Predicting Undergraduate Nursing Students’ Intention to Use the Electronic Health Records Software Application

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EXTENDED ABSTRACT

Introduction

Most hospitals in Singapore have adopted electronic health records (EHRs) in their practice. As a result, nurses need to use and be aware of electronic nursing documentation in providing patient care (Kelley et al., 2011). Preparing competent nurses who have the knowledge and skill to use EHRs is in high demand, especially at the undergraduate level. It is recommended that nursing students should prepare to use EHRs when they are in nursing school so that they are aware of and comfortable with the latest health information technology (Bembridge et al., 2010; Fetter, 2008; Meyer et al., 2011). Previous literature suggested that nursing students’ perceptions and intentions to use EHRs would influence their willingness to learn the system and use it in practice (Borycki et al., 2011; Fetter, 2008).

Advanced technology cannot improve organization outcomes or enhance individuals’ performance if it is not accepted or not being used by the end users (Davis et al., 1989). In an educational environment, nursing students are end users and their acceptance of EHRs is essential. Failure of system adoption would likely lead to financial loss and users’ dissatisfaction, whereas the success of system adoption can lead to improved productivity and gains in profits (Hu et al., 1999). If nursing students do not accept and do not have any intention to use the EHRs program in their instruction, the University could lose revenue and fail to produce optimal learning outcomes. The purpose of this study was to describe, identify, and predict factors that influence nursing students’ intention to use the electronic health records for nursing education in the simulation laboratory before it is implemented.

Conceptual Framework

The Health Information Technology Learning Model (HITLM) was used to guide the study. The model was derived from existing literature, and empirical observations. According to the HITLM, the constructs provided by the Technology Acceptance Model (TAM) are perceived usefulness (PU), perceived ease of use (PEOU), attitude toward using (ATU), and intention to use (ITU). The primary key factors (PU and PEOU) are influenced by external variables. Attitudes toward using are the bridge between both key factors (PU and PEOU) and intention to use. Factors suggested by Theory of Planned Behavior (TPB), Subjective norm (SN) and perceived behavioral control (PBC) would also influence the intention to use. The intention to use would influence the actual use of EHRs (Fishbein and Ajzen, 1975). Based on the literature, the following external variables were included in the conceptual framework: age, academic year, knowledge of EHRs, awareness of EHRs, support from faculty, and support from simulation lab staff (please see Figure 1).
**Research Questions**

The study’s research questions are:
1. What are the relationships among key variables in the proposed model (HITLM)?
2. What are the predictors of the nursing students’ intention to use the electronic health records for nursing education in the simulation laboratory?
3. What is the most influential factor in predicting nursing students’ intention to use the EHRs in the simulation laboratory?

**Methods**

**Design**

This study was a quantitative, descriptive cross-sectional study design, in which undergraduate nursing students completed a questionnaire.

**Sample**

The sample was a convenience sample of undergraduate nursing students recruited from a local university in Singapore. The inclusion criteria were undergraduate nursing students who were studying in year 1 to year 4, and have been involved in simulations and skills laboratory activities in the university. A total of 263 undergraduate nursing students were invited to participate in the study, and 218 completed questionnaires were returned. The overall response rate was 83% which is considered satisfactory. This sample size was adequate to achieve a moderate effect size (0.13) with $\alpha = 0.05$ and power level = 0.80.

**Instrument**

The Electronic Health Records Acceptance Survey (EHRAS) was used in this study. The EHRAS was modified from two surveys; the eICU Acceptance Survey (Kowitlawakul, 2008) and the Seeman and Gibson’s survey (2009). In this study, the internal consistency of the instrument constructs ranges from 0.60 to 0.89 of the subscales, and with a total coefficient $\alpha$ of 0.93, which was considered satisfactory (Polit & Beck, 2008).

**Data Collection**

Data collection was started in January 2012 using the EHRAS and ended in March 2012. The study has been approved by the Institutional Review Board (IRB) of a university in Singapore. The information sheets, consent forms, and questionnaires were provided to the students after the purposes of the research study were explained.

