

LAPORAN AKHIR

THE UTILIZATION OF INFORMATION TECHNOLOGY AMONG DOCTORS IN KELANTAN A COMPARATIVE CROSS-SECTIONAL STUDY BETWEEN MEDICAL OFFICERS IN THE TERTIARY CENTERS (HKB & HUSM) AND DISTRICT HOSPITALS AND HEALTH CLINICS.

GERAN JANGKAPENDEK USM



UNIVERSITI SAINS MALAYSIA

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Nama Penyelidik-penyelidik:

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Dr. Ling Naing @ Mohd Ayub
Nor Azmi Zainal

**BAHAGIAN PENYELIDIKAN & PEMBANGUNAN
CANSITORI
UNIVERSITI SAINS MALAYSIA**

Laporan Akhir Projek Penyelidikan Jangka Pendek

- 1) Nama Penyelidik: Dr. Nik Mohd Rizal bin Mohd Fakri

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- 2) Pusat Pengajian/Pusat/Unit : Pusat Pengajian Sains Perubatan

- 3) Tajuk Projek:

**The utilization of information technology among doctors in Kelantan
A comparative cross-sectional study between medical officers in the tertiary
centers (hkb & husm) and district hospitals and health clinics.**

BAHAGIAN PENYELIDIKAN
PUSAT PENGAJIAN SAINS PERUBATAN

SALINAN :

Bng. Penyelidikan, PPSP

Perpustakaan Perubatan, USMKK

RCMO

T/Tangan : Tarikh : 26/7/05

- 4) (a) Penemuan Projek/Abstrak
(Perlu disediakan makluman di antara 100 – 200 perkataan di dalam Bahasa Malaysia dan Bahasa Inggeris. Ini kemudiannya akan dimuatkan ke dalam Laporan Tahunan Bahagian Penyelidikan & Pembangunan sebagai satu cara untuk menyampaikan dapatan projek tuan/puan kepada pihak Universiti).

ABSTRACT

Objectives To compare the knowledge, skills and attitudes of IT between doctors in HUSM, those in health ministry hospitals and health clinics and those from general practice.

Methods A comparative cross-sectional study among 84 medical officers from HUSM, 84 medical officers from health ministry hospitals and health clinics and 84 general practitioners in Kelantan. A structured self-administered questionnaire was used. There were three domains in the questionnaire; knowledge, attitudes and practices and skills (30 questions for each domain). There were three options for the administration of the questionnaire; paper-based, computer-based and web-based. The questionnaire was tested for reliability and validity among 30 medical officers in HUSM.

Results There was no significant difference in knowledge and attitude among all three groups of doctors. However in skills, there was significant difference among the doctors from general practitioners as compared to other two groups.

Conclusions All three groups of doctors from health ministry hospitals and health clinics and those from general practice had good knowledge and positive attitude of information technology. However doctors from general practice showed a significantly lower skills in information technology.

USM J/P-06 - 2

- (b) Senaraikan Kata Kunci yang digunakan di dalam abstrak:

Bahasa Malaysia

Bahasa Inggeris

information technology

medical informatics

doctor

general practitioner

5) Output Dan Faedah Projek

- (a) Penerbitan (termasuk laporan/kertas seminar)

(Sila nyatakan jenis, tajuk, pengarang, tahun terbitan dan di mana telah diterbit/dibentangkan).

(b) Faedah-Faedah Lain Seperti Perkembangan Produk, Prospek Komersialisasi Dan Pendaftaran Paten.

(Jika ada dan jika perlu, sila guna kertas berasingan)

(c) Latihan Gunatenaga Manusia

i) Pelajar Siswazah

ii) Pelajar Prasiswazah:

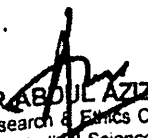
iii) Lain-Lain :

6. Peralatan Yang Telah Dibeli:

Sila lihat lampiran belanjawan

UNTUK KEGUNAAN JAWATANKUASA PENYELIDIKAN UNIVERSITI

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T/TANGAN PENERUSI
J/K PENYELIDIKAN
PUSAT PENGAJIAN

THE UTILIZATION OF INFORMATION TECHNOLOGY AMONG DOCTORS IN KELANTAN: A COMPARATIVE CROSS-SECTIONAL STUDY BETWEEN MEDICAL OFFICERS IN THE TERTIARY CENTERS (HKB & HUSM) AND DISTRICT HOSPITALS AND HEALTH CLINICS.

