

## Our Experience on the Influence of Task-Technology Fit Model on the Performance of Nursing Information System in Armed Forces General Hospital in Taiwan, Republic of China

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**Abstract: Purpose:** We will explore and analyze the care performance of nursing information system by the model of Task-Technology Fit in Armed Force General Hospital in Taiwan (ROC). The users' (nurses) experience will be examined and integrated into materials for training the new recruited staff, thus shortening their learning curve and promote the safety of patients' care. **Method:** In this experiment, we will make use of questionnaires designed to evaluate the nurse's cognitive style, their self-affirmation in using computers, goodness-of-fit of the IT system to their work. Some of the questionnaire employed a Likert scale to evaluate. Some demographics were also recorded and discussed later. We randomly chose the 500 participants (all nurses) in Kaohsiung Armed Forces General Hospital. The statistic analysis was using the SPSS 13.0. Besides, the questionnaires contained four parts with high reliability and high validity repeated check-up before and during the test. Thus, these results of these articles were high-value and could be used for patients' care in the future. **Results:** The degrees of satisfaction in using the computers in station are high (R=3.67), however, the degrees of satisfaction in using the nursing information system on the mobile nursing stations showed only neutral (R=2.67). The levels of satisfaction with the functions of the nursing IT system (R=3.06) and its operational interface (R=3.14) are high. However, we also found that the influence of personal traits on the task-Technology Fit was not significant. In addition, nursing IT system has a significant impact on the nursing personnel's goodness-of-fit. On the other hand, the personal traits of every nurse do not have the apparent influences on the assistance to the nursing work in Armed Forces General Hospital. **Conclusion:** The rapid development of the nursing system will reduce the time spent in handwriting, integrate the nursing IT systematically, increase the convenience of further studies, ensure the continuity of the nursing projects, and accelerate communication and coordination in the medical team. During the implementation of the nursing IT system, the nursing personnel should be continuously educated in order to increase their acceptance of, and inclination for, updating their knowledge of the IT technology. The nursing managers in hospitals should pay attention to the education of nursing staff. The information technology center in any hospitals should interface and program the more ideal programming such as the user-friendly, easy-to-use and multi-functional abilities should be continuously developed for strategies of differentiation in the severe medical environment. Besides, we believed that good task-technology fit may increase the effectiveness of nurses' care and also own the benefits of promoting patients' safety.

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### 1. Introduction

Compared to ordinary industries, the complexity and uncertainty of medicine is much higher. As to the development of computer, using widely the IT technology to increase patients' safety has become a trend in the future. If the IT was used in nursing care, it will not only provide systematic care to the patients and benefit hospitals in improving their medical quality and reducing operation costs [1]. There are

more and more scholars in the world constantly arguing that advanced IT technology has a positive effect in improving nursing care. Not only medical efficiency but also the medical professionalism was valued recently. It can provide the more timeliness and rapid for the patients. Through the cloud mobility management, patients can get faster medical care and health management service, for example, medical

cloud service, electronic medical records, nursing IT systems and HIS Cloud today.

Already in 1990, Norris and his co-workers had posited that the computerization of nursing projects would increase the performance of nursing work [2]. Until to 2001, Harris and Menno also argued that the IT technology would play an important and critical role to improve the efficiency of nursing work in the future [3,4]. More researches also showed that the successful development of the nursing IT system will effectively lower nurses' work load and thus increase the quality of patient care [5]. Moreover, IT system not only provides hospital management information at the right time, and all the time, as a reference for strategy making, but also saves costs in time and human resources [5]. [6,7].

In this survey, we aimed to explore nursing personnel's performance after using an IT system, and the key factors of their inclination in using such a system. As the nursing personnel from the military hospitals in Taiwan (ROC), it also faced the great transformation of the IT industry. We should seek for the associated factors that are able to lower nurses' heavy work load and thus ameliorate the difficulty of the lack of nurses year by year. With the experience of the users' experience, it will become a basis for the future development of nursing IT system, which will be easier to construct and use. Such the valuable experience will also be integrated into the training programs of new recruited nursing staff, thus shortening the learning curve of the abecedarian and improving safety of patients care.

