

2011

The Interplay of Facilitating Conditions and Organizational Settings in the Acceptance of Teleconsultation Technology in Public Hospitals in Malaysia

Nurazean Maarop

University of Technology Malaysia, nurazean@ic.utm.my

Khin Tan Win

University of Wollongong, win@uow.edu.au

Follow this and additional works at: <http://aisel.aisnet.org/acis2011>

Recommended Citation

Maarop, Nurazean and Win, Khin Tan, "The Interplay of Facilitating Conditions and Organizational Settings in the Acceptance of Teleconsultation Technology in Public Hospitals in Malaysia" (2011). *ACIS 2011 Proceedings*. 14.
<http://aisel.aisnet.org/acis2011/14>

This material is brought to you by the Australasian (ACIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in ACIS 2011 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

The Interplay of Facilitating Conditions and Organizational Settings in the Acceptance of Teleconsultation Technology in Public Hospitals in Malaysia

Nurazean Maarop^{1,2}

¹Advanced Informatics School,
University of Technology Malaysia,
Kuala Lumpur, Malaysia
Email: nurazean@ic.utm.my

Khin Than Win²

²School of Information Systems and Information Technology,
Faculty of Informatics,
University of Wollongong,
New South Wales, Australia
Email: win@uow.edu.au

Abstract

This research explores users' intention to use teleconsultation technology. The study also explores the influence of facilitating conditions on the acceptance of the technology in the health care environment in Malaysia. Further, the study compares the level of user acceptance in two organizational settings: (1) between emergency and non-emergency environment, and (2) between referring and referral hospital. This research presumes on the basis of exploratory and descriptive study engaging a survey of healthcare providers who practice in public hospitals in Malaysia. The study reports a high level of acceptance and acceptable extent of facilitating conditions of teleconsultation technology. Thus, some facilitating conditions demonstrate significant correlations with the acceptance of teleconsultation. Interestingly, the study exhibits valuable insights concerning the acceptance of teleconsultation technology in the respective settings being compared. Overall, the findings provide useful insights for both practitioners and future researchers of health information technology adoption studies in the relevant context.

Keywords

Teleconsultation, Health IT, Technology Adoption, Technology Acceptance, Facilitating Conditions

INTRODUCTION

The recent introduction information technology (IT) in health care certainly has tremendously enhanced health care quality and service delivery. There are many types of health applications used in health care sector. One of the most emerging applications proven to be beneficial to hospital management and patients' health outcome is telemedicine. Telemedicine is defined as the integration of information telecommunication, human-machine interface technologies and health technologies to deliver health care, to promote the health status of the people and to create health (Mohan and Raja-Yaacob 2004). It provides healthcare facilities, clinical information and education over a distance (Maheu et al. 2001). Teleconsultation is one of the main components of telemedicine served as a communicational and interaction platform between two or more health care professionals. In Malaysia, this includes consultation and referral over electronic platform engaging at least two health professionals communicating about disease and patient management that takes place between primary (also secondary) and tertiary health care facilities respectively.

According to the health vision of Ministry of Health (MOH) Malaysia, the telemedicine application was anticipated to be promoting good health and preventing morbidity and mortality (MOH Malaysia 2009). Subsequently, the new teleconsultation was launched in early 2010 and indeed its potentials should be realized and aligned correspondingly. The implementation of the recent teleconsultation technology was done in stages involving 38 participating hospitals. Prior to adoption into routine use, the technology has to be proved to be superior to the conventional method it is intended to replace (Roine et al. 2001). Nonetheless, at the national level, there is no thorough study has been conducted to explore the potential and acceptance of teleconsultation technology particularly from the perspective of health care providers who practice at the participating hospitals. Telemedicine implementation is costly. It is the hope of MOH Malaysia to turn teleconsultation into an integral part of the healthcare delivery system in the country, which will facilitate more equitable, accessible and affordable delivery of health care. Therefore, this study is relevant as the outcome can be of importance to project implementer, MOH, national health care direction, and theoretical advancement. Physicians are the end-

users of teleconsultation technology and their acceptance is often crucial to technology implementation success (Chau and Hu 2001).

Above and beyond, physicians' acceptance of telemedicine technology represents the most important challenge for telemedicine continuance (Gagnon et al. 2005). In particular, the physicians' acceptance of telemedicine represents the vital part for its diffusion on a national scale (Gagnon et al. 2003). For that reason, there is a need to develop an in-depth understanding concerning the acceptance of the new teleconsultation technology in the Malaysian health care context. In particular, the objectives of this study are to (I) explore the intention to use the teleconsultation technology among health care providers and (II) investigate the interplay of facilitating conditions and the acceptance of teleconsultation, (III) compare the level of acceptance and facilitating conditions between emergency and non-emergency environment and, (IV) compare the level of acceptance and facilitating conditions between referring and referral hospital.

