"Fit" Determining Nurses' Satisfaction of Nursing Information System Usage

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Abstract. In the digital age, nursing units must more than ever be able to utilize nursing information system (NIS) to enhance efficiencies, effectiveness, and decision-support, and get timely answers to questions, when they arise in daily clinical and administrative practice. Previous researchers have suggested that satisfaction status is established on the degree of fit, when achieve a good fit between the users' requirements and technological capabilities to attain optimal use satisfaction. Thus, this study attempts to understand how impact of fit of individual requirement-technological capability on user satisfaction through the holistic perspective of fit within the nursing context. The results indicate that the fit of users' perceptions-technological capabilities interaction is a more important factor than individuals' factor of users' perceptions or technological capabilities in users' satisfaction of information system usage.

Keywords: Fit · Satisfaction · Nursing information system

1 Introduction

The use of a Nursing Information System (NIS) is widespread in modern healthcare organizations. Approximately 95 % of healthcare organizations have adopted NIS to support nursing clinical practice and general administration in Taiwan [1]. An NIS is defined as the emerging applications of the information technology to help nurses deliver or acquire accurate and real time clinical information to or from patient, physician, or other healthcare providers to ensure quality healthcare [2]. Previous studies have verified that NIS can assist nurses in making clinical decisions, as well as increasing their efficiency and effectiveness in their daily routines [1, 3]. Goodhue & Thompson (1995) [4] and Parkes (2013) [5] suggest that the degree of users' satisfaction is established on fit, i.e. when a good fit is achieved between the users' requirements and technological capabilities to obtain optimal use satisfaction. However, the perspectives of previous studies are incomplete since they ignored the fit relationship between users' perceptions and technological capabilities impacting users' satisfaction [6–8]. This study argues that nurses perceived fit of individual requirement-technological capability influences nurses' satisfaction with NIS usage.

Hence, we attempt to tests whether the fit of users' perceptions- technological capabilities interaction is a more important factor than individuals' factor of users' perceptions or technological capabilities in users' satisfaction of information system usage through the perspective of fit as covariation in the context of nursing work.

2 Theoretical Background, Research Model and Hypotheses

Figure 1 displays the research models of this study. Consequently, several hypotheses will be developed and tested.
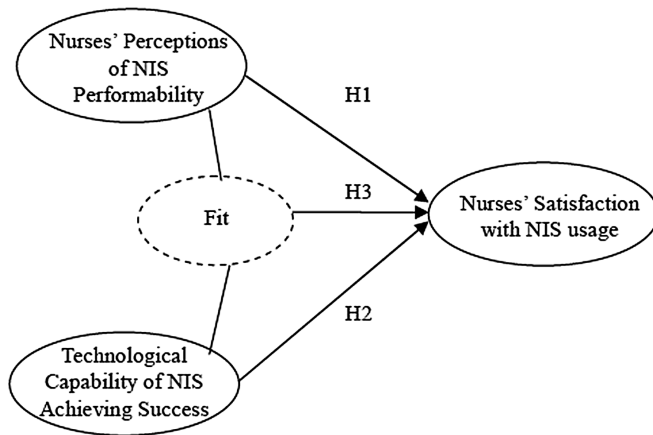

Fig. 1. Research model

2.1 Nurses' Perceptions of NIS Performability and Nurses' Satisfaction with NIS Usage

In the field of healthcare informatics, previous literatures have identified that the degree to which healthcare professionals perceive the performability of a healthcare information system has a significant influence on the users' satisfaction of healthcare information system applications [1, 6]. Moreover, according to Lee et al. (2008) nurses are more likely to have higher satisfaction than physicians by adopting an electronic healthcare system when they perceive that the device provides friendly-interface, compatibility, accurate and real-time information [9]. Thus, this study postulates:

H1: Nurses' perceptions of NIS performability are significantly related to nurses' satisfaction with NIS usage.

2.2 Technological Capability of NIS Achieving Success and Nurses' Satisfaction with NIS Usage

Technological capability is an important factor impacting user satisfaction with information system applications [8]. Sarker et al. (2005) declared that user perceived

continuity in the availability of technology functional support from a device is a key antecedent of user satisfaction and continued use of the information system [10]. Otieno et al. (2007) [11] through an investigation of 1666 nurses found that technological quality of electronic medical records has a positive correlation with user satisfaction. Thus, this study postulates:

> H2: Technological capability of NIS to achieve success is significantly related to nurses' satisfaction with NIS usage.

