ADOPTION OF A NEW SYSTEM AT KING HUSSEIN CANCER CENTER (KHCC): THE EFFECT OF COMPUTERIZED PROCESS WORKFLOW ON USERS' SATISFACTION

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ABSTRACT

This study was conducted, in the years, between 2019 and 2020, to investigate "The Effect of Computerized Process Workflow on Users' Satisfaction at King Hussein Cancer Center (KHCC)". A random stratified sample was selected from users of the computerized system at the KHCC, divided into three strata ((Medical Team Staff except for Nurses), Nurses, and Administrative Staff). Questionnaires were distributed to a 250-employee sample; the analysis proved a positive effect on Users' Satisfaction and a significant difference attributed to the Functional Nature at the KHCC because of the new computerized process workflow. Finally, the researcher demonstrated the effect of the new computerized process workflow on users' satisfaction at the KHCC.

Keywords: Users' Satisfaction, KHCC, Computerized Work, Transfer of Computerized Work, Auditing and Controlling of Computerized Work, Delay or Postpone of Computerized Work, Save and Storage of Computerized Work.

JEL Classification Code: M11, M15, M54, O32.

INTRODUCTION

Organizations in many countries in the world are increasingly applying electronic systems throughout the organization process in spite these systems cost interested organizations much money. And although most of the electronic systems are useful to use, employees may resist working on a system that might achieve the desired progress. Therefore, system acceptance by users is a critical issue at any organization to make the system work (Mosweu et al., 2016). It is assumed that using the computerized system enables the organization to specify its input and detailed work process. In addition, the users of the computerized system and because of the process workflow nature expect that it can easily save, access, and restore information. The advantages of the computerized systems make them more appealing, especially when these systems facilitate management process workflow. In contrast, the traditional documentation systems have encountered many problems some of which were being increased because of the traditional deficiency of information dysfunctional channels. Furthermore, wherever papers are kept either in the filling area or in special files in the assigned places, users make mistakes when saving files and restoring them. Therefore, there were some difficulties, the problem of losing data, accessibility, and privacy issues (Forcada, 2005).

It is worth noting that adopting a new computerized system might be too complicated but also it might improve the ways of doing a job and increasing satisfaction. However, it should be taken into consideration how this system could affect the process workflow. There is a widespread change in organizational activities in the last decades due to the shift of using and implementing computerized systems, which is strongly reflected in the organizational process workflow. Subsequently, drastic changes to employees' jobs come through because of these changes, so there will be an effect on their satisfaction positively or negatively (Morris & Venkatesh, 2010). Information technology success is measured in some kinds of literature by users' satisfaction with some indicators such as user and management's attitudes towards the computerized system, user skills, user expectation, user experience, ease of use, organizational support, and user involvement in the computerized system (Mahmood et al., 2000). Saying that if the computerized systems change the process workflow and transformed it into enjoying workflow systems, it will affect job enjoyment in which satisfaction increases and burnout decreases (Kelly & Lefton, 2017). This study was applied in the health sector as it is of great importance in terms of its effects on the health and welfare of society as a whole. Also, the KHCC specializes in treating a disease that has special care because it affects the mental condition of patients as well as their physical condition. Acceleration in service, which is, advanced process workflow, might reduce the burden on patients. Employees in this sector face patients with special care, leading to an effect on their mental condition. Thus, job satisfaction was taken as a measure because it influences the psychological state and the satisfaction of patients or other external bodies due to the contagion effect. Also, it is an important indicator that could be reflected in other factors such as organizational work behavior, employee commitment, productivity. (Robbins & Judg, 2013).

In light of the researcher's knowledge of the nature of the work at the KHCC, there were noticeable some complaints about the new system used; on the contrary, some praised that system. Furthermore, to fill the gap in the literature, especially in the Middle East, this study provides a framework of thought and practices that would be a key to other future studies in the related subjects. As a result, this study will examine the effect of the new computerized process workflow on users' satisfaction at the KHCC. All employees who use the computerized system at the KHCC will be included.