## 2. Methods and Materials:

Our research is based on the theory and method of Task-Technology Fit (TTF) proposed by Goodhue and Thompson in 1995 [8,9]. There two major trends in the early studies. The first trend of TTF emphasizes that the attitude and ideas from users' may predicted the way that they use the IT system. The second trend shows that if the good fit and its association between the IT technology and nurses' care persisted, it may effectively improve the performance of nursing. Until now, Goodhue and Thompson combine both trends and argue that if an IT technology benefits work, the design, application and promotion of such a technology must be accepted by users, who must be inclined to use the technology to achieve a good fit and maximise its strength. In fact, the TTF were found to contain eight assessing factors including quality of medical information, IT locatability, authorisation of the IT access, consistency and compatibility of the IT sources, ease of use/training, production timeliness, systems reliability and relationship with users. This model is good at mutual corroboration: it can be used to predict the nursing work efficiency and patients' care, as well as to evaluate the users' performance.

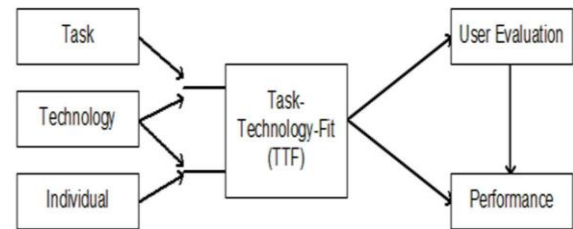


Fig. 1: TTF theory proposed by Goodhue and Thompson (1995)

The theory of TTF proposed by Goodhue and Thompson has been applied to many fields, especially the medicine in order to evaluate the objects' psychology and cognitive behavior, and thus to reveal how IT technology influences one's work performance. In TTF model, whether an IT technology is able to support the certain task is described through Task-Technology Fit. For example, Jarupathirum et al. revealed the major concept of TTF is that the higher the fitness, the more benefits in assisting one's task [10]. In the same time, it may influence the satisfaction of nurse, regarding the decisions, as well as the efficiency and quality of one's work [11]. In other words, both task characteristics and technology characteristics will impact the condition of task-technology fit, and then the methods of application and operational behavior [12]. Successful designing and establishing of nursing IT system must conform to the theory of TTF through various experiments and analyses; the nursing IT system can be considered as "success" when it has been proven to satisfy nursing personnel's needs and to enforce the task of clinical patient care. In TTF models, three important components included as task, technology and individual (Fig. 1). These three components are closely related to task-technology fit. Yet, as different kinds of nursing work have different work contents and requirements (eg. the demands and the associated working characteristics of medical and surgical wards are different), their task-technology fit also differs.

It is well known that the medical team working in military hospitals has the different characteristics and missions than the common hospitals. In addition, the most common source of the patients from military people. When the medical teams in the military hospitals also take care of military personnel and their family members, the nurses may pay attention to the patients those who are the superior officers of the nursing staff. This relationship may induce un-usual treatment plan and time to treat. Hence, whether the TTF model can be applied to the military hospital systems and the influences of nursing staff's personal traits on task-technology fit are popular subjects in the researches on IT management.

Personal traits	Goodness-of-fit of the IT system to their work	Assistance to their work
1. Demographics	1. Quality	1. Providing timely medical care
2. Experience of using computers	2. Locatability	2. Establishing accurate nursing records
3. Cognitive style	3. Authorisation	3. Offering nursing and health counselling services
4. Self-affirmation in using computers	4. Production timeliness	
	5. Compatibility	
	6. System reliability	
	7. Ease of use/training	
	8. Relationship with users	

Fig. 2: A model of impact factors on nursing personnel's work performance by using a military hospital nursing IT system

The purpose of our study is to detect the cognition and acceptance of the nurses using the IT system (so called nursing information system). In this Model, we could find the associated factors in TTF (Fig. 2) and may easily realize how the nurses' performance in medical care was affected by the use of nursing IT system in military hospital. In our experiment, the 500 volunteer were randomly selected for various departments such as medical wards, surgical wards, division of out-of-patient, intensive care units (ICU), emergency room and operating room and so on in Kaohsiung Armed Forced General Hospital. We wanted to know the four primary problems. What are the nursing missions that fit the military hospital by the nursing IT system? Do the personal traits of the nurses in military hospitals influence their nursing work when taking care of the patients? What degrees of the nursing information system hospital may assist the nurses' performance in military hospitals? How does the NIS (nursing information system) affect the TTF of patient's care in military hospital?