**Data analysis**

The IMB SPSS version 20.0 was used to analyze the data. Statistical significance for all of the analysis was defined as $p \leq 0.05$. Descriptive statistics were used to describe the nature and overview of nursing students. Bivariate analysis was conducted to investigate the relationships between demographic/external variables and the model constructs. Multiple regressions (path analysis) were performed to explain and identify the most influential predictor (Mertler & Vannatta, 2002) of the students’ intention to use EHRs.
Results

Characteristics of the Participants

The age average of the participants was 21 years old (SD = 1.50), and it ranged from 19 to 29 years old. Most of students were female (85.3%). On average, the students had 113.73 days of practicing experience in clinical sites (SD = 205.34, range = 0-1095 days), while they had average of 11.15 years of experience in using computer (SD = 3.40, range = 0.25-20 years).

Relationships Among Variables/Constructs in the Proposed Model

According to Pearson’s correlation among external variables and the two key determinant factors (perceived usefulness and perceived ease of use), age and awareness of EHRs have no statistically significant correlation with perceived usefulness. Also, age and academic years also have no statistically significant correlation with perceived ease of use. Table 1 presents the correlation among the constructs in the HITLM (perceived usefulness, perceived ease of use, attitude toward using, subjective norm, perceived behavioral control, and intention to use). Results showed that all the variables have statistically significant correlations with each other that range from 0.232 to 0.579 with \( p < 0.01 \).

Table 1: Pearson’s correlation coefficients results (N=218)

<table>
<thead>
<tr>
<th></th>
<th>PU</th>
<th>PEOU</th>
<th>SN</th>
<th>PBC</th>
<th>ATU</th>
<th>ITU</th>
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</thead>
<tbody>
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<tr>
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<td>0.405**</td>
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<tr>
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<td>0.390**</td>
<td>0.367**</td>
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<tr>
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<td>0.424**</td>
<td>0.402**</td>
<td>0.232**</td>
<td>0.579**</td>
<td>1</td>
</tr>
</tbody>
</table>

**\( p < 0.01 \)

Multiple regressions/path analysis

The results of path analysis illustrated in Figure 1. According the results of regression 1 (perceived usefulness as a dependent variable), knowledge of EHRs, academic year, and perceived ease of use path coefficients were statistically significant \( (p < 0.05) \). The results of regression 2 (perceived ease of use is a dependent variable), awareness of EHRs and support from faculty/tutor path coefficients were statistically significant \( (p < 0.01) \). Knowledge of EHRs and support from lab staff path coefficients were not statistically significant \( (p > 0.05) \). The results of regression 3 (attitude toward using as a dependent variable), perceived usefulness and perceived ease of use path coefficients were statistically significant \( (p < 0.01) \). The results of regression 4 (intention to use as a dependent variable), Perceived usefulness, attitude toward using, and subjective norm path coefficients were statistically significant \( (p < 0.01) \). Together, perceived usefulness, attitude toward using, subjective norm, and perceived behavioral control explained 44% of variance observed in intention to use \( (R^2 = 0.44) \).

Conclusion

To enhance the students’ intention to use EHRs in learning, cultivating a positive attitude toward using EHRs, as well as increasing the perceived usefulness and subjective norm is an imperative. Providing students with knowledge of EHRs should be initiated before implementing this technology. The contents of the class could focus on how this technology could enhance their performance in the nursing laboratory and clinical practice. Learning could be made simple and easy. Faculty could be trained to use the program effectively and proficiently so that they could support the students to learn. The faculty could also enhance students’ awareness of EHRs and ensure that they have the appropriate information.
This study found that students’ attitude was the main predictor of intention to use which differed from some previous studies. The results of this study provided direction for the implementation of health informatics in nursing education. The Health Information Technology Learning Model was examined, and it could be used in guiding learning health informatics and applied to nursing discipline and different healthcare professional student groups. More investigation on the HITLM in nursing and other healthcare discipline is needed. The replication of this study in another discipline is also highly recommended.

Figure 1: HITLM and path analysis results (N=218)

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References