LITERATURE REVIEW

Van Eaton et al. (2005) have proved that adopting Web-based computerized rounding and sign-out system (UWCores) in health care sectors enabled physicians to reduce difficulties of work and facilitated access to patients' information, whereas it has a positive effect on patients' care, patient-physician relationships, productivity, progressing of communication, and quality of the provided care. Furthermore, information technology has enabled pharmacists to spend less time for documentation and more time on patients' care, and it enables users to track patients among medical recommendations and care provider intervention, as well as enabling managers to have the required reports (Zimmerman et al., 1995). As proposed by Johannesson & Perjons (2001), the adoption of a new system or when it is designed or developed should base on some principles. And Enterprise Application Integration technologies (EAI) are needed such as Corba and DCOM to combine the organization's work. Again, there should be no duplication and overlap of the process, and it should be a clear sequence, contribute to the advanced goal for each step with time-limited and exception for unnecessary steps. Interestingly, Zomorodi (2018)

pointed to the importance of redesign workflow in healthcare sectors by integrating technologies to address flexibility and facilitate the ways of doing work, also confirmed that redesign of the workflow through a specific approach enhances professionals satisfaction. In contrast, the traditional method of doing work had, for the most part, a negative effect on the organization's resources, operations, the customer (patients in the case of healthcare)–employee relationship, and on the way of conducting and delivering the services, but, now, Electronic Health Record (EHR) has become an essential part for outpatient pursuit care. (Holroyd-Leduc et al., 2011)

Notwithstanding, the computerized process system facilitates the accessibility of needed information, which, in turn, improves the quality of work in hospitals. Hence, it enables healthcare providers to deliver better care to targeted patients. As an example, EHR is used for admission and discharge, planning, assessment, documentation, reviewing treatments, writing a medication, viewing reports, results, and patient history. (Kossman & Scheidenhelm, 2008). Additionally, Przybylo et al. (2014) have demonstrated that using HIPAA Compliant Text Messaging Application facilitated process workflow between inpatient medicine teams, and between physicians and patients. Indeed, the computerized system makes changes in the process workflow, furthermore; the computerized system influences users' experiences and positive cognitions. This, in turn, reflects on users' performance and satisfaction (Treku & Sun, 2019). Considering the computerized system and users, there are fears and difficulties from the users' side. Other than that, the successful computerized system is an accepted system by users to keep on (Mosweu et al., 2016). Al Farsi & West's (2006) study showed that the computerized systems have been used firstly in accounting and radiology departments, now Electronic Medical Records (EMRs) are increasingly used in hospitals and medical centers to save essential data, and this accordingly enhanced communication and physicians' satisfaction and improved patients' care. Moreover, computerized systems contributed to saving and storing information, auditing and controlling, entering the required information, and recalling it, this study explained that using the computerized system can be easily defined as users' responsibility to reduce medical errors and increase productivity. Still, Schuld et al. (2011) found the upholding the Information Technology (IT) with Clinical Pathways in a hospital in 2004 was seen as important for staff satisfaction. Similarly, the study by Lium & Faxvaag (2006) on six Norwegian hospitals was applied through the process of transforming the traditional paper system into EHR; later, medical secretaries, clinicians, and nurses from (medical, surgical, and dermatology departments) showed positive attitudes towards the new system workflow. While Simon (2006) emphasized on computerized system's role in developing workplace values and how computerized communication means affect satisfaction.

METHODOLOGY

### The Characteristics of the New System

Previously, the KHCC was using paper files and manual-handing-over orders alongside Oracle, ATS, DocuWare, MOZAIQ, and PACS systems. In late 2009 and under King Abdullah II Bin Al Hussein's request to automate the public health sector in Jordan, public hospitals started to adopt Electronic Health Solutions (EHS)/ Hakeem program to facilitate workflow and give a complete record about patients. For more explanation, EHS harnesses the VistaA system, which was used in the US Department of Veterans Affairs (VA). After that, in 2012, the KHCC has become more open as it has adopted EHS/ Hakeem program and merged it with the existing old

systems to be working together appropriately, but EHS at the KHCC is working independently from the public hospitals. Thus, such an improvement has achieved qualitative progress in terms of process simplification and improving the care provided to patients. Again, the implementation of such a system has led to an organized process workflow, easing medical reviews, and reduction of general costs.

