means of acquiring information. Other preferred methods would be consulting their colleagues in the institutions (44.1%) and doing independent search at the library (35.8%). The preference indicated by the respondents distinctly signifies the influence of IT-based sources and facilities on their searching behaviour.

Table 4. What do you prefer to do if you need information on a certain or specific topic related to your research or clinical work? (n=336)

	Frequency (%)				
	Least Preferred	Less Preferred	Somewhat Preferred	Preferred	Most Preferred
Independent search at the library	12 (3.6)	39 (11.7)	91 (27.4)	119 (35.8)	71 (21.4)
Consult librarian	20 (6.0)	76 (22.8)	111 (33.2)	87 (26.0)	40 (12.0)
Surf the Internet	1 (0.3)	2 (0.6)	16 (4.8)	98 (29.5)	215 (64.8)
Consult medical practitioners at your workplace	10 (3.0)	25 (7.5)	93 (27.9)	147 (44.1)	58 (17.4)
Consult medical practitioners in other research institutions and	22 (6.6)	58 (17.4)	111 (33.3)	111 (33.3)	31 (9.3)

universities

Table 5 gave insight to the success rate as perceived by the respondents when they searched for information using their method of choice. Respondents often or always got the information they needed by surfing the internet, followed by an independent search at the library and consulting colleagues at their workplace. Interestingly, they reflected that they sometimes obtained information by consulting the librarian.

Table 5. How frequently do you get information on a certain or specific topic related to your research or clinical work? (n=336)

	Frequency (%)				
	Never	Rarely	Sometimes	Often	Always
Independent search at the library	11 (3.3)	41 (12.3)	105 (31.4)	117 (35.0)	60 (18.0)
Consult librarian	39 (11.6)	83 (24.8)	109 (32.5)	75 (22.4)	29 (8.7)
Surf the Internet	0 (0)	3 (0.9)	30 (9.0)	107 (32.0)	194 (58.1)
Consult medical practitioners at your workplace	8 (2.4)	37 (11.1)	110 (33.0)	147 (44.1)	31 (9.3)
Consult medical practitioners in other research institutions and universities	24 (7.2)	67 (20.1)	114 (34.2)	113 (33.9)	15 (4.5)

The same trend can be seen in terms of satisfaction in getting the searched information as shown in Table 6. Respondents were inclined to feel more satisfied with surfing the internet and searching independently rather than referring to others. Although these findings shed light on the significance of IT-based resources and facilities in their endeavours, it somehow poses a crucial question to the role librarians play throughout the research process undertaken by medical professionals.

Table 6. How satisfied are you with the information you obtained on a certain or specific topic related to your research or clinical work? (n=336)

	Frequency (%)				
	Very Dissatisfied	Dissatisfied	Unsure	Satisfied	Very Satisfied
Independent search	6 (1.8)	21 (6.3)	77 (23.2)	185 (55.7)	43 (13.0)

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at the library					
Consult librarian	12 (3.6)	14 (4.2)	134 (40.6)	124 (37.6)	46 (13.9)
Surf the Internet	1 (0.3)	3 (0.9)	20 (6.0)	190 (56.9)	120 (35.9)
Consult medical practitioners at your workplace	6 (1.8)	13 (3.9)	80 (24.0)	190 (57.1)	44 (13.2)
Consult medical practitioners in other research institutions and universities	12 (3.6)	19 (5.7)	124 (37.3)	145 (43.7)	32 (9.6)

Table 7 and 8 focused on the crux of the study when the respondents were pro-pounded with questions on the importance of IT-based resources and facilities and their frequency of use on available and relevant information technology during their research or clinical work.

Most respondents (72.2%) were found to more frequently utilize search engines to search for information as summarized in Table 7. The subsequent choice of information source utilized by medical professionals was open access electronic journals and library subscribed databases. It is observed that CD ROMs were never or rarely utilized as a tool to search for information (73.3%). This may be due to the fact CD ROMs have been superseded by more technologically advanced information sources.

