HAKEEM E-SYSTEMS USABILITY IN JORDAN PUBLIC HOSPITALS: A CASE STUDY OF PRINCE HAMZA HOSPITAL

Dr. Emad Ahmed
Assistant Professor, Arab Open University Amman, Jordan
e_ahmad@aou.edu.jo

Dr. Medhat Alsafadi
Assistant Professor,St. Augustine College, Chicago-USA
Malsafadi@staugustine.edu

Dr. Ahmad Mashal
Associate Professor, Arab Open University Amman, Jordan
a_mashal@aou.edu.jo

Dr. Walid Saleh
Associate Professor, Arab Open University Amman, Jordan
w_saleh@aou.edu.jo

ABSTRACT:

Information technology has become a major part in all sectors, especially medical services, as this technology provides great support for health care at all levels, the most important of which is electronic medical records, given the importance of medical information systems, Jordan recently launched a project Hakeem program for the purposes of developing the Jordanian medical sector to determine the importance of This program by exploring the relationship between its usability and the performance of the medical sector, and it was verified that there are statistically significant differences between two groups of Al-Hakim program users (residents and consultants / specialists) according to their initial training, age and gender in Prince Hamzah Hospital, where the questionnaire was manually distributed to a target sample formed From 83 doctors (resident, specialist/consultant) from various departments and specialties in Princess Hamzah Hospital, descriptive statistics were adopted, in addition to two independent samples T-test to describe the research sample and test the research hypotheses. The results showed that the independent variables of age and gender had a significant effect on the doctor's performance in Prince Hamzah Hospital, while the initial training did not show any significant effect on the doctor's performance using Hakeem. In view of this results increasing demand for the health information system in Jordan and with the presence of responsible and active parties, there is a need for administrators in the medical sector to pay attention to indicators of usability effectively in order to improve system performance and accountability so that the indicators can measure concepts related to the needs of specific actors and should not focus only To measure what is available or easy to measure in order to enhance the ability to understand and use a judicious system among clinicians primarily so that the use of data in performance is an integral part of clinical education and professional development now and in the future to ensure that performance indicators are clear, consistent and fit within the

conceptual framework the chosen. Finally, since the Hakeem program is a national e-health program, this type of study should be carried out not only in one site in Prince Hamzah Hospital, so for future studies it should be conducted in multiple facilities to enrich the result.

Keywords: Electronic Health Solution (EHS), Hakeem program, Usability, Prince Hamzah Hospital (PHH), Training, Gender, Age, Performance, t-test

INTRODUCTION:

Global developments in technology have expanded the adoption of electronic technologies in various sectors due to their importance and role in supporting work systems [1]. Modern information technology is emerging more and more in health care; IT systems are offering tremendous opportunities to leverage the healthcare process at different levels. The electronic health systems EHS and electronic medical records EMR are viewed as interchangeable synonyms in most healthcare informatics [2]–[6], electronic Medical Records (EMR) or Electronic Health Systems (EHS) are computerized medical information which collects, stores, and creates a secure and a private electronic lifetime record which provides key health history information about individual patients. This patient record is available electronically to authorized health providers anywhere and anytime to support high quality medical and health care services [7]. The revolution in using EMRs leaned on the perceived advantage to enable better quality healthcare through providing the essential health data of patients which are up-to-date anytime and anywhere. EMRs are designed to facilitate sharing and accessing of information across healthcare providers in the same health care organization and other healthcare organizations which will increase knowledge exchange for collaborative decision making regarding patient health. Also EMRs are viewed as having a great potential in improving errors reduction, optimizing billing, losing patients medical files, reform policies, scientific management, forming a data repository for research and quality improvements and reduction of papers [8]–[11] These advantages or expectations of EMRs and EHSs are facing barriers which can affect the success rate. There are specific and favorable conditions allowing optimal success for EMRs and EHSs; these conditions are affected by the material properties of the technology, interpersonal factors such as individuals' attitudes and concerns, the operational aspects of implementation such as readiness and resources and socio-political forces [12].