The Study Variables

This study included (Computerized Process Workflow) variables, which will be:

(i) Computerized Work, (ii) Transfer of Computerized Work, (iii) Auditing and Controlling of Computerized Work, (vi) Delay or Postpone of Computerized Work, and (v) Save and Storage of Computerized Work (Figure 1).
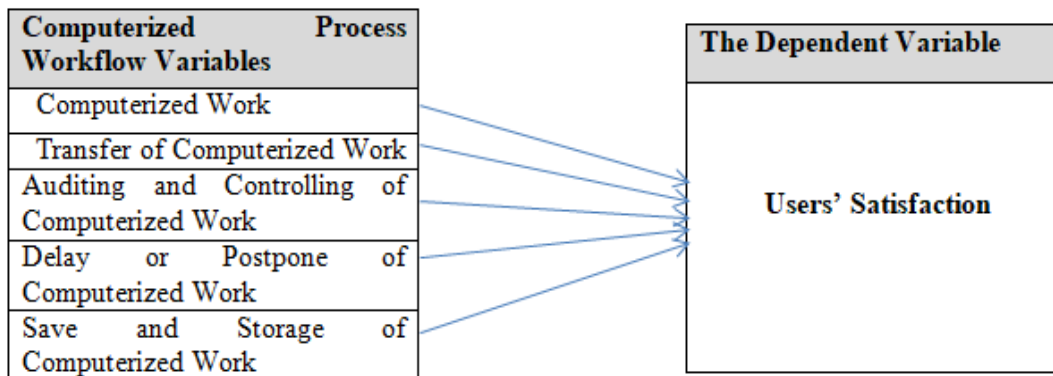
FIGURE 1
THE STUDY MODEL

Method of Data Collection

The 5-point Likert scale was used for measuring the responses to questionnaires. The scale ranges from Strongly disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly agree (5). These points have been used in constructing the survey's statements. Accordingly, the following criterion was implemented: Low level (1-2.33), Medium (2.34-3.67), High (3.68-5).

Sample Size

The study population consists of professionals who work and use the computerized system at the KHCC, including ((Medical Team Staff except for Nurses), Nurses, and Administrative Staff)). Consequently, the study population is composed of three strata. The first stratum is (Medical Team Staff except for Nurses) forming of doctors, pharmacists, radiotherapists, radiologists, physiotherapists, and laboratory technicians. The second stratum is (Nurses) who use the computerized system at any department at the KHCC. The third is (Administrative Staff) forming of staff at accounting, medical records, reception, human resource, and research & development departments. Therefore, the total population that uses the computerized system is about (2500) individuals. The population, in this study, was limited to the KHCC staff for two reasons. First, the KHCC staffs are the immediate users of the applied

systems and have more experience than others, where their satisfaction/dissatisfaction might influence other external entities or care receivers. Second, due to security and privacy issues, when patients, the ministry of health's staff, insurance companies, or the court need information, they request it and are given it according to the legitimacy; so, they do not recognize the changes in the system after or before like the internal staff.

A random stratified sample representing the study population was selected, which composes 10% of the targeted population. Therefore, the sample size n (250) is approximately divided as the following: n stratum= (N stratum/N population)*n (Figure 2).

Job nature	The sample size of each stratum(n stratum)
Medical Team Staff except for Nurses	(500/2500)*250= 50
Nurses	(1000/2500)*250= 100
Administrative staff	(1000/2500)*250= 100

FIGURE 2
CALCULATION OF THE SAMPLE

Data Analysis

Description of *"users' satisfaction"*

Job Satisfaction is known as the positive feeling about a job that results from an evaluation of its characteristics (Robbins & Judge, 2013). Conducting the analysis and depending on the 5-point Likert scale, the arithmetic means of *"Users' Satisfaction"* paragraphs as a whole reached (3.77) with a *"High"* degree of estimation. The paragraphs were between (3.62-3.99) with *"High"* and *"Medium"* degrees of estimation. Where the paragraph *"I feel that using the computerized system at the KHCC is the right decision"* was the highest arithmetic mean (3.99), followed by paragraphs *"I feel confident in terms of confidentiality and security when using the computerized system"* (3.86), next *"I am Satisfied with the level of accuracy of work by using the computerized system"* (3.74), then *"I feel satisfied with the speed of response to the computerized system to the required operation"* (3.72), after that *"The computerized system is characterized by a high degree of quality"* (3.67); finally, the lowest mean was paragraph *"I am satisfied with the computerized system that is used at the KHCC"* (3.62). As shown, the paragraphs attributed to the *"Users' Satisfaction"* variable achieved a high degree of estimation from the point of Users' view, which demonstrates how they are satisfied with applying the computerized system and how that increases the speed, accuracy, confidentiality of work. As well, the result shows a medium degree of estimation regarding the current applied system at the KHCC and the quality of the system.