Table 7. Frequency of using IT-based sources and facilities among medical professionals (n=336)

	Frequency (%)				
	Never	Rarely	Sometimes	Often	Always
Online library catalogues (OPAC)	24 (7.2)	66 (19.9)	101 (30.4)	88 (26.5)	53 (16.0)
CD ROMs	114 (34.4)	130 (39.3)	66 (19.9)	17 (5.1)	4 (1.2)
Library websites	15 (4.5)	34 (10.2)	88 (26.5)	119 (35.8)	76 (22.9)
Library subscribed databases	14 (4.2)	18 (5.4)	72 (21.6)	108 (32.4)	121 (36.3)
Search engines	2 (0.6)	2 (0.6)	16 (4.8)	73 (21.8)	242 (72.2)
Open access electronic journal	2 (0.6)	7 (2.1)	46 (13.8)	93 (27.9)	185 (55.6)
E-books	6 (1.8)	29 (8.7)	119 (35.7)	104 (31.2)	75 (22.5)

In response to the importance level of IT-based sources and facilities, many respondents (69.5%) considered search engines as the most important tool for seeking information. On the other hand, 62.2 % of the respondents deemed open access elec-

tronic journals with the same level of importance. As for library subscribed databases and library websites, 55.1% and 36% of the respondents have respectively recognized them as being the most important.

Table 8. Importance level of IT-based sources and facilities among medical professionals (n=336)

Source	Frequency (%)				
	Least important	Less important	Neutral	Very important	Most important
Online library catalogues (OPAC)	10 (3.0)	17 (5.1)	120 (36.0)	120 (36.0)	66 (19.8)
CD ROMs	61 (18.5)	78 (23.7)	149 (45.3)	36 (10.9)	5 (1.5)
Library websites	5 (1.5)	12 (3.6)	70 (21.1)	125 (37.8)	119 (36.0)
Library subscribed databases	4 (1.2)	6 (1.8)	37 (11.1)	102 (30.7)	183 (55.1)
Search engines	1 (0.3)	0 (0.0)	20 (6.0)	81 (24.2)	233 (69.5)
Open access electronic journal	1 (0.3)	4 (1.2)	24 (7.3)	96 (29.0)	206 (62.2)
E-books	8 (2.4)	13 (4.0)	80 (24.4)	128 (39.0)	99 (30.2)

4 Discussion

For the purpose of this study, a questionnaire was administered to delve into the methods of acquiring information among medical professionals in Malaysia, particularly concerning the utilization of information technology-based sources and facilities provided by the libraries in their institutions.

It is established from the initial findings that the respondents mostly preferred surfing the Internet to search for information, which evidently indicates how information technology has changed the searching behaviour among researchers. In addition, the findings confirmed that they were always able to get what they were searching for through the Internet, and justifiably were very satisfied with the result of their search. In this study, the respondents were required to rate their usage frequency on a selection of IT-based sources and facilities which include online library catalogues (OPAC), CD ROMs, library websites, library subscribed databases, search engines, open access electronic journal and e-books. Findings revealed that the three most utilized information sources and facilities were search engines, open access electronic journal and library-subscribed databases.

The findings also verified that search engines were one of the most important tools in seeking information according to the respondents, followed by databases subscribed by libraries and library websites. The tools that were considered less important were online library catalogues and CD ROMs.

The results were not surprising since there are different search engines available on the Internet, each with their own techniques and specialities. Medical professionals mostly use search engines for their research. They spend a substantial quantity of time on a search engine to search for information that is of interest or value to them. There are several factors which influence the users in their preference of a search engine include homepage style, result page style, number of retrieved results, number of retrieved relevant results, the popularity of search engines and easy user interface (Mostafa, 2005).

All these findings are significantly consistent with many previously conducted studies. User studies conducted to evaluate the United Kingdom's digital information service in the academic sector disclosed the dominance of Internet search engines in students' information-seeking strategy (Griffiths & Brophy, 2005). The Pew Internet survey in the United States confirmed that 92% of online adults use search engines to find information on the Web and search engine was found to be the second most popular internet activity next to e-mail (Purcell, 2011). Rieger (2009) also affirmed similar trends in his study that students and faculty members were convergent in their overall satisfaction with 1) the outcome of their searches using search engines and 2) trust in search engine in supporting their studies and research.

Currently, there are different types of search engines available such as Google, Google Scholar, Yahoo, Ask.com and Bing, but the most popular search engine nowadays is Google as it has the search interface of choice (Rieger, 2009). Googling has also become synonymous with research (Griffiths & Brophy, 2005; Mostafa, 2005).

Based on a previous study conducted by Yu and Kaufman (2007) on the evaluation of 4 online search engines by physicians, it is found that Google was chosen as having the best system for quality of answer and ease of use. An international survey on perceptions of library and information resources (De Rosa, 2005) reported that 84% of information searches begin with a search engine and Google is the overwhelming favourite (62%) across all geographic regions and U.S. age groups followed by MSN Search at 7% and Ask Jeeves at 3%.