Many studies have been conducted to investigate the barriers and facilitators, but the majority of these studies have focused on studying healthcare providers; particularly physicians perspective, attitudes, satisfaction, performance and resistance to change with the slow success rate of EMRs and EHSs; physicians are the frontline user-group, their adoption and support of EMRs will have a great influence and impact on other user-groups such as nurses, administrative staff. But also studies have emphasized on understanding and comparing each user-group is essential to lead organization growth and survival to reach a successful rate of EMRs and EHSs [13], [14]. Prince Hamzah Hospital (PHH) is a government hospital located in Amman, Jordan, with a total building area of 60,000 square meters and consisting of ten floors with a capacity of 500 beds. The mission and vision of PHH is to provide the best medical services in the region with a commitment to development and modernization in cooperation with the relevant authorities and the optimal utilization of available resources as the Jordanian National E-Health Program "HAKEEM" was developed for PHH as part of the country's

pioneering e-healthcare transformation program. Hakeem was launched under the patronage of His Majesty King Abdullah by E-Health Solutions in October 2009, and the program aims to facilitate effective and improved healthcare for patients by providing immediate and up-to-date electronic medical information throughout the public sector[15]–[17].Hakeem initiative is based on a highly customized version of VistA system developed for the United States Department of Veterans Affairs (VA) medical system. VistA is a proven open source health information technology solutions that can be used in a small clinic or hospital, yet it can also easily be scaled up to meet the needs of large national health care system, Hakim allows doctors to easily follow up their patients' records by relying on the national number of each patient so that he can see the results of laboratories, operations and reviews of all his medical history, and this helps the medical sector to easily and quickly access all important data about each patient, especially if The citizen suffers from chronic diseases or allergies to any medicines [18], [19]. In June 11, 2013 Prince Hamzah Hospital and Electronic Health Solutions announced that Hakeem program implementation process finished successfully. Prince Hamzah Hospital was announced as the first computerized hospital in Jordan by EHS.

The research provides important insight into Prince PHH's data entries. [20]vThese results are expected to help PHH management understand some of the dimensions that affect low utilization rate. The study is expected to add to the body of knowledge in the field of healthcare in Jordan. Therefore, the aim of this study is to verify whether there is any significant difference in the usability of Hakeem system between two groups of Hakeem users (residents and consultants / specialists) based on initial training and age. And gender.

LITERATURE REVIEW:
2.1 Electronic Healthcare Record Systems:

Health information technology uses multiple modern techniques to provide compatibility between several parties so that patient information is available to them such as insurance companies, doctors, laboratories and hospitals, so that this information is available through the Internet easily, easily and quickly at any time regardless of the geographical area [21]. Health information is divided into several sections to include clinical information, drugs and reviews, and each of them needs special attention due to its importance and priority, which makes doctors unable to dispense with health information in their work [22].

2.2 Electronic Health Records:

Administrations always tend to apply knowledge management systems to develop their work performance, and this is linked to relying on electronic systems, which in turn greatly enhance this in all sectors[1], [23], [24] So the technology it's important for Medical records that considered as electronic health records as they include about the continuity of care records with linking them with the information of pharmacies and laboratories with the inclusion of patients' health information in each region [25], its provides a feature for the patient also to electronically view his information moment by moment and these electronic health records provide summaries about the health status For society as a whole, the United States is considered one of the leading countries in electronic health information, in addition to that it has linked these health records with the national system [26].

2.3 Benefits of Electronic Health Record System:

For many investors in the health sector, there were important points facing them about the cost of modern technology systems for medical records, but at the same time when

measuring the effectiveness and importance of these electronic medical records, the cost is excluded because they achieve high benefits so as to offset some of the costs that are paid if the electronic systems are not applied For medical records, which confirms their effectiveness more with the passage of time for investors in the health sector and for governments, as they also manage the health sector for citizens because the speed, ease and geographical availability of these systems work to raise the efficiency of the medical sector as a whole, which increases the quality of health services provided [13], [27], [28].Electronic medical records provide important advantages to all stakeholders in the medical sector by providing enhanced graphs for patient information, which allows a higher perception of the reader to this information, especially for medical decision-making in clinical cases, while providing direct and accurate documentation of all data, which improves the image of the quality of health services provided. More specifically in relation to doctors, the medical record of each patient is provided to them with the ability to amend each patient's medicines according to the development of his condition and to provide a follow-up report for him easily and from any site without reviewing the patient [29], [30].