The First Hypothesis

H_1 *There is no statistically significant Effect (α≤ 0.05) of Computerized Process Workflow (Computerized Work, Transfer of Computerized Work, Auditing and Controlling of Computerized Work, Delay or Postpone of Computerized Work, (Save and Storage of Computerized Work)) on Users' Satisfaction at the KHCC.*

In Table 1, (R) between the dependent variable *"Users' Satisfaction"* and the independent variable *"Computerized Process Workflow"* reached (0.755) indicating a strong positive relationship, whereas the table shows (R square) that reached (0.571) which means the independent variable *"Computerized Process Workflow"* was able to explain (57.1%) of the dependent variable *"Users' Satisfaction"*, as it seems (Adjusted R Square) reached (0.564), where the difference between it and R square is very small (0.007), this indicates the ability of an independent variable to predict the value of the dependent variable.

Table 1 MULTIPLE REGRESSION COEFFICIENTS									
	Coefficients			Model Summary			ANOVA			
	β	t	α	R	R Square	Adjusted R Square	df1	df2	F	α
Computerized Work	0.402	5.562	0.000	0.755a	0.571	0.564	4	245	81.383	0.0
Transfer of Computerized Work	-0.047	-0.560	0.576							
Auditing and Controlling of Computerized Work	0.197	2.491	0.013							
Delay or Postpone of Computerized Work	0.236	3.119	0.002							
Save and Storage of Computerized Work	0.151	2.132	0.034							

β Coefficients values show that any additional increase of each dimension of *"Computerized Process Workflow"* except *"Transfer of Computerized Work"* variable, will increase the prediction of *"Users' Satisfaction"* sequentially by (40.2%), (19.7%), (23.6%) and (15.1%) Present the authors in the order in which they have contributed to the work, and type them one per line (do not double space between authors). When all have been typed, highlight all of the authors and affiliations at once, and click on *"Heading 2."* Do NOT use Heading 2 again anywhere in the document.

The Second Hypothesis

H_2 *There are no statistically significant differences in the Effect (α≤ 0.05) of Computerized Process Workflow on Users' Satisfaction attributed to the Functional Nature ((Medical Team Staff except for Nurses), Nurses, Administrative Staff) at the KHCC.*

Table 2 ANOVA TEST AND MODEL SUMMARY							
ANOVA Test			Sum of Squares	DF	Mean Square	F	α
((Computerized Process Workflow and Users' Satisfaction)) * Functional Nature	Between Groups	(Combined)	3.816	2	1.908	4.744	0.010
	Within Groups		99.346	247	0.402		
	Total		103.162	249			

The ANOVA test was used to investigate if there were differences in the Effect of Computerized Process Workflow on Users' Satisfaction Attributed to the Functional Nature ((Medical Team Staff except for Nurses), Nurses Staff, Administrative Staff) at the KHCC.

In Table 2, depending on (ANOVA) test (F) reached (4.744) at significance level (.010), the Null Hypothesis (2-H0) is rejected where *"there are statistically significant differences in the Effect (α≤ 0.05) of Computerized Process Workflow on Users' Satisfaction attributed to the "Functional Nature" at the KHCC".*

Since the significance level in the second hypothesis is less than (0.05), then the Post Hoc test is required to determine the significant differences in the Effect of Computerized Process Workflow on Users' Satisfaction Attributed to the *"Functional Nature"* at the KHCC. Therefore, the investigation, now, is between the means of the *"Functional Nature"*.

Thus, in Table 3 below, there are significant differences at (α≤0.05) between means of *"Medical Team Staff Except for Nurses"* and *"Nurses",* which the differences between means reached (.262*) at the significant level (0.047) and that is less than (0.05). In contrast, there are no significant differences at (α≤0.05) between means of *"Medical Team Staff Except for Nurses"* and "Administrative Staff", in which the differences between means reached (.015) at level (0.990) and that is higher than (0.05). Also, there are significant differences at (α≤0.05) between means of *"Administrative Staff"* and *"Nurses",* whereas the differences between means reached (0.247*) at the significant level (0.017) and that is less than (0.05).