BACKGROUND

According to Dillon and Morris (1996) acceptance is the willingness within a user group to employ information technology (IT) to the tasks it is designed to support. Nowadays, many researchers have been interested in factors that explain the acceptance and use of different technologies in health care. Technology Acceptance Model (TAM) was proposed by Davis (1989) has been used in a number of studies to explain user acceptance. TAM has become evident as one of the most influential theories in Information Systems (Ventakesh et al. 2003). TAM suggests that when users are presented with new software, a number of factors would influence their decision about how and when they will use it. Specifically, two primary constructs from TAM are of importance in determining the acceptance of technology (Davis 1989). These were perceived usefulness (PU) and perceived ease of use (PEOU). PU was defined as the degree to which a person believes that using a particular system would enhance his or her job performance (Davis 1989). PEOU was defined as the degree to which a person believes that using particular system would be free from effort (Davis 1989). BI was used as a measure of strength of one's intention to perform a specific behaviour, that is, use an information system (Davis 1989).

Although TAM was used fairly convincing in explaining physicians' acceptance and utilization of health IT, the actual barriers and facilitators to technology use were still not covered suggesting a more rigorous research endeavour should be carried out to uncover specific, contextualized, and actionable constructs that may have existed in health IT diffusion (Holden and Karsh 2010). Therefore we have considered Unified Theory of Acceptance and Use of Technology (UTAUT) (Ventakesh et al. 2003), Model of PC Utilization (MPCU) (Thompson et al. 1991) and Theory of Interpersonal Behaviour (TIB) (Triandis 1980) to support the exploitation of facilitating conditions as one of the important topic of concerns in the teleconsultation acceptance and adoption. Facilitating conditions was defined in MPCU as "objectives factors in the environment that observers agree make an act easy to accomplish" (Thompson et al. 1991) and in regards to UTAUT, facilitating conditions are supports from organizational and technical infrastructure (Venkatesh et al. 2003) to accommodate adoption activities. Facilitating conditions was postulated in the study of telemedicine adoption on a national scale in Canada. However, the items selected for the use of questionnaire were claimed to be reasonably inadequate which has resulted in failure in testing the effect on the utilization (Gagnon et al. 2003). Conversely Hu et al. (1999) found that conditions such as proper training, technology access, and in-house technology expertise, were positively associated with behavioural intention to use telemedicine technology by physicians. UTAUT has been tested in a study examining factors influencing health IT adoption in Thailand's community health centres and the study has confirmed the validity of facilitating conditions and the model itself in developing countries' healthcare setting (Kijisanayotin et al. 2009). In particular, our previous review of telemedicine implementation in developing countries has also asserted that lack of technical support, recurrent service and equipment failures, inadequacy of telecommunication infrastructure, absence of practice management guidelines, poor market promotion of technology and less support from relevant management could cause telemedicine technology remain unused or underutilized in those regions (Maarop & Win 2009). In turn, we considered some of these facets and backgrounds to justify the topics of concerns that were then used to ask the survey participants involved in the context of this study. Hence we seek to explore the state of facilitating conditions of teleconsultation utilization in public hospitals in Malaysia. Further, we postulate that several relevant facilitating conditions are significant in enhancing the acceptance of teleconsultation in Malaysia. Based on literature studies and our preliminary investigation (Maarop & Win 2009, Maarop et al. 2009), these conditions are identified as in-house technology support, technical support such as system manual, support from Head of Department, training, placement of workstation, completeness of equipment, stability of network, awareness program and amount of workload.

Since telemedicine operates beyond one dimensional environment, the context where the telemedicine is intended to commence must be examined carefully first (Whitten & Adams 2003). An investigation of hospitals' characteristics on telehealth adoption by Gagnon et al. (2005) underlined the significance of considering