RESEARCH FRAMEWORK:

Since the purpose of this study was to investigate the relationship between independent variables (age, gender, and training) and the dependent variable usability; quantitative research method has been identified to be used to answer the current research questions and hypotheses.
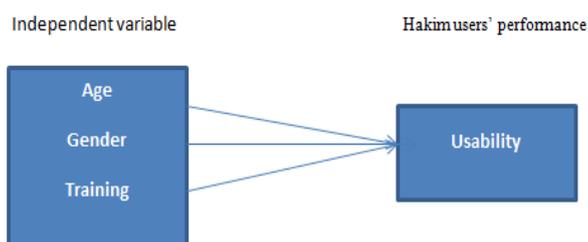

Figure 1 illustrates the proposed research model.

The researcher has developed the following hypotheses to be tested in order to get the results.

H01: There is no significant difference in Hakim users' performance between residents and consultants/specialists based their initial training.

H02: There is no significant difference in between residents and consultants/specialists based their age.

H03: There is no significant difference in Hakim users' performance between residents and consultants/specialists based their gender

RESEARCH METHODOLOGY:

A self-administered close-ended questionnaire was distributed manually to a targeted sample of 83 physicians selected from Prince Hamzah Hospital.[31]–[35]The population base for the study consisted of specialist physicians/consultant physicians, and resident physicians (seniors and juniors) employed at PHH in Jordan, which consist of 246 physicians from different departments and specialties. The hospital is considered to be one of the largest sources of employment within the respective community, random sampling method; was adopted a sample size provides enough confidence to generalize the results on the population.[10], [36], [37]noted that a sample size of 30 cases is the minimum acceptable size if the researcher goal is to generalize the results to the population by conducting statistical tests to test the research hypotheses. A suitable sample comprises the users of Hakeem for one year at least, a total of 83 physicians at PHH were selected from different specialties and departments. Subjects' participation is voluntary and there are no penalties/rewards for nonparticipation. The questionnaire was distributed to physicians on different days during two weeks at different time intervals and locations (departments and clinics) by quality department staff. Physicians were

asked to answer the questionnaire and to give it back after answering.[38]–[40]

4.1 DATA ANALYSIS & RESULTS

The current research results and analysis were based on a sample of (83) participant. A survey questionnaire was distributed to physicians at both levels: consultants/ specialists (34), and residents (49)

Table 1: Respondents Groups

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SPECIALIST/CONSULTANT	34	41.0	41.0	41.0
	RESIDENT	49	59.0	59.0	100.0
	Total	83	100.0	100.0	

The surveyed participants were (51) males and (32) females. The participants work experience with Hakeem ranged from one year of experience to three year, where (42) participants one year experience with the system, (23) had two year experience, and 19 had three year experience. The age distribution for the participants was categorized into two main groups: the first group consisted of the participants between the ages of (25-35) years old, which represent the residents group. The second category consisted of participants who are over the age of (35), which represent the consultants/specialists group.

Table 2: Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	MALE	51	61.4	61.4	61.4
	FEMALE	32	38.6	38.6	100.0
	Total	83	100.0	100.0	

Table 3: Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	25-35 YEARS OLD	41	49.4	49.4	49.4
	36-60 YEARS OLD	42	50.6	50.6	100.0
	Total	83	100.0	100.0	

4.2 Testing of the research hypotheses:

To test the first hypothesis, the researcher utilized t-test for two independent groups. The test was conducted three times; at each time the performance as the dependent variable and initial training, age, and gender as the independent variables. The test was conducted at 95% confidence level ($\alpha \leq 0.05$). T-test for two independent groups was conducted between performance as the dependent variable and initial training as the dependent variable. [41]The results of the test revealed that there is no significance difference for initial training between the two tested groups on performance (Sig = 0.845 which is higher than 0.05). Null hypothesis H01 was accepted. The following two tables show the results of the test:

Table 4: Group Statistics

	Performance	N	Mean	Std. Deviation	Std. Error Mean
Training	SPECIALIST/CONSULTANT	34	3.5532	.60663	.10404
	RESIDENT	49	3.5196	.95471	.13639