Table 3 POST HOC TEST FOR MULTIPLE COMPARISONS BETWEEN "FUNCTIONAL NATURE"				
Functional Nature (I)	**Functional Nature (J)**	**Mean Difference (I-J)**	**Std. Error**	**α**
Medical Team Staffs Except for Nurses	Nurses	0.262[*]	0.110	0.047
	Administrative Staffs	0.015	0.110	0.990
Nurses	Medical Team Staffs Except for Nurses	-0.262[*]	0.110	0.047
	Administrative Staffs	-0.247[*]	0.090	0.017
Administrative Staffs	Medical Team Staffs Except for Nurses	-0.015	0.110	0.990
	Nurses	0.247[*]	0.090	0.017

RESULTS

Depending on the Multiple Regression test, (F) reached (81.383) at a significant level (0.000). Therefore, the result showed that there was a statistically significant Effect (α≤ 0.05) of Computerized Process Workflow (Computerized Work, Auditing and Controlling of Computerized Work, Delay or Postpone of Computerized Work, (Save and Storage of Computerized Work)) on Users' Satisfaction at the KHCC. And it was shown from the Post Hoc Test, there were significant differences at (α≤0.05) between *"Medical Team Staff Except for Nurses"* and *"Nurses"* strata's attitudes towards adopting the new computerized system at the KHCC, *"Administrative Staff" and "Nurses"* as well, while there was no difference in the attitudes between *"Medical Team Staff Except for Nurses"* and *"Administrative Staff" strata"*.

DISCUSSION

The findings of the analysis demonstrated the Effect of Computerized Process Workflow on Users' Satisfaction. Accordingly, this agrees with Morris & Venkatesh (2010), and Ho et al. (2019). In contrast, Hanauer et al. (2016) study did not find a growing up in physicians' perceptions towards the computerized system.

Assuredly, the results of this study matched with Lium & Faxvaag (2006), Zomorodi (2018), and Khajouei et al. (2011). On the contrary, Suh (1999) seems to disagree with the

previous studies since he could not provide any evidence about the Effect of the Computerized System on Users' Satisfaction.

Again, investigating the second hypothesis it was noticeable from the findings that there are statistically significant differences in the Effect of Computerized Process Workflow on Users' Satisfaction attributed to the *"Functional Nature"*. Admittedly, some of the literature demonstrated the Effect of Computerized Process Workflow on Users' Satisfaction as a whole, and some focused on a specific segment of users. For example, Khajouei et al. (2011) showed that the nurses and physicians were satisfied by the computerized system. Also, Zimmerman et al. (1995) demonstrated that the computerized system affected pharmacists' satisfaction. Furthermore, Maillet et al. (2015) showed that nurses were satisfied with the computerized system as well. Moreover, Guseva et al. (2014) showed that administration staff had positive attitudes towards the computerized system.

CONCLUSION AND RECOMMENDATIONS

Based on the results of the study, the study proposes that the computerized system is crucial for the survival and development of organizations; the KHCC should increase the skills of employees through continuous training on the systems used, and on any new system introduced, and should exploit the best technology and keep pace with development. Even with the computerization burden, employees should continue to be informed in the decisions for future improvements. Furthermore, the KHCC should maintain confidentiality through confidential passwords, and codes of authority, and prerogatives and activate the role of the information technology department to update the system and boost users' involvement. For all that, the KHCC should move fully to which part of the operation is using the computerized system, and thinking seriously about leaving some traditional paper systems due to their importance, whereas that would be reflected on the staff and patients at the same time. The study recommends all managers at the KHCC emphasize the importance of new systems and their effect on process workflow and, also their importance to Job Satisfaction. Additionally, it recommends organizations adopt modern computerized systems to speed up the process and facilitate work. Hence, the KHCC should arrange its operations around the new computerized system and enhance the skills of employees through continuous training on it. Noticeably, there are other things related to job satisfaction that may affect the results of the conducting studies like supervision, equity of distributing rewards, and so on. Therefore, the researcher recommends researching the impact of (Equity Theory and Organizational Justice) on employees' performance at the KHCC.

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