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Evaluation of Clinicians' Satisfaction of a Discharge Summary System (DSS) in a Taiwanese Teaching Hospital – The Reliability of an Evaluating Instrument

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Abstract

Evaluation is important in determining the success of electronic medical records (EMRs). Thus, this study introduces how to use both qualitative and quantitative methods in such research. This study provides a suitable assessment questionnaire including dimensions and attributes revised from the "updated DeLone and McLean IS Successful Model" tailored to the Taiwanese medical environment. In short, this study demonstrates the reliability of this evaluation tool and we believe it could be incorporated into EMRs from the perspective of patient safety, healthcare administration, and health informatics.

Key words:

evaluation research, HIS evaluation, evaluation instrument

Introduction

The development of information technology has enabled health professionals to improve the efficiency and quality of patient care. A Hospital Information System (HIS) integrates lots of sub-systems, and has the potential to improve patient care, cost containment and improve the efficiency of work practice [1]. An Electronic Medical Record (EMR) system is a part of HIS. Adoption of EMR could lead to better quality and more efficient healthcare. An EMR contains sensitive health data of individual patients; thus, it is important to realize whether such a system is both secure and error free for patient care in a healthcare organization. Thus, in order to assess current-generation EMRs in Taiwan, we adopte "goal-based evaluation" [2] in designing an appropriate evaluation tool in this research.

The purpose of the study is to establish a suitable evaluation instrument which includes dimensions and attributes for the "EMR evaluation" based on "Patient Safety". Accordingly, this research was performed in a teaching hospital in the south of Taiwan. This sample hospital has been using a Discharge Summary System (DSS) to improve the quality of patient care for more than two years. In order to protect the privacy of patient records, only attending physicians, residents, interns, and nursing specialist practitioners (NSP) are permitted to use this system. Therefore, forty-six physicians were invited to join this evaluation study as they are the main stakeholders in this DSS.

Methods

This research combined and revised both the "updated DeLone and McLean Information System model" [3] and the dimension of "Safety Quality"[4] to generate a more comprehensive model in evaluating this DSS. A Likert-scale was used in the questionnaires and answers were assigned a value of 1 to 7 from "strongly disagree" to "strongly agree". Hence, forty seven questions with a free-text question were developed to measure 7 categories (Figure 1): **System Quality, Information Quality, Service Quality, Safety Quality, Use Frequency, Work Impact, and Overall Satisfaction.** Consequently, this research found evaluating attributes based on the above research model by using literature review to satisfy the requirements of the Taiwanese medical environment. The research uses "cross-sectional" design to achieve its goal. Thus, research questionnaires were provided for the physician's office and were collected every week by researchers from May to the middle of June in 2006.

Results

The respondse rate of this research was 71.7% (33 of 46), and the data were analyzed by using the SPSS statistical software package. Demographic data are shown in Table 1. "Reliability analysis" was conducted and the Cronbach's value of "reliability analysis" shown in Table 2. However, obeying the hypothesis of "Factor analysis", the ratio of variables to samples is 1:2 [5]. As the sample size is 33, only the reliability can be tested in this research. Consequently, the final scale contained 42 questions which comprise 7 dimensions: System Quality, Information Quality, Service Quality, Safety Quality, Use Frequency, Work Impact, and Overall Satisfaction. The results of "Reliability analysis" show that those 42 questions follow the same trend in this research questionnaire.

Discussion

This is a successful study because a suitable assessment instrument was designed based on statistical techniques. To summarize the salient features of the analysis, several findings are of interest, and three reasons could be cited to explain this result. **Firstly,** it demonstrates that both "literature review" and "Delphi method" are important techniques in designing a research questionnaire. **Secondly,** it is essential to adopt clinicians' suggestions, to realize end-users' opinions and use suitable wording in such an evaluation study. **Thirdly**, HIS/EMR evaluation is very difficult to perform in a real medical environment because healthcare professionals are extremely busy with patient care. Thus, it needs to get the support and cooperation with healthcare professionals' to complete and gain useful data from them.

In addition, the most significant finding is that **"Safety Quality"** could be incorporated of the "updated DeLone and McLean Information System model" based on the aspects of technology. However, it still needs further research to demonstrate this result by using "Factor analysis" with large samples (more than 200).

Conclusion

This research demonstrates that Quantitative and Qualitative approach of cross-sectional survey design, Literature review, Delphi method, clinicians' opinions, and cooperation with healthcare professionals are the essential factors in such evaluation research. Additionally, large samples could help researchers to complete a successful evaluation study. The next stage of this research will further refine this instrument for Taiwanese EMRs evaluation.

References

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Table 1 - Demographic Characteristics of Study Sample (N=33)

Dimensions	Cron-bach's α value	Corrected Item-Total Correla-tion	Items	P value
System Quality	0.872	0.642–0.776	4	0.018
Information Quality	0.951	0.772–0.892	7	0.000
Service Quality	0.916	0.677–0.796	8	0.000
Safety Quality	0.839	0.429–0.681	7	0.000
User Frequency	0.865	0.627–0.841	4	0.001
Working Influence	0.948	0.744–0.902	7	0.000
Overall Satisfaction	0.957	0.826–0.935	5	0.014
Total Dimensions	0.968	0.299–0.859	42	0.000
α = 0.005				

Table 2- Cronbach's a value of research questionnaire

Characteristic		Sample	Percentage
Clinical departments	Internal Medical	9	27.2
	Surgery	7	21.2
	Pediatrics	5	15.2
	Obstetrics and gynecology	6	18.2
	E neurology	6	18.2
Gender	Male	11	33.3
	Female	22	66.7
Age	21-25	7	21.2
	26-30	18	54.5
	31-35	6	18.2
	36^{+}	2	6.1

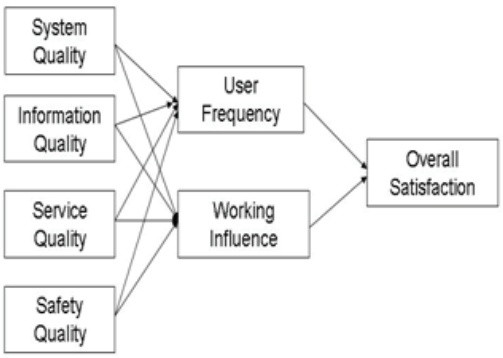

Figure 1 - Evaluation model

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