It is well known that personal traits may play an important role in various psychological and physiologic fields. As to the comments of Zumd, the personal traits may further divide into three major impact factors such as cognitive factors, demographics and personality [13]. The three factors were discussed below.

(1) Demographics: It includes age, gender and education level. Hubona and other researchers found that the type of work and personal traits (such as age, gender, training, education and skills) are all important factors that may influence users' inclination to use new IT technology [14]. Some articles indicate that women are less self-confidence than men. The nurses over 40 years old take the application of an IT system to the medical industry more seriously. Besides, the educational level also influences the self-affirmation of computer users.

(2) Cognitive factors: The impaction from the person's cognitive style on the IT system had been well-discussed. For example, Adams, and Divis et al.

all brought up the perceived usefulness and perceived ease of use which play the important roles in the cognitive factors [1,15,16]. In addition, individuals' attitudes, intention to use and actual system use are also proposed to be the decisional factors [17,18,19].

(3) Personality: Compeau and his co-workers believed that one's personality may influence the self-affirmation in using computers, and further affect the performance in their duty and work. They prove that the higher users' "computer self-efficacy" is, the lower their computer anxiety will be, which will enable them to perform better in learning and working [20].

In our study, we took some reference for many authors and enrolled the above three factors in the questionnaire [24,25,26,27,28,29,30,31]. The questionnaire has undergone several revisions and a pre-test (about 50 people by random choice) to ensure the Cranach's  $\alpha$  data which is the representative of reliability must be above 0.7 [21]. All 500 nurses were randomized chosen and the total questionnaires were distributed to the objects individually. Our survey was conducted for four months (from March to June in 2014). All the participants completed the questionnaire when the nurses were off duty so that the regular work about patient care would not be interrupted.

The contents of questionnaire were divided into 4 major parts. The first part covers personal information and demographics (It may include 9 topics: gender, age, education levels, years of service, experience in using computers, frequency of using the military hospital nursing IT system, preference for using a desktop or the tablet on a mobile nursing station, comments on the functions of the military hospital nursing IT system, and comments on the operational interface of the military hospital nursing IT system). The second part of this questionnaire is to realize the subjective perceptions from nursing staff's (total 10 questions). The third part is the analysis of nursing staff's situations in using computer software (total 10 questions). The fourth part of our questionnaire explores how the nursing IT system

supporting the immediate medical care, establishing the correct nursing records, and providing health counseling services (total 28 items). In other word, our intent in this questionnaire is to know the below results: 1. to evaluate nursing personnel's cognitive styles; 2. to further realize the nursing personnel's self-affirmation in using computers ; 3. to check the goodness-of-fit of the IT system to their job, and how the IT system helps their work; 4. To clarify the personal demographics. This survey in our demographics includes the degree of nurses' satisfaction of the desktops in nursing stations and i-Pads on mobile nursing stations.

Besides the basic IT and demographics, the rest of the questionnaire is measured by the Likert scale. Each question is all recorded by 5-level Likert item, to which the score from 1 to 5 is given. The higher the score is, the higher the identification will be (eg. 5: Strongly agree; 4: Agree; 3. Neither agree nor disagree; 2. Disagree; 1. Strongly disagree). (Appendix 1, 2, 3, 4 for contents of the questionnaire). All the results would be analyzed by SPSS 13.0. The demographic IT of the collected samples will be demonstrated through frequencies, percentage and standard deviation of descriptive statistics. The

demographics (gender, age, education level), experience in using computers, cognitive styles and self-affirmation in using computers are examined with Pearson's chi-squared test and multi factor line regression method. Finally, analyses of reliability and validity will be conducted. If Cronbach's  $\alpha$  was greater than 0.7, it revealed that the results showed high reliabilities. If the data was between 0.5 and 0.6, the reliability was acceptable. However, the data is below 0.3, the results of questionnaire were not reliable.