Table 5: Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Training	Equal variances assumed	5.837	.018	.181	81	.856	.03364	.18542	-.33527	.40256
	Equal variances not assumed			.196	80.478	.845	.03364	.17154	-.30770	.37498

T-test for two independent groups was conducted between performance as the dependent variable and gender as the independent variable. The results of the test revealed that there is a significance difference for gender between the two tested groups on performance (mean performance for females = 3.75, mean performance for males = 3.50, Sig = 0.036 which is less than 0.05). Null hypothesis H02 was rejected, and the researcher can conclude that gender is one of the factors that impact Hakeem's users' performance. The following two tables show the results of the test:

Table 6: Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
performance	MALE	51	3.5020	.64232	.08994
	FEMALE	32	3.7500	.55729	.09852

Table 7: Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
									Lower	Upper	
performance	Equal variances assumed	.996	.321	-2.136	81	.036	-.28444	.13314	-.54934	-.01954	
	Or not assumed			-2.128	72.755	.037	-.28444	.13365	-.55081	-.01806	

T-test for two independent groups was conducted between performance as the dependent variable and age as the independent variable. The results of the test revealed that there is a significance difference between the two tested groups performance based on age (mean performance for the first age group (residents) = 3.45, mean performance for the second age group (specialists/consultants) =3.74, Sig = 0.036 which is less than 0.05). Null hypothesis H03 was rejected, and the researcher can conclude that age is one of the factors that

impact Hakeem's users' performance. The following two tables show the results of the test:

Table 8: Group Statistics

	Age	N	Mean	Std. Deviation	Std. Error Mean
performance	25-35 YEARS OLD	41	3.4537	.69634	.10875
	36-60 YEARS OLD	42	3.7381	.50345	.07768

Table 9: Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
									Lower	Upper	
performance	Equal variances assumed	.996	.321	-2.136	81	.036	-.28444	.13314	-.54934	-.01954	
	or not assumed			-2.128	72.755	.037	-.28444	.13365	-.55081	-.01806	

DISCUSSION:

The purpose of this was to understand the attributes affect the usability rate of PHH physician's; which will help to indicate the failures and success points in Hakeem program use and adoption. The performance of Hakeem User's was tested through Training, Age, and gender to examine the influence of their learn ability and satisfaction on the usability rate. The results of the current study showed agreement with previous studies on two of the variables: age and gender, and showed disagreement on the training as a variable that might affect the performance. Age in the current study was used in combination with years of experience to divide the sample into two groups: residents and consultants/specialist. The result of the current research as was shown in the results section revealed the age was significant in the performance, which can be translated in the current research to that consultants/specialists do have higher performance on using Hakeem. This can be attributed to more than one reason. Consultants/specialists see only limited number of patients compared to residents; which may put residents in relatively a lower degree of

performance. Other reasons may include that consultant/specialists do understand the core of their jobs more than residents. This result was consistent with [42]–[45], Where they found that age was significant on the dimensions of job performance. Gender in the current research showed significance as was shown in the result section. This result is consistent with the literature [46], [47]. Initial training in the current study showed no significance, which may in a way disagree with the existing literature where most of the studies showed significance for training. The reason of this agreement may be explained by referring to the setting of the research and the type of participants. The current research dealt with physicians, whom regardless of their rank get the same initial training at PHH, which may explain this result.

CONCLUSION & RECOMMENDATIONS:

In view of the increasing demand for the health information system in Jordan and with the presence of responsible and active parties, there is a need for administrators in the medical sector to pay attention to indicators of usability effectively in order to improve system performance and accountability so that the indicators can measure concepts related to the needs of specific actors and should not focus only To measure what is available or easy to measure in order to enhance the ability to understand and use a judicious system among clinicians primarily so that the use of data in performance is an integral part of clinical education and professional development now and in the future to ensure that performance indicators are clear, consistent and fit within the conceptual framework the chosen. Finally, since the Hakeem program is a national e-health program, this type of study should be carried out not only in one site in Prince Hamzah Hospital (PHH), so for future studies it should be conducted in multiple facilities to enrich the result. The sample size can be enlarged to ensure

that it is possible to achieve Contributing and highly significant results especially that the Hakeem system is still in an early stage of maturity, and major steps can still be taken to improve its usability effectiveness. Measuring usability provides opportunities for significant improvements in the health system.

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