organizational characteristics and the dynamics of each of healthcare facilities. Little research has been done to elucidate the moderating effects of hospitals' characteristics on teleconsultation acceptance. Also, the interviews of 37 specialists from six medical disciplines revealed that social and technical adaptation is required to make teleconsultation an attractive, user friendly and reliable technology as to be accepted into physicians' practice thus physicians in six medical specialists cannot utilize teleconsultation to the same extent (Lehoux et al., 2002). Further, the service should be disseminated more among those who do not require comprehensive of patient examinations, who are lack of sufficient access to specialist and those in need and prefer such service (Lehoux et al., 2002). Another example of the moderating effect can be seen in between primary care and secondary care. Consequently, the acceptance of technology was evident to be the one of the components determining success of telemedicine in both primary and specialized care (Romero et al 2008). Nevertheless, at the same time, the primary care is often more concerned about workflow and acquisition of photographic images whereas specialised care is more concern about quality of images and diagnostic certainty (Romero et al 2008). In a normal circumstance, the centralized health care system is in parallel with 'domain-defensive' strategy whereas decentralized health care system is much associated with 'domain-offensive' organization (Fairbank et al., 2006). In this regards, Walker and Whetton (2002) claimed that an organization that is complex and decentralized has the potential to introduce telehealth services relatively easily in comparison with the centralized whereas a formalized structure with a lack of resources and limited management support would reduce users' voluntary use of telehealth service. This is consistent with the previous finding which indicated that when a hospital follows domain offence strategies and, at the same time have plentiful resources and being managed by highly interactive top management teams, an adoption of imaging innovations are at best (Tabak et al., 2000). This is because, with different structures of health care as well as the location of health centre, telemedicine support can be dissimilar and (Nessa et al. 2008). Further, Lehoux et al. (2002) indicates that medical disciplines depending on either thorough physical examinations or specialised investigative techniques are unlikely to restructure their work routines to accommodate teleconsultation thus specialities that primarily exploit images or numerical data tend to perceive teleconsultation as more useful. Hence, with these backgrounds we undertake the endeavour to compare how physicians accept teleconsultation between different organizational settings.

RESEARCH METHODOLOGY AND MODEL

In general, this study presumes on the basis of exploratory and descriptive study. The purposive sampling was applied involving health care providers to respond to self-response quantitative survey. The survey was distributed to only existing users of the system and those personnel who have attended teleconsultation seminar and training. The sample which involved the users and future adopters of teleconsultation technology at the participating hospitals in Malaysia was drawn from the actual subjects of the population. The preliminary study was performed to confirm the relevancy of the categories that were highlighted in the research model. Based on the result from preliminary interviews, most of the categories addressed in the tentative research model were relevant to be considered in the questionnaire. The measurement items were developed based on the issues addressed by literature review including from developing countries context (Maarop & Win 2009), previously tested items (Davis 1993; Chau and Hu 2002) and were further modified according to the context of Malaysian health care environment (Maarop et al. 2009). Further, before embarking on the primary data collection, we piloted the questionnaires on a small sample of 12 teleconsultation users and experts, so that the feedback can be used to make modifications to the instrument (Morgan et al. 2004). A contact list of participants together with the information concerning the locations of the corresponding adopting hospitals was obtained from the key person at the respective division of MOH Malaysia. In terms of actual population, there were only 38 hospitals elected by MOH which were rendered with teleconsultation services that link to the nation-wide telehealth network. Of these 38 teleconsultation participating hospitals, only 11 hospitals involved in this study since the majority of other hospitals were still in midst of technical arrangement for the completion of installation with the relevant vendor. Further, due to budget and timeframe constraint, the data were collected from the available and accessible participating hospitals in Peninsular Malaysia. The participation was based on initial permission and it was done on the individual voluntary basis.

In the context under study, based on our preliminary investigation, the prime teleconsultation activities were found to be related with medical support involving image transfer along with patient history report and then followed up with consultation over the system or telephone. Most of teleconsultation cases were based on the need for specialist consent and advice for the health providers at the referring hospital to further manage the patient. In the context of this study, emergency environment involves acute emergency patients requiring brain or spine attention (in the case of neurosurgery) and acute chest pain (in the case of cardiology) that require urgent specialist intervention and shall be admitted. In the acute emergency setting, when a patient was admitted to the emergency and trauma department that has first-level imaging diagnosis facilities (e.g. CT, ECG and X-Ray), the referring doctor would create a teleconsultation case by loading the respective images together with patient clinical history and clinical examination findings. Meanwhile, the patient would need to be stabilized as to be transported to tertiary care hospital. At the very best, the case would be picked up and responded by the in

charge medical officer as immediate as possible with less than 3 hours response time at the receiving workstation. In a minor emergency setting or semi-urgent cases, patients are likely to be advised by specialist to remain in the local hospital. The follow-up teleconsultation is likely to be made in this condition. On the other hand, the non-emergency environment involves patients who are likely to be treated under routine management as outpatients such that they would visit a hospital or clinic that provides teleconsultation facilities for diagnosis or treatment to seek for medical advice and treatment and shall not be admitted (e.g. in the case of dermatology and radiology). For example in the case of dermatology, a patient would come to any allied health facility to undergo routine check-up. If the in charge doctor felt that the patient needed teleconsultation referral, the patient would be registered into teleconsultation system together with the attachment of his or her medical history and preliminary clinical findings. The skin images will be captured and subsequently uploaded into the system as to enable further diagnosis by a dermatologist at the referral centre. The case is usually responded between one and five working days. A follow-up teleconsultation would be made upon requirement by the specialist.