### 3. Results

The 500 valid questionnaires were collected after 4 months. The questionnaires were analyzed in different ways. The first one belongs to descriptive statistics which could help us to understand the situations of nursing personnel using two different devices, and the degree of their satisfaction. The second one is to examine the reliability and the validity of the questionnaires. The third one is using the regression analysis to analyze the impact of personal traits to the task-technology-fit in nurses (know how to gain benefit during job), the influence of personal traits on IT system and the influence of personal traits on assisting their nursing work.

#### (1) Descriptive statistics:

Subjects	Statistics analysis
Gender	100% of objects are women
Age	Under 25 Y/O (26%), 26 to 35 Y/O (41%), older than 35 Y/O (33%)
Education levels	College (96%), Master (4%)
Years of employment	1 to 3 years (41%), 5 to 10 years (17%) , More than 10 years (40%)
Experiences of using computers	None (3%), Less than 1 year (17%), 1 to 2 years (9%), 3 to 5 years (5%), 6 to 10 years (26%), More than 10 years (39%)
Frequency of using the IT system	Usually (51%), Sometimes (19%), Often (15%),Occasionally (5%), Always (9%)
Satisfaction of using desktop computers	High satisfaction (R=3.67)
Satisfaction of using tablets on the mobile nursing stations	Normal satisfaction (R=2.67)
Satisfaction of the functional design of the IT system	High satisfaction (R=3.06)
Satisfaction of the operational interface of the IT system	High satisfaction (R=3.14)

(2) The reliability and validity analysis in our questionnaire

The reliability analysis of all questions is described in the following paragraphs:

1. Dimension 1: There are 10 questions on the impact of the personal traits on the task-technology fit. The Cronbach's  $\alpha$  showed 0.748 which revealed the questionnaire contents with high reliability. Therefore, the results are valid).

2. Dimension 2: There are 10 questions on the affection of the military hospitals nursing IT system on the task-technology fit. We were glad to find out that the data of Cronbach's  $\alpha$  was 0.853 which represent higher reliability, and the results are valid).

3. Dimension 3: We used 28 questions to test the assisting relationship between personal traits and nursing work. The results revealed that the data of Cronbach's  $\alpha$  was 0.894. In other word, the

questionnaire contents owned higher reliability and we could believe the results).

4. Dimension 4: On the validity analysis of all questions, the level of KMO (Kaiser-Meyer-Olkin) showed 0.7. It revealed that our survey of the questionnaire were moderate adaptability for analysis) [22].

(3) Regression analysis [23]

1. Personal traits do not have a apparent influence on the goodness-of-fit of IT system ( $R^2=0.000$ ,  $\beta=0.101$ , Significance= 0.316,  $t =13.337$ ). (Personality did not affect the use of Nurse Information System).

2. The military hospital nursing IT system has a significant influence on the goodness-of-fit of the nurse care ( $R^2=0.009$ ,  $\beta=0.329$ , Significance= 0.000,  $t =6.464$ ). (It means that the nurse information system can help the nurses in patients' care and decrease the work loading).

3. The personal traits do not have a remarkable influence on the assistance to the nursing work. ( $R^2=0.027$ ,  $\beta=0.191$ , Significance= 0.056,  $t =4.577$ ). (In other word, the personality of nurses in military hospitals in Taiwan did not impact their routine job).

Hypothesis	Influence path	Adjusted R2	Standardized path coefficient	t	Result
H1	Personal traits-->Goodness-of-fit	0	0.101	0.316	Not support
H2	Goodness-of-fit-->Assistance to the nursing work	0.099	0.329	0.001	Support
H3	Personal traits-->Assistance to the nursing work	0.027	0.191	0.056	Not support

The analysis revealed that the nursing IT system used by Kaohsiung Armed Forces General Hospital would apparently support the nurses' work. In other words, we could find out that The NIS system is good for the nurses' patient care. The task-technology fit in nurses is excellent in the military hospitals in Taiwan (Republic of China) (which also means that Hypothesis 2 is tenable). Our study just matched past researches. We believed that higher the IT task fit, the better users' subjective effects and performance will be. This is consistent with the studies of Jarupathirum and other scholars [10].