2.3 Fit Between Nurses' Perceptions of NIS Performability and Technology Capability to Achieve Satisfaction with NIS Usage

According to Yusofs et al. (2006) the fit of relationships among technology, staff skills and organizational management process will be helpful in enhancing organizational performance and strategy planning [12]. Southon et al. (1997) found that poor fit among several organizational elements is a key reason for the failure of technology acceptance in the field of public health [13]. By integrating the abovementioned insights, this study argues that a good fit of users' perceptions- technological capabilities interaction has a better use satisfaction than human or technology factors on use satisfaction. Thus, this study postulates:

> H3: Nurses' satisfaction with NIS usage can be influenced by the fit of nurses' perceptions of NIS performability-technology capability of NIS achieving success

3 Methods

3.1 Instrument Development

The measures to be used in this study were obtained from previous literature. Items for measuring nurses' perceptions of NIS performability were adapted from Davis et al. (1989) [14], while scales used to measure technology capability of NIS achieving success was adapted from Chenet al. (2015) [15], and Petter & Fruhling (2011) [16]. Nurses' satisfaction with NIS usage measures was adapted from Chen et al. (2015) [15]. This study employed multi-item five-point Likert scales anchored by 5 = "strongly agree" and 1 = "strongly disagree." Pretests were examined by 30 registered nurses before they were used in the selected target population.

3.2 Data Collection

The questionnaire was distributed to 200 registered nurses at 4 healthcare institutions. All hospitals already had established and widely employed NIS offering support services for nurses' clinical and administrative affairs. 153 questionnaires were returned. Of these, 11 were incomplete. The valid sample size was 142, with an effective response rate of 71 %.

4   Results

4.1   Measurement Model Assessment

This study used a CFA to estimate the reliability and validity of the scales of measurement items. The scales' convergent and discriminant validity were examined as demonstrated in Table 1. The Cronbach's alpha of all constructs, which displayed an adequate reliability, was > 0.7, the threshold suggested by Hair et al. (1998) [17]. The items' factor loading, which recommends an acceptable outcome for discriminant validity according to Antony et al. (2002) [18], was > 0.7 in all instances. All values of average variance extracted (AVE) were greater 0.5 displaying an acceptable convergent validity. Additionally, the composite reliabilities (CR) for all constructs were above 0.7; all values well exceeded the required threshold of 0.6, showing good composite reliability. Table 1 displays the AVE square root values on the diagonal line, which surpass the values on the non-diagonal line that are correlation coefficients between inter-construct correlations. Therefore, the results showed powerful evidence of good discriminant validity.

Table 1. The results of construct correlations

Constructs	Mean	S.D	Nurses' perceptions of NIS performability	Technological capability of NIS achieving success	Nurses' satisfaction with NIS usage	
Nurses' perceptions of NIS performability	3.888	0.780	0.375***	**0.825**		
Technological capability of NIS achieving success	3.730	0.886	0.444***	0.301**	**0.816**	
Nurses' satisfaction with NIS usage	3.861	0.558	0.407***	0.317***	0.378***	**0.780**

Note: Square root of Ave extracted for each latent construct is displayed in diagonals.

p**<0.01, p***<0.001

4.2   Structural Model Assessment- the Perspective of Fit as Covariation

This study compared the coefficients of determination (R^2) of the two models to examine the goodness of fit of the research model. The direct effects model variance explained 13.1 % (R^2 = 26.7 % vs. 39.8 %) less variance in nurses' satisfaction with NIS usage. The values of R^2 were greater than 10 % in the model, which implied that latent variable regressions were significant in this study [19]. Thus, the results hint at the acceptance of the fit over the main effects model. Moreover, nurses' perceptions of NIS performability, technological capability of NIS achieving success, and fit have significant influence on nurses' satisfaction with NIS usage (β = 0.244; 0.207; 0.433, t-value = 3.303; 3.117; 5.110, respectively); hence hypotheses 1, 2 and 3 were supported.

5   Discussions

The findings show that the fit of nurses' perceptions of NIS performability and the technological capability of NIS achieving success was found to have a significant impact on nurses' satisfaction with NIS usage. The fit of nurses' perceptions -technology capability interaction is a more important factor than individuals' factors of users' perceptions or technological capability with respect to users' satisfaction with information system usage; it determines the success or failure with NIS implication. Therefore, this study suggests that nursing department supervisors can apply the concept of holistic fit and assist in developing and evaluating an appropriate type of NIS for achieving better performance.

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