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Department of Medical Education, School of Medical Sciences, Universiti Sains Malaysia, Health Campus, Kubang Kerian Kelantan.

Introduction

Information Technology (IT) plays a vital role in the development of health care in our country and other parts of the world. This report describes the comparison of knowledge, skills and attitudes of IT between doctors in HUSM, those in health ministry hospitals and health clinics and those from general practice.

Methodology

A comparative cross-sectional study was conducted among 84 medical officers from HUSM, 84 medical officers from health ministry hospitals and health clinics and 84 general practitioners in Kelantan. A structured self-administered questionnaire was used. There were three domains in the questionnaire; knowledge, attitudes and practices and skills (30 questions for each domain).

Results There was no significant different in knowledge and attitude among all three groups of doctors. However in skills, there was significant different among the doctors from general practitioners as compared to other two groups.

Conclusions All three groups of doctors from health ministry hospitals and health clinics and those from general practice had good knowledge and positive attitude of information technology. However doctors from general practice showed a significantly lower skills in information technology.

INTRODUCTION

Information Technology (IT) plays a vital role in the development of health care in our country and other parts of the world. The evolving nature of medical knowledge and technology requires that the doctors of tomorrow be able to develop practice management and computer skills in order to enhance quality patient care, ongoing education, and research. Recent advances in information technology will offer clinicians valuable new tools to support the medical management of patients.⁷ To date, there is no formal education on medical informatics introduced in School of Medical Sciences, Universiti Sains Malaysia(USM).

In other countries, it has been introduced as early as 1972 (University of Heidelberg).¹² Other example, in response to the call for more informatics teaching in the medical curriculum, an elective special study module has been offered to first-year students at Queen's University since 1997. Informatics for undergraduate students in medicine and allied health professions must be developed as a relevant and useful component of the curriculum.⁵

USM has long introduced the problem-based learning approach. There will be arguments about the impact on the introduction of medical informatics in the curriculum. However at Dalhousie , Kaufman DM have introduced the integration of medical informatics as a horizontal theme in the problem-based learning undergraduate medical education curriculum. The education of future physicians can be enhanced when medical informatics is introduced into a curriculum in conjunction with the problem-based learning approach.¹¹ It has been shown that students' use of computer technology and IT skills, is more influenced by the demands of the overall curriculum than by undertaking a single module in medical informatics.¹ At Chicago Medical School (CMS), the Informatics program incorporates information technology at every stage of medical education.¹³

The importance of informatics training within a health sciences program is well recognized and is being implemented on an increasing scale. A group of researchers from Medical Education, Faculty of Medicine, University of Calgary, Alberta, Canada have described how the discipline of medical informatics can be integrated into an undergraduate medical curriculum, not as a course or series of courses but as a repeated theme throughout the 3-year system-based curriculum.¹⁷

However, Medical School University of Zagreb with long-term experience and students' opinion, shown that the most relevant Medical Informatics subjects, any kind of medical application, should necessarily come at the end of the medical curriculum.³

Why do we need medical informatics education? Medical informatics education is of particular importance at the beginning of the 21st century for the following reasons:²

1. progress in information processing and information and communication technology is changing our societies;
2. the amount of health and medical knowledge is increasing at such a phenomenal rate that we can-not hope to keep up with it, or store, organise and retrieve existing and new knowledge in a timely fashion without using a new information processing methodology and information technologies;
3. there are significant economic benefits to be obtained from the use of information and communication technology to support medicine and health care;
4. similarly the quality of health care is enhanced by the systematic application of information processing and information and communication technology;
5. it is expected, that these developments will continue, probably at least at the same pace as can be observed today;
6. health care professionals who are well-educated in health or medical informatics are needed to systematically process information in medicine and in health care, and for the appropriate and responsible application of information and communication technology;
7. through an increase in scope and the provision of high quality education in the field of health and medical informatics, well-educated health care professionals world-wide are expected to raise the quality and efficiency of health care.