This study also found that the demographics and personal traits of the nurses in the military hospitals (ex. gender, age, education level, years of services, experience and the frequency of using computers) do not have a significant influence on the NIS system. Besides, the demographics and personal traits of the nurses in military hospitals do not show apparent impactation on the nursing work (which means that hypotheses 1 and 3 are untenable) [31,32].

#### 4. Discussion

In 2000, *The Economist* published "Worldwide Health Rankings," in which the Republic of China ranks second place, after Sweden. In 2007, the International Institute for Management Development (IMD) released its World Competitiveness Yearbook, in which Taiwan ranks thirteenth in terms of health infrastructure. All the good result is the implementation of the National Health Insurance on 1995, which offers world-class medical service to Taiwanese people. Till now, many patients in Taiwan still gained the benefits from this excellent institution.

Goodhue's theory of Task-Technology Fit (TTF), which is applied to this study, emphasizes four major aspects: 1. System integration: An IT system should provide the standard presentation of contents

and IT to satisfy nursing care needs. 2. Availability of work stations: the more numerous the PCs or terminals, the more the opportunities for nursing personnel to use them; this will thus increase their good TTF. 3. Higher ratio of the assisting IT team : For example, if there are more assisting personnel available from the IT department, there will be more people available to solve urgent problems encountered during medical treatment, and thus, may reduce the delay of the waiting time for nursing works. 4. Deployment of assisting members: If there are more assisting personnel available (such as IT technicians or experienced nursing staff), they can be deployed at different units, and they can thus facilitate the promotion of the nursing IT system, reduce the time required for problem solving, and intensify the inclination for using this system. Hence, the chief of any hospitals should take the availability of the IT system into consideration including enroll many information technicians, training the experienced nurse leaders which are all necessary in the development of the hospitals.

There are many new products available to support medical work. For example, PDAs (personal digital assistants) was widely used by hospitals around the world in patient care many years ago, however, it is out-of date. In fact, PDA may allow the working nurses to bring some necessary IT with them and thus, they saved the time to constantly move between the bed-site of patients and stations for newer data and information about the care of the patients. For example, Hualien Tsu Chi Medical Centre has been using PDAs for clinical practices and the integration of nursing orders since 2001. Yet, the longer transmission time between PDAs and station computers (1 to 2 minutes) may lower the satisfaction of nurses. Recently, PDAs have been gradually replaced by an e-nursing electronic information

system with web-base (connected to the wireless internet) which moves along with nurses, who can easily input or look up IT related to patients. Besides, this computerized nursing information system would assist the clinical nursing care and decision.

On a nursing cart, there is medical equipment, facilities, medicine and a computer that is able to. When taking care of patients and giving them medicine, nurses can take this “electronic nursing cart” with them. The IT system on the mobile station, such as a computer and/or i-Pad, makes “mobile nursing station,” which integrates nurse calls, smart phone, and the nursing order system together in the cloud computing. With the technological progress, the functions of traditional fixed nursing stations have slowly been replaced by the smart mobile nursing station. Nurses can immediately receive and handle patients’ problems anywhere and anytime, without returning to the fixed nursing stations, so that their workload is greatly reduced and they can better focus on the tasks of patient care. This system may support the excellent nursing quality which could promote the patients’ safe by information technology. The mobile nursing station also ensures that no phone call will be missed, thus creating a safe medical environment for patients. Different hospitals may design their nursing orders system in different ways. Take Kaohsiung Armed Forces General Hospital for example; from the computer on the mobile nursing station, they can accomplish different tasks, including the execution of different nursing cares and various doctor orders, checking the results of examination reports, scheduling time of any examination and operation time, checking medication records and medication queries, blood transfusion records, consultation notification, nutrition care and records, reporting on restraint patients, assessment of special patients’ physiologic condition (ex. falling down, heart rate, and blood pressure), patients’ psychological assessment and discharge planning, and patients’ health education IT. Moreover, the smart mobile nursing station also has a real-time anomaly alert function to ensure patients’ safety. The system is operated with a touch screen, thus saving use of paper and diminishing the writing time.