Basically, the teleconsultation technology is utilized by two main end users namely sender and receiver who have the access to the application and both of them reside in the participating hospitals namely referring (for sender) and referral hospital (for receiver) respectively. The sender is a medical officer or medical assistant at primary hospital who is in need to get access to specialist in order to obtain further directive on patient management. The sender will access the teleconsultation system with his or her specified login ID and password and then fill in the necessary patient details and report together with the clinical inquiries to be sent over to the consultant at the referral (tertiary) hospital. Subsequently, the in charge health care provider at the referral centre will retrieve the image along with the corresponding patient details and then will either consult the case immediately or forward it to the other specialist in the same hospital.

Ethics approval and consents were firstly obtained before proceeding to data collection since this involved study of human behaviour in health care environment. Research ethics were approved by Institute for Health Behavioural Research (IHBR) MOH Malaysia, MOH Research and Ethics Committee (MREC) Malaysia and Economic Planning Unit (EPU) Malaysia. The research model used for the purpose of this study is shown in Figure 1. Specifically, we looked into the exploration of facilitating conditions and the associations that may have existed between the conditions and the acceptance of teleconsultation. Behavioural intention (BI) was used as a measure of strength of one's intention to perform a specific behaviour, that is, use an information system (Davis 1989). Further, we compare the level of acceptance between emergency and non-emergency environment and, between referring and referral hospital.

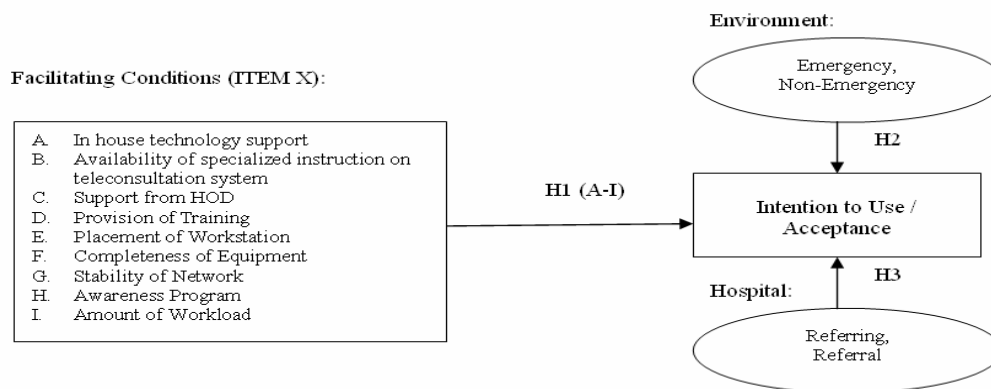


Figure 1: Research Model

The following hypotheses (Hypotheses 1) were set out to determine whether the facilitating conditions influence the acceptance of teleconsultation technology. These aspects have been identified in the background reviews and labeled as A to I shown in Figure 1. Concurrently, based on health care settings discussed in the literature reviews, hypothesis 2 and 3 were set out to determine whether there are differences between the level of user acceptance in two organizational settings: (1) between emergency and non-emergency environment, and (2) between referring and referral hospital. These hypotheses are as follows:

Hypotheses 1:

(H1: A-I): There are associations between Item X (A-I) and user acceptance.

Hypothesis 2

(H2): There is a significant difference between the level of user acceptance for emergency and non-emergency environment.

Hypothesis 3

(H3): There is a significant difference between the level of user acceptance for referring and referral hospital.

RESULT

In order to explore Hypothesis 1 (Item A-I) addressed in this research model (Figure 1), a questionnaire using a 7-point likert scale of 1 (Strongly Disagree) to 7 (Strongly Agree) with 4 as a mid-point score was employed. Of 38, only 11 participating hospitals (accounted for 29% of total hospital population) participated in this study. According to the participants contact list released by the respective department of MOH Malaysia during our preliminary study, we identified a target sample of 165 health providers from a target population who we felt qualified to participate in the survey involving 11 participating hospitals. Consequently, 72 usable responses were received to constitute an acceptably representative organizational sample (response rate of 43.6%). The findings reported in this study are based on the responses of the participants with the following profiles (n=72): 43.1% medical officers, 25% of specialists and 31.9% of medical assistants and radiographers. Further, of 72, 58.3% (n=42) and 41.6% (n=30) are participants who practice in the emergency and non-emergency department respectively. Likewise, of 72, 59.7% (n=43) and 40.3% (n=29) are participants who practice in the referring and referral hospital respectively. We employed descriptive and non parametric tests in order to answer four research objectives addressed in this study. Data from the survey were analyzed using SPSS Version 17.0 for Windows. The presentation of the findings is organized according to the respective analysis used in this study namely Descriptive and Reliability Coefficient, Correlation Coefficient and Mann-Whitney U test.