The aim of this study is to assess the current attitudes, knowledge and skills of doctors in Kelantan of the role of information technology(IT) in medicine. This will give a basis for preparing the introduction of medical informatics into a curriculum in conjunction with the problem-based learning approach.

OBJECTIVES

General objective:

To compare the knowledge, skills and attitudes of IT between doctors in HUSM, those in health ministry hospitals and health clinics and those from general practice.

Specific objectives:

1. to assess the current attitudes, knowledge and practice of doctors in Kelantan of the role of IT in medicine.
2. to assess the extend of utilization of IT by doctors in Kelantan.
3. to evaluate the importance of IT among doctors in their Continuing Medical Education (CME) , researches and career.
4. to suggest mechanisms towards improvement in the role and knowledge level of IT among doctors.
5. to compare the knowledge, skills and attitudes of IT between doctors in HUSM ,those in health ministry hospitals and health clinics and those from general practice.
6. to find out the factors (socio-demographic) influencing the knowledge, attitudes and practice of IT among doctors in Kelantan.

METHODOLOGY

A comparative cross-sectional study was conducted among 84 medical officers from Hospital Universiti Sains Malaysia (HUSM), 84 medical officers from health ministry hospitals and health clinics and 84 general practitioners in Kelantan between October to December 2001. A structured self-administered questionnaire was used. There were three domains in the questionnaire; knowledge, attitudes and practices and skills (30 questions for each domain). There were three options for the administration of the questionnaire; paper-based, computer-based and web-based. The questionnaire was tested for reliability and validity among 30 medical officers in HUSM.

Data collection and handling

In October 2001, self-administered questionnaire was issued to approximately 84 medical officers from HUSM, 84 medical officers from health ministry hospitals and health clinics and 84 general practitioners in Kelantan. Simple randomization was carried out for the selection of the participants. The questionnaires were posted via ordinary mail and the participants were asked to return the completed questionnaire using the supplied stamped envelope.

In knowledge domain, the questionnaire consisted of 10 items of true false type. In attitude and skills domains, the questionnaire consisted of 10 items of 5-point Likert-type. The questionnaire also included a biographical section asking participants to indicate their age, gender, year of service, and place of work.

Data analysis

Analysis of the data was performed using SPSS version 11.0 for Windows. It was analysed by Bonferroni ANOVA test. The test was considered significant if $p < 0.05$

RESULTS

Demographic data

174 participants (55% male and 45% female) completed and returned the questionnaires. The age range of the participants was between 26 to 68 years old. The years of service range was between one to forty years.

Knowledge

Participants from Health Ministry had the highest mean score of 71.0 as compare to participants from USM (70.3) and those from general practice with the lowest score of 66.7. However the difference was not significant (Table 1).

Table 1

Variable	Group	Group	Mean Difference	Std. ^a Error	<i>p</i> value ^a
Knowledge	USM	KKM	-0.44	4.77	1.00
		GP	3.93	5.01	1.00
	KKM	USM	-0.44	4.77	1.00
		GP	4.37	5.17	1.00
	GP	USM	-3.93	5.10	1.00
		KKM	-4.37	5.17	1.00

^a Bonferroni ANOVA test

Attitude

Participants from Health Ministry had the highest mean score of 69.2 as compare to participants from USM (65.4) and those from general practice with the lowest score of 64.4. However the difference was not significant (Table 2).

Table 2

Variable	Group	Group	Mean Difference	Std. ^a Error	<i>p</i> value ^a
Attitude	USM	KKM	-4.18	2.52	0.296
		GP	0.66	2.67	1.00
	KKM	USM	4.18	2.52	0.296
		GP	4.84	2.73	0.233
	GP	USM	-0.66	2.67	1.00
		KKM	-4.84	2.73	0.233

^a Bonferroni ANOVA test

Skill

Participants from USM had the highest mean score of 66.1 as compare to participants from Health Ministry (58.3) and those from general practice (GP) with the lowest score of 41.0. The different were statistically significant between the GP group and the other two groups (Table 3).