Because of the computerized records, it may decrease the risk from mistake recorded, make sure of medical message uniformity, facilitate the nurses’ work carefully and effectively promote the quality of patients’ care. This IT can also customize form templates and edit the layout; it also has a glossary of the words frequently used in different situations and a spelling check function. It reduces the time spent in handwriting and chances of IT loss and spelling mistakes, and thus ensures completeness of the medical records, and comprehensively enhances the

quality of the medical records and safety. Such improvements from electronization would benefit the evaluation for the medical team. In our study, we found that the nursing orders IT system used in our military hospital has a high satisfaction level for the users ( $R=3.06$ ), and its touch function design on the computer screen also own the high satisfaction level ( $R=3.14$ ). These results suggest that the nurse information system (NIS) may be promoted to the other military and even other hospitals in Taiwan.

I-Pad or computer on the smart mobile nursing station obtains IT from the hospital cloud platform through the wireless local area network, while computers at the fixed nursing stations connect to the platform through the local area network. Indeed, the two systems have the same functions. For example, National Cheng Kung University Hospital in Taiwan recently conducted a survey on using an “electronic nursing cart” and found that 90% of nursing personnel are willing to use an electronic nursing cart and believe that it is helpful to their work; 82.25% of nurses believed that the design of electronic nursing cart can provide the better patient care service from enough IT. In our experiment, the nurses’ satisfaction about our nursing IT system is above 3 (3.06), which suggest that the nurses are satisfied. According to Lee’s research, a IT technology must comply with the needs of the tasks so that technology will have the positive influence on the task fit. Its functions must also be constantly upgraded and updated. Their results were similar to our study’s [11]. This study also finds that nursing personnel have a high satisfaction level in using desktop computers at the fixed nursing stations (3.67), but a low one in using i-Pad on the mobile nursing cart (2.67). Although the connection speed of i-Pad (wireless internet) is slower than that of the computers at the fixed nursing stations, the difference is very insignificant (the transmitted time is nearly the same). The low satisfaction level in using i-Pad might be caused by the implementation of certain policies. For patients’ safety, supervisors of nursing department in our hospital ordered that nurses must write and record any data in the fixed nursing station rather than mobile nursing cart. Although many nurses were bothered by this inconvenient stipulation, we found that this rule may avoid mistakes caused by entering IT during the process of treatment. The implementation of this policy greatly avoids errors stemming from entering wrong IT. However, the benefit still needed further evaluation in the further. In our studies, some nurses also suggest that the software design should be improved, and the weight of the electronic nursing cart (including the computer on it) should be reduced for better mobility. These suggestions are the references for the future design of

both the computer hardware and software, and the specification of the mobile cart as well.

Many studies indicate that the support to the IT system from top management is one of main factors for the success of a task in various fields. Hospitals are very special workplaces, and top management is mostly assumed by doctors. In Taiwan, traditionally, doctors' orders are more authoritative. Also, the superintendent (doctor) can give executive orders for the task implementation, which also influences the promotion of the nursing IT. The military hospital is even stricter: just like an army, it demands discipline and obedience. The superintendent of a military hospital is a military appointment with the highest rank in the hospital. Comparing the orders from the superintendent to those of an ordinary hospital, the orders from the superintendent of a military hospital are more authoritative and must be carried out. Hence, with superintendent's support, the tasks of promoting a nursing IT system in a military hospital, software and hardware upgrading, and a complete and sustained education for nursing personnel will definitely be executed. Be that as it may, we still want to provide correct ideas to the nursing personnel in the military hospitals. We hope that they will use the nursing IT system more frequently because they understand its necessity, and not because they are forced to do so by hospital regulations. When they use the system more voluntarily, their performance in nursing work will be better as well.