The current study had several limitations. The result of this survey may be subject to respondents' attitudes and the degree to which they responded accurately to the questionnaire. Also, the result of the study may not be applied to all medical professionals in Malaysia.

5 Recommendations

Rasul and Singh (2017) suggested through their study on the role of academic libraries in facilitating research that it is pertinent for libraries to distinguish the needs of their users to enable them to assist research activities accordingly. User satisfaction to certain library services may be influenced by users' sense of familiarity. Therefore, to enhance greater usage of library resources and facilities, librarians need to educate users on how to use these resources effectively, and to provide research-based training

sessions such as bibliographic citation, usage of data analysis software and research publication tools.

De Rosa (2005) discovered that most respondents in the study on perceptions of library and information resources indicated they learn about new electronic information sources by words of mouth from friends, relatives or colleagues (61%) in contrast with librarians, which are ranked lowest (8%). Therefore, librarians should increase their efforts to market and promote the resources and services offered by libraries to engage more users.

Awareness of the sources and facilities provided by libraries is important to instigate their optimum and effective utilization. As Larson (2017) revealed in her study, a reasonably high awareness of subscribed online databases among respondents may lead to higher usage of the information sources. The usefulness of electronic resources to the end users is very important because it implies that the information needs of users are being met to enhance their scholarly endeavours.

6 Conclusions

A large percentage of the respondents use search engines and academic journal articles to search for information. The present study signified that search engines, open access electronic journals, library-subscribed databases and library websites were the sources with high importance level for the purpose of information-searching among the respondents. The institutions should maintain effective access to internet connection and continuous subscription of online databases. Libraries also should create awareness on open access to health information resources.

Libraries nowadays face another challenge due to the proliferation of information which is further augmented by the advancement of information technology at an exponential rate. The role of the library as an information provider may be on the verge of diminishment if librarians do not stand together to reinvent their purpose of existence and transform to a more relevant role to stay competitive.

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References

- Bourque, L., & Fielder, E. P. (2003). *How to conduct self-administered and mail surveys* (Vol. 3): Sage.
- Connaway, L. S., & Powell, R. R. (2010). *Basic research methods for librarians: ABC-CLIO*.

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- Davies, K. (2007). The information-seeking behaviour of doctors: a review of the evidence. *Health Information & Libraries Journal*, 24(2), 78-94.
- De Rosa, C. (2005). Perceptions of libraries and information resources (Dublin OH: OCLC Online Computer Library Center).
- Griffiths, J. R., & Brophy, P. (2005). Student searching behavior and the web: use of academic resources and Google.
- Larson, A. G. (2017). Faculty awareness and use of Library subscribed online databases in the University of Education, Winneba. Ghana: A survey.
- Mavodza, J. (2011). Information seeking behaviour of library users at Metropolitan College of New York. *Reference Services Review*, 39(4), 643-653.
- Mostafa, J. (2005). Seeking better web searches. *Scientific American*, 292(2), 66-73.
- Ong, S. W., Hassali, M. A., & Saleem, F. (2018). Community pharmacists' perceptions towards online health information in Kuala Lumpur, Malaysia. *Pharmacy Practice (Granada)*, 16(2).
- Purcell, K. (2011). Search and email still top the list of most popular online activities. *Pew Internet & American Life Project*, 9, 1-15.
- Rasul, A., & Singh, D. (2017). The role of academic libraries in facilitating postgraduate students' research. *Malaysian Journal of Library & Information Science*, 15(3), 75-84.
- Rieger, O. Y. (2009). Search engine use behavior of students and faculty: User perceptions and implications for future research. *First Monday*, 14(12).
- Sahu, H. K., & Nath Singh, S. (2013). *Information seeking behaviour of astronomy/astrophysics scientists*. Paper presented at the Aslib Proceedings.
- Yu, H., & Kaufman, D. (2007). A cognitive evaluation of four online search engines for answering definitional questions posed by physicians *Biocomputing 2007* (pp. 328-339): World Scientific.
- Zawawi, S., & Majid, S. (2001). The information needs and seeking behaviour of the IMR biomedical scientists. *Malaysian Journal of Library & Information Science*, 6(1), 25-41.
- Zhang, L., Ye, P., Liu, Q., & Rao, L. (2011). Survey on the utilization of NSTL electronic resources in colleges and universities in Wuhan, China. *The Electronic Library*, 29(6), 828-840.