Descriptive and Reliability Coefficient

A summary of measurement items and likert scores (mean and standard deviation (S.D)) of acceptance and facilitating conditions on the completed obtained survey (N=72) was shown in Table 1 and 2 respectively. As the intention of this study was to explore the acceptance of the new teleconsultation technology, which primarily focused on the outcome of the intention to use, we followed the intention-based approach. Hence, we used behavioural intention as a surrogate to actual utilization behaviour since behavioural intention is the best indicator of system usage (Sun and Zhang 2006) and often replaced with user's actual behaviour towards system use (Fishbein and Ajzen 1975). Indeed, when the target technology has not been entirely implemented, measuring actual use may necessitate a proper longitudinal endeavour (Holden and Karsh 2010) and this cannot be realized due to time and budget limitation. The measurement of behavioural intention was represented by three items labelled as Item 1-3 as illustrated in Table 1. Cronbach's alpha () was used to measure the reliability of the instrument items (Cronbach 1970). As a consequence, the reliability coefficient for all 3 items of behavioural intention demonstrated acceptable value of 0.854. Accordingly, the reliability of all measurement scales were above the recommended minimum level of 0.70 (Nunnally 1978). Generally, the respondents reported a high level of behavioural intention to use teleconsultation technology with the overall means of 6.287.

Table 1. Measurement Items and Likert Scores of Acceptance

Item	Measurement	Mean	S.D.
1	I intend to use teleconsultation technology as often as needed.	6.36	.512
2	I intend to use teleconsultation technology more when technological barriers do not exist.	6.15	.799
3	I predict I would use teleconsultation more in future.	6.35	.772

Note: N = 72; Reliability Coefficient (α) on 3 items = 0.854; Overall Means = 6.287

Based on the results shown in Table 2, there is no statistical evidence to show that the respondents regard job workload as a significant constraint in the process of delivering health services using teleconsultation. This is evident when the majority of means score fall somewhere between the score of 'Disagree A Little' (Scale 3) and 'Neutral' (Scale 4). Overall, most respondents revealed a moderate to high level of facilitating conditions in delivering health services using teleconsultation. Accordingly, among the highest scores of facilitating condition were found to be associated with the provision of training (Item D), supports and encouragements from head of department (Item C), in-house technology support (Item A) and awareness program (Item H) with all the respective values fall somewhere between Agree and Strongly Agree. The mean and S.D scores for all items are shown in Table 2 with an acceptable reliability coefficient () of 0.722 precluding Item I (amount of workload) as apparently it is not regarded as a favourable or positive facilitating condition.

Table 2. Measurement Items and Likert Scores of Facilitating Conditions

Item	Measurement for Facilitating Conditions	Mean	S.D.
1	A A specific person (champion or assistant) is available during difficulties	6.10	.842
2	B There is specialized instruction on hardware and software (system manual) concerning TC system is available to the user	6.01	.847

3	C	My Supervisor (e.g. HOD) obviously supports and encourages the utilization of teleconsultation system.	6.11	.797
4	D	There is provision of training to facilitate the utilization of teleconsultation system.	6.19	.882
5	E	Teleconsultation equipment is accessible within walking distance when I want to use it.	5.65	.875
6	F	Most of the time, all necessary equipment are complete and sufficient for me to conduct a teleconsultation system.	5.64	.810
7	G	Most of the time the teleconsultation network is always stable and rarely shut down.	5.13	.871
8	H	There were talks or briefing (or something alike) held as part of the awareness programs to attract the use of teleconsultation.	6.08	.783
9	I	I am swamped with work and have no time to use teleconsultation	3.58	1.371

Note: N = 72; Reliability Coefficient (α) on nine items = 0.666; Reliability Coefficient (α) on positive items (without Item I) = 0.722

Correlation Coefficient

The pair wise correlation was used to indicate the relationships between two or more variables, including the strength and direction (Allen 2008). Prior to calculating correlation coefficient, the assumption of normality was tested. Subsequently, the computation of Spearman's correlation coefficient (r_s) was performed on the data as the data have violated the normality assumption (Allen 2008). The result is shown in Table 3.