In the past, the comprehensive IT development for military hospitals was much restrained by many traditional burdens, including the special military missions and concerns of the IT safety and security. Compared to the openness of ordinary hospitals, the conservativeness of military hospitals causes them to gradually lose their competitiveness. In recent years, the top management of the military hospitals has realized the importance of applying IT technology to patient care, and gradually adopted the more positive and active attitude in constructing the IT system, which may have very positive effect in increasing hospitals' competitiveness. Yet, the enactment and implementation of the Personal IT Protection Act restrict the development of the nursing IT system for all hospitals. For example, IT stored at the fixed and mobile nursing stations might be intentionally falsified, hackers might attack the network system, patients' privacy might be violated and wrong medical treatments might be given to patients. These negative aspects have gradually emerged and gotten the attention of scholars around the world. For example, Wilson argued that the hospital IT system must be controlled and protected, for example, password

design for login, regular password changes, users' limits of authority, controlling and monitoring of the data access, data backup and recovery [33]. For Armed Forced hospitals, due to their relationship to the military secrets and specific military appointments, their protection and security of the electronic medical records and the other IT should be more rigorous than in the ordinary hospitals.

According to statistics provided by Taipei Veterans General Hospital (Taiwan), before the introduction of the nursing IT system, the total time of all the nursing staff spent in writing the nursing records is about 450 hours daily, on average. After the establishment of the system, the time spent on handwriting is greatly reduced. To our surprised, it saves 2.42 minutes on average for each nursing problem, and thus saves 715 hours for the whole hospital monthly, on average. If a nurse works for eight hours per day, it saves the human power of 89 nurses and a cost in human resources of more than NTD 1,000,000 every month, on average. Hence, it has become a trend to fully adopt the nursing IT system in saving the costs of human resources and time for nursing job and in improving the quality of patient care. The construction of the medical IT system for Taiwanese military hospitals can also avoid medical disputes, improve patients' safety and increase hospitals' competitiveness.

## 5. Conclusion

The fast development of computers and internet brings different kinds of convenience to nursing personnel, including reducing time spent in and mistakes caused by handwriting, integrating IT systematically, facilitating the process for future researches, providing actual materials for clinical education, ensuring the continuity of nursing projects, and a uniform standard for communication and coordination. Yet, during the implementation of this nursing IT system, the education of nursing personnel should be sustained (especially the training courses for new recruited nurses for their acceptance of and inclination for technology, and training in the use of an online system). Supervisors from different units should also take responsibilities for setting up good models and teaching [34]. The Information management office in various hospitals should keep upgrading the IT system to make it more user-friendly, easy-to-use and convenient. The top management of military hospitals should also focus on how to improve the operational advantages of the hospitals, their competitiveness, and the quality of patient care through the nursing IT system, so that a win-win situation can be achieved for patients' safety and the reduction of the workload of the nursing staff.

Table I. Part One: Personal Traits to the Goodness-of-Fit of the Military Hospital Nursing IT System

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
1. I do not like to think too much	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I'll try to avoid situations requiring a thorough consideration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I prefer doing things that challenge my thinking skills instead of doing things that require not to think too much.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I rather prefer complicating question than simple one.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I am not happy to spend too much time to think.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I fully trust my premonition.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I believe my first impression on a person.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. My first impression on a person is usually right.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I usually rely on my intuition to decide whether I should trust a person.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I usually could feel whether someone is right or wrong, even though I cannot explain why.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table II. Part Two: Influence of the Military Hospital Nursing IT System on Goodness-of-Fit of Nursing Personnel

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
1. Although I do not have experience of using a similar software, I will still use it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Even though no one taught me how to operate the computer, I will still use it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. If someone taught me how to use the computer at the beginning, I will use it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. If the software has the help function, I will use it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. If the software has a users guide, I will use it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. If someone briefly taught me how to operate the software at the beginning, I will use it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. If I could ask someone when I encountered a problem, I will use it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. If someone could demonstrate how to operate the software to me before I start the operation, I will use it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. If this software can help me to finish my work on a timely basis, I will use it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. If I had experience of using a similar software for the same task before, I will use it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table III. Part Three: Influence of Personal Traits on the Assistance to the Nursing Work (the Military Hospital Nursing IT System)