Table 3

Variable	Group	Group	Mean Difference	Std. ^a Error	<i>p</i> value ^a
Skill	USM	KKM	7.88	3.33	0.057
		GP	25.17	3.55	0.000
	KKM	USM	-7.88	3.33	0.057
		GP	17.29	3.59	0.000
	GP	USM	-25.17	3.55	0.057
		KKM	-17.29	3.59	0.000

^a Bonferroni ANOVA test

Discussion

In Malaysia, ICT is a big government agenda. Various approaches have been made over the years to ensure the country could possibly incorporate ICT in many government and private sectors. MultiMedia Supercorridor and SuperCyber were developed in 1998 to convince the world that Malaysia is very serious and committed in the development of ICT. Special loans or grants are provided to the government workers to buy computer. Malaysia ex- Prime Minister, Dr. Mahathir Mohamed as the key person in the project had introduced special motto in year 2000: 'One computer for each house' to promote Malaysian people using computers. Medical schools in the country should have computer laboratory for the ease of student to utilize the internet and other computing activities. More research grants are easily approved if they involved in ICT. All these happenings have taken place over the last five to six years. It would give an impression that over that time, more people in Malaysia have been exposed to the progressively rapid development of ICT in many aspects throughout the country. More people are now using computers in their house, including their children. For the schools students, computer clubs are now very active and popular.

It is therefore not surprising to see that all three groups scored at the higher side in knowledge and attitude. There are many positive development of information technology in medicine. High technology medical equipments help doctors in their daily clinical judgement and management. Researchers in laboratories utilise high-end computers to process complex data. Internet has made publishing their study reports even easier than before.

However all three groups scored quite low in the skills domain. Participants from the general practice scored lowest (41.0) and it was statistically significant as compared to other two groups (p value= 0.000). Getting higher scores probably explain that doctors from USM and Health Ministry utilise more information technology compare to their colleagues in general practice. In USM, medical doctors need to use computer to communicate via emails, getting results from the laboratories, publishing research reports, and lecturers would use the computers as teaching facilities. Lowest score in skill domain probably explain that doctors from general practice do not really utilise the computers as compare to those in the health ministry and USM.

Conclusion

All groups from USM, Health Ministry and general practitioners scored higher in knowledge and attitude domain. They had a good knowledge and attitude towards the utilisation of information technology in medicine. However their score in attitude were quite low and the general practitioners group score significantly lower than the other groups.

Reference:

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Keywords : information technology, medical informatics, doctor, general practice

ABSTRACT

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General introduction

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METHODS

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Instruments

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DISCUSSIONS

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CONCLUSIONS

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ACKNOWLEDGEMENTS

- 1. Chairman, Research and Ethics Committee, Universiti Sains Malaysia for the short terms grant given for the study.**
- 2. Cik Jemilah Jusoh, Department of Medical Education, Universiti Sains Malaysia.**

REFERENCES

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Utilization of Information Technology Among Doctors in Kelantan

The aim of this study is to assess the knowledge, attitudes and skills of doctors in Kelantan to the role of Information Technology in the medicine.

There are 30 questions in this questionnaire. They are divided into three sections: Section 1 deals with IT Basic IT Skills & Knowledge, Section 2 deals with attitudes towards IT and Section 3 concerns with IT Practices. We would be grateful if you would spare a few minutes to complete all sections.

Your answers to these questions will NOT be graded and will be treated confidentially. The results will be used to assess the knowledge, attitudes and skills and practice of doctors in Kelantan to the role of Information Technology in medicine and to plan IT input in the undergraduate medical curriculum .

Background Profile:

Age:.....

Years of services:.....

Gender:.....

University of graduation (optional):.....

Place of work:.....

Section 1-Basic IT Knowledge

In this session, you are asked about your basic IT Knowledge. For each Competency listed, please mark in the relevant answer grade that you think most appropriate: 1 = Don't know, 2 = Know, 3 = Intermediate, 4 = Expert.