Table 3. Correlation Coefficient (Spearman's)

		BI	A	B	C	D	E	F	G	H	I
BI	Correlation Coefficient (r_s)	1	.556**	.367**	.276*	.565**	.229	.144	-.076	.423**	-.017
	Sig. (2-tailed)		.000	.002	.019	.000	.053	.229	.526	.000	.884
	N	72	72	72	72	72	72	72	72	72	72

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Spearman's coefficient (r_s) exhibited the presence of strong positive correlations between in-house technology supports (Item A) and acceptance, $r_s = .556$, $p < 0.01$ as well as between provision of training (Item D) and acceptance, $r_s = .565$, $p < 0.01$. According to Cohen (1988), r_s of .50 or larger represents a strong correlation whereas r_s of .30 - .50 represents a medium correlation. This signified that the higher the technical supports and provision of training for teleconsultation service, the higher the acceptance of teleconsultation technology among users. Spearman's coefficient also indicated the presence of medium positive correlations between provision of system manual (Item B) and acceptance, $r_s = .367$, $p < 0.05$ as well as between awareness program (Item H) and acceptance, $r_s = .423$, $p < 0.01$. Other items were indeed not adequately significant ($p > 0.05$) to have been correlated with the acceptance of teleconsultation technology. Overall, item A, B, D and H were found to be significant to correlate with BI, indicating there were positive associations between acceptance and in-house technology support, provision of system manual, provision of training and awareness program respectively. The support from HOD (item C) has shown a weak correlation with the acceptance of teleconsultation technology in Malaysia. On the other hand, item E, F, G and I were found not significant to correlate with BI, indicating that there were no relationships between acceptance of teleconsultation and placement of workstation, completeness of equipment, stability of network and amount of workload respectively.

Mann-Whitney U Test

The Mann-Whitney U test is a non-parametric test used to analyse the difference between the medians (Allen 2008) of samples of emergency and non-emergency environment and samples of referring and referral hospital, concerning BI (acceptance). The result is shown in Table 4.

Table 4. Results of Comparison between Organizational Settings

Subject	Setting	N(72)	Mean Rank	Asymp. Sig
Intention to Use (BI) / Acceptance	A. Environment	Emergency	42	37.67
	Non-Emergency	30	34.87	.561

	B. Hospital	Referring	43	41.15	.049
		Referral	29	30.09	

Notes: N Asymp. Sig. (2-tailed), confidence level (95%), $\alpha(.05)$

The test was performed to know whether there is any significant difference in the acceptance of teleconsultation between emergency and non-emergency environment. The probability value (Asymp. Sig) obtained from SPSS 16.0 for Windows was larger than the predetermined alpha value (.05). Likewise, the test was also performed to know whether there is any significant difference in the acceptance of teleconsultation between referring and referral hospital. As a result, the probability value (Asymp. Sig) obtained from SPSS 16.0 for Windows was .049 slightly smaller than the predetermined alpha value (.05). In summary, the results provide no evidence to suggest that there is a significant difference between teleconsultation acceptance in the emergency and non emergency settings. However, there is a significant difference between the participants' acceptance of teleconsultation technology at referring and referral hospital. Both conclusions are made at the confidence level of 95%.

DISCUSSION

Several insights and implications for teleconsultation acceptance and adoption can be drawn from the results of this study. Firstly, overall the adopting physicians exhibited high intention to use teleconsultation. Secondly, almost every facilitating condition being addressed in this study was found to be acceptably satisfying among the users of teleconsultation technology. Interestingly in particular, amount of workload was not agreed by the majority of adopting physicians to be a constraint to teleconsultation use. Furthermore, some facilitating conditions have shown significant relationships with the acceptance of teleconsultation technology. Apparently the facilitating conditions with lower scores did not emerge to be correlated with the acceptance of teleconsultation. Besides, the facilitating conditions in the form of technical assistance (in-house technology support and provision of system manual) and change management program (training and awareness program) are seen more significant than those conditions relating to the provision of infrastructure in promoting the intention to use the technology. As indicated by the findings, the facilitating conditions with high scores are also potential to influence the uptake of teleconsultation thus should be placed as important aspects in enhancing the utilization capacity. These again include provision of training, in-house technology support, provision of specialised manual for the system, and dedicated awareness programs. However, even though there was high support and encouragement for the users to use teleconsultation from the respective head of department, the situation was still not adequate to influence the acceptance of the technology. The facilitating conditions with slightly lower scores in this study were the placement of workstation and stability of network. The result indicated that the teleconsultation equipment was considerably accessible within walking distance when one user wanted to use it. However, the placement of the workstation did not appear to be correlated with the acceptance of the technology. Likewise, the condition of the network was justly acceptable for the users to conduct teleconsultation session but the proviso was not significant to correlate with the acceptance of the technology. In general, there should be some enhancement in the provision of facilitating conditions as the more satisfying the condition is, the more it may have favourably contributed to the likelihood of the intention to use the technology.