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
1. The introduced IT system can satisfy my needs in work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. The IT system provides necessary information for daily tasks.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. The stored data are correct and in details.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I can easily find the information I need from the IT system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Each form used in the IT system is clearly defined; it helps me to operate it easily.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I am authorized to download the nursing information and relevant information to my computer from the hospital database.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I am not authorized to download the nursing information and relevant information to my computer from the hospital database.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. The IT system can immediately provide the needed information related to work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. The data and report of analysis in the IT system can be updated in time.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. The data in the IT system is consistent with HIS.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. The system often fails or has problems frequently.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. The IT system is very stable and I can rely on it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Operating the tablet is very stable and I can totally rely on it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. The interface of the IT system is clear and easy-to-use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. I can easily use the IT system on a desktop computer.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
16. I can easily use the IT system on tablet from the mobile nursing cart.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. When I need help, I can get trainings related to tablets.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. When I need help, I can get relevant trainings.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. I believe the IT system satisfies my needs in daily work and meets the objectives of the hospital.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. I believe the IT system helps me in monitoring patients' situations and increases my work efficiency.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. When I need help for my tasks, the IT system always provides me the necessary information.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. I believe the IT system offers a good technical support and consultation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. I believe the IT system provides solutions to problems encountered in my work and greatly reduces the repeating records.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. In general, I like using the military hospital nursing IT system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. In general, I like operating the IT system by using tablet on the mobile nursing cart.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. I believe the IT system shortens my working time and provides patients immediate medical cares.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. I believe the IT system helps me in establishing accurate nursing records.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. I believe the IT system helps me provide patients health consultation services correctly and promptly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table IV

1. Gender	<input type="checkbox"/> Male <input type="checkbox"/> Female
2. Age	<input type="checkbox"/> under 25 <input type="checkbox"/> 26~30 <input type="checkbox"/> 31~35 <input type="checkbox"/> 36~40 <input type="checkbox"/> 41~45 <input type="checkbox"/> over 46
3. Education levels	<input type="checkbox"/> Senior High (vocational high school) <input type="checkbox"/> University (college) <input type="checkbox"/> Master degree <input type="checkbox"/> Ph. D degree
4. Years of services	<input type="checkbox"/> Less than 1 year <input type="checkbox"/> 1~3 years <input type="checkbox"/> 3~5 years <input type="checkbox"/> 5~10 years <input type="checkbox"/> More than 10 years
5. Experience of using computers	<input type="checkbox"/> None <input type="checkbox"/> Less than 1 year <input type="checkbox"/> 1~2 years <input type="checkbox"/> 3~5 years <input type="checkbox"/> 6~10 years <input type="checkbox"/> More than 10 years
6. Frequency of using the IT system	<input type="checkbox"/> Always <input type="checkbox"/> Often <input type="checkbox"/> Usually <input type="checkbox"/> Occasionally <input type="checkbox"/> Sometimes
7. I prefer operating the nursing IT system by using:	
a. a desktop computer	<input type="checkbox"/> Very satisfied <input type="checkbox"/> Satisfied <input type="checkbox"/> Neither satisfied nor dissatisfied <input type="checkbox"/> Dissatisfied <input type="checkbox"/> Very satisfied
b. a tablet on the mobile nursing cart	<input type="checkbox"/> Very satisfied <input type="checkbox"/> Satisfied <input type="checkbox"/> Neither satisfied nor dissatisfied <input type="checkbox"/> Dissatisfied <input type="checkbox"/> Very satisfied
8. Am I happy with the functions of the IT system?	<input type="checkbox"/> Very satisfied <input type="checkbox"/> Satisfied <input type="checkbox"/> Neither satisfied nor dissatisfied <input type="checkbox"/> Dissatisfied <input type="checkbox"/> Very satisfied
9. Am I happy with the operational interface?	<input type="checkbox"/> Very satisfied <input type="checkbox"/> Satisfied <input type="checkbox"/> Neither satisfied nor dissatisfied <input type="checkbox"/> Dissatisfied <input type="checkbox"/> Very satisfied

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