Q1.	Can you assemble a computer ?	Yes	No
		<input type="radio"/>	<input type="radio"/>
Q2.	Have you installed any computer software ?	Yes	No
		<input type="radio"/>	<input type="radio"/>
Q3.	What is the name of your operating system ?(please select one or more): 1. Windows 98 2. Windows ME 3. Windows XP 4. Mac OS 9 5. Mac OS X 6. Others:.....		
Q4.	Do you know how to install a printer	Yes	No
		<input type="radio"/>	<input type="radio"/>
Q5.	Do you know the difference between computer hardware and software	Yes	No
		<input type="radio"/>	<input type="radio"/>
Q6.	Do you know how to use disk maintenance programmes (e.g. Disk Defragmenter, ScanDisk, Disk Cleanup, etc.)	Yes	No
		<input type="radio"/>	<input type="radio"/>
Q7.	regarding intranet:	Yes	No
	a) Local Area Network (LAN)	<input type="radio"/>	<input type="radio"/>

Q8.	b) how to print to network printer or printer attached to remote computer on LAN.	Yes	No
Q9.	a) how to browse the WWW. Name one browser that your are familiar with (e.g. Netscape, Internet Explorer, etc.): _____	Yes	No
Q10.	b) how to use e-mail programme. Please name an e-mail programme that you use currently (e.g. Outlook Express, Microsoft Outlook, Pine (telnet), Netscape-mail, etc.) _____	Yes	No

Section 2

In this session, you are asked about your attitudes towards IT. Please mark in the relevant answer according to your current attitude. Please select only one from 1 (strongly disagree) to 5 (strongly agree).

Attitudes towards IT

Q1.	Patient's personal data and profile is easily shared via discussion list on the Internet.	Disagree <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 Agree
Q2.	Information technology teaching should be introduced in the medical curriculum.	Disagree <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 Agree
Q3.	Medical information from the Internet can improve my clinical management.	Disagree <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 Agree
Q4.	Using Electronic Medical Record compromises patient's confidentiality.	Disagree <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 Agree
Q5.	Using computers will make people less confident with their own decisions.	Disagree <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 Agree
Q6.	Clinical decision supported by information from the Internet is more reliable.	Disagree <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 Agree
Q7.	Computer will one day replace medical textbook. (Electronic medical learning materials will some day replace medical textbook).	Disagree <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 Agree
Q8.	Virtual human will someday replace human subject for students' clinical examinations and practices.	Disagree <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 Agree
Q9.	Patients' long stay in hospitals is reduced when an IT system is fully utilised.	Disagree <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 Agree
Q10.	Hospitals equipped with IT infrastructures are better than non equip hospitals.	Disagree <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 Agree

Q30. If there is a plan to introduce Medical Informatics in the curriculum, rank the approaches below according to your preferences.

Integrated across the whole curriculum	
Stand-alone formal lectures/seminars/tutorials	
Self-directed learning with study pack/handouts	
Computer assisted learning packages	
Project based	
Group work	
Bedside teaching/ward rounds	
Student assignments	
Other (please describe):.....	

Section 3 – Practices of IT

In this session, you are asked about your current practices of IT. Please mark in the relevant answer(s) according to your current practices. Please select only one from 1 (Never) to 4 (Always).

Previous experience with, and present Access to Computers:

Q1.	I used computers: (you may tick more than one) a. in the secondary school b. in the university c. at home d. in the hospital e. other place (please name):.....	
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I use computers for

		Never → Always <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> 1 2 3 4
Q2.	typing using word processing	Never → Always <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> 1 2 3 4
Q3.	analysing data using spreadsheets	Never → Always <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> 1 2 3 4
Q4.	retrieving medical information from the Internet	Never → Always <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> 1 2 3 4
Q5.	sending e-mail messages	Never → Always <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> 1 2 3 4
Q6.	creating presentation	Never → Always <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> 1 2 3 4
Q7.	performing statistical analysis	Never → Always <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> 1 2 3 4
Q8.	entertainments	Never → Always <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> 1 2 3 4

Q9.	other uses: _____	Never			Always
		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		1	2	3	4

Q10. How many hours per week do you use computers?

- More than 10 hours
- 5 – 10 hours
- 2 - 5 hours
- 1 – 2 hours
- Less than 1 hour
- Never use

How often do you utilize the computer for the following purposes?

	Never	Sometimes	Often
Patients' data and record management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Upgrading your knowledge on current medical practices (CME)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Getting expert opinion on your patients' management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Free online medical journals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Referrals of patient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Case presentations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>