The study showed a remarkable acceptance discrepancy between users at the referring hospitals and users at the referral hospitals towards teleconsultation. This observation can be attributed to the fundamental motive and reason for why teleconsultation was originally put into operation. Teleconsultation was aimed to virtually expand the clinical service and expertise to remote and underserved areas thus to improve quality of national health care (Mohan and Raja-Yaacob 2004). Thus teleconsultation was initiated to enable the extension of specialised services to the underserved areas and the sharing of scarce expertise and specialisation services (MOH 2009). Hence, it seemed reasonable why the technology was more embraced by the referring hospitals than the referral hospitals since there were clear intentions towards specialist access by those physicians at the primary (referring) hospitals. Consistently, findings of a review of telemedicine in developing countries have revealed that majority of the countries regard teleconsultation as a proxy to specialists' access thus the need for telemedicine is likely to be associated with the need for tele-specialists' consultation and second opinion (Maarop & Win 2009). Apparently in the context under study, teleconsultation technology has been accepted as an effective delivering tool in both emergency and non-emergency health care environment. However, based on the survey outcome, there was no enough evidence to show that there was difference in the intention to use teleconsultation between users at the emergency and non-emergency environment. Hence irrespective of types of environment, the acceptance of teleconsultation technology was encouraging in Malaysia. Thus, our findings have important implications for the overall of teleconsultation implementation. In the context under study, the maldistribution of specialist services is not only seen in the rural but also in urban areas (MOH 2009). Therefore the facilities incorporated in teleconsultation technology should address many of these facets in order to uphold the health care providers in promoting good health by preventing morbidity under non-emergency and minimizing mortality under emergency environment.

The scope of the research was limited in several respects. Due to the limited sample size in the present study and also violation of normality assumption on the data, statistical analyses were limited to descriptive and non parametric tests. Besides, as the study presumed on the basis of exploratory and descriptive, the operationalisation of the study was rather directed towards a descriptive interpretation and was not meant for theoretical validation or producing predictive model. As the focus of the study was to describe the influence of facilitating conditions on the acceptance of teleconsultation, hence, potential factors from other dimensions were not brought into the study. Besides since the data were collected during the stage when the new teleconsultation technology was recently implemented, the study was cross-sectional in nature. Nevertheless, in respect to theoretical development and future work, the categories that were discussed from this study may be potentially used to conceptualize a better measurement tools for facilitating conditions in the relevant context as the items demonstrated acceptable reliability.

CONCLUSION

This study helps to provide empirical evidence concerning the exploration of intention to use teleconsultation and the potential influence of facilitating conditions on the acceptance of the technology in the context of public hospital in Malaysia. The special contribution of this study is the exploration of intention to use teleconsultation technology among health care providers in different organizational settings. The study reports a high level of acceptance and acceptable facilitating conditions of teleconsultation technology. As a result, some facilitating conditions demonstrate significant correlations with the acceptance of teleconsultation. Overall, the findings provide useful insights for both practitioners and future researchers of health IT adoption studies in the relevant context. The study demonstrated the importance of contextualized facilitating factors that have existed in telemedicine diffusion which constituted a significant role in the acceptance of the technology. Besides, the study exhibits no significant difference in the acceptance of teleconsultation technology between physicians in the emergency and non-emergency environment whereas there is a higher tendency that physician who practises at referring hospital to utilize teleconsultation than those at the consulting sites. In respect to future theoretical work, the findings can be considered to conceptualize a further comprehensive teleconsultation acceptance model.

REFERENCES

- Allen, P. and Bennett, K. 2008. *SPSS for the health and behavioural sciences*. South Melbourne, Victoria, Australia: Thomson,
- Chau, P.Y.K, and Hu, P.J.H. 2001. "Information technology acceptance by individual professionals: A model comparison approach," *Decision Sciences* (32:4), pp 699-719.
- Chau, P.Y.K., and Hu, P.J. 2002. "Examining a model of information technology acceptance by individual professionals: an exploratory study," *Journal of Management Information Systems* (18:4), pp 191-229.
- Cronbach, L. 1970. *Essentials of Psychological Testing*. New York: Harper & Row
- Davis, F. 1989. "Perceived usefulness, perceived ease of use and user acceptance of information technology," *MIS Quarterly* (13:3), pp 319-340.
- Davis, F.D. 1993. "User Acceptance of Information Technology: System Characteristics, User Perception and Behavioural Impacts," *International Journal of Man Machine Studies*, (38:3), pp 475-487.
- Dillon, A., and Morris, M. G. 1996. "User acceptance of information technology: Theories and models,". In Williams, M. E. (Ed.) *Annual Review of Information Science and Technology* (Vol. 31), pp 3-32. Medford, NJ: Information Today.
- Fishbein, M., and Ajzen, I. 1975. *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- Holden, R.J, and Karsh, B.T. 2010. "The Technology Acceptance Model: Its past and its future in health care," *Journal of Biomedical Informatics* (43:1), pp 159-172.
- Hu, P.J.H., Chau, P.Y.K., Sheng, O.R.L., and Tam, K.Y. 1999. "Examining the technology acceptance model using physician acceptance of telemedicine technology," *Journal of Management Information Systems* (16:2), pp 91-112
- Gagnon, M.P., Godin, G., Gagné, C., Fortin, J.P., Lamothe, L., Reinhartz, D., and Cloutier, A. 2003. "An adaptation of the theory of interpersonal behaviour to the study of telemedicine adoption by physicians," *International Journal of Medical Informatics* (71:2-3), pp 103-115.
- Gagnon, M.P, Lamothe, L., Fortin, J.P., and Cloutier, A. 2005. "Telehealth adoption in hospitals: an organisational perspective," *Journal of Health Organization and Management* (19:1), pp 32-56.

- Kijisanayotin, B., Pannarunothai, S., and Speedie, S. M. 2009. "Factors influencing health information technology adoption in Thailand's community health centers: Applying the UTAUT model," *International Journal of Medical Informatics* (78:6), pp 404-416.
- Maarop, N. and Win, K. T. 2009. "A Review of Telemedicine in Developing Countries: Introduction and Implementation Issues". *Proceedings of the 6th Conference on Asia Pacific Association of Medical Informatics (APAMI)*, November 21-24, Hiroshima, Japan, pp. 85-92.
- Maarop, N., Win, K.T., Sukdershan-Singh, H.S., and Masrom, M. 2009. "Teleconsultation Service Utilization Key Issues in the Context of Malaysia: An Organizational Perspective". *International Conference on Research and Innovation in Information Systems (ICRIIS)*, December 8-9, Johor Bahru, Malaysia, pp. 81-86.
- Maheu, M.M., Whitten, P. and Allen, A. 2001. *E-Health, Telehealth, and Telemedicine: A Guide to Start-Up and Success*. San Francisco: Jossey-Bass.
- Ministry of Health Malaysia (2009), *Annual Report 2009*. Kuala Lumpur, Malaysia: Ministry of Health Malaysia.
- Mohan, J., and Raja-Yaacob, R.R. 2004. "The Malaysian Telehealth Flagship Application: a national approach to health data protection and utilisation and consumer rights," *International Journal of Medical Informatics* (73:3), pp 217-227.
- Morgan, G.A, Leech, N.L, Gloeckner, G.W., and Barrett, K.C. 2004. *SPSS for introductory statistics: Use and interpretation. (2nd ed.)*, Mahwah, NJ: Lawrence Erlbaum
- Nunnally, J.C. 1978. *Psychometric Theory (2nd ed.)*. New York: McGraw-Hill
- Roine, R., Ohinmaa, A. and Hailey, D. 2001. "Assessing telemedicine: A systematic review of the literature," *Canadian Medical Association Journal* (165:6), pp 765-771.
- Sun, H., and Zhang, P. 2006. "The Role of Moderating Factors in User Technology Acceptance,". *International Journal of Human-Computer Studies* (64:2), pp 53-78.
- Thompson, R.L., Higgins, C.A., and Howell, J.M. 1991. "Personal computing: Toward a conceptual model of utilization," *MIS Quarterly* (15:1), pp 125-143.
- Triandis, H. C. 1980. "Values, attitudes, and interpersonal behaviour" In: Page, M. M. (Ed.). *Nebraska symposium on motivation*, 1979, pp. 195-259. Lincoln, NE: University of Nebraska Press
- Venkatesh, V., Morris, M.G., Davis, G.B., and Davis, F.D. 2003. "User acceptance of information technology: toward a unified view," *MIS Quarterly* (27:3), pp 425-478.
- Whitten, P., and Adams, I. 2003. "Success and failure: a case study of two rural telemedicine Projects," *Journal of Telemedicine and Telecare*, (9:3), pp 125-129.

ACKNOWLEDGEMENTS

We would like to thank the Director General of Health Malaysia, MOH hospitals and Telehealth Division of MOH Malaysia for their valuable cooperation.

COPYRIGHT

[Maarop & Win] © 2011. The authors assign to ACIS and educational and non-profit institutions a non-exclusive licence to use this document for personal use and in courses of instruction provided that the article is used in full and this copyright statement is reproduced. The authors also grant a non-exclusive licence to ACIS to publish this document in full in the Conference Papers and Proceedings. Those documents may be published on the World Wide Web, CD-ROM, in printed form, and on mirror sites on the World Wide Web. Any other usage is prohibited without the express permission of the authors.