Full Length Research Paper

The effect of organizational support, self efficacy, and computer anxiety on the usage intention of e-learning system in hospital

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The purpose of the study is to develop the usage intention model of e-learning systems. A survey of 1071 samples of six teaching hospitals in Taiwan shows that the effects of organizational support, self efficacy, and computer anxiety on usage intention are mediated by perceived ease of use, and perceived useful. According to the statistical results, the proposed model fits very well for the samples. Besides, both self efficacy and computer anxiety are important antecedents of perceived ease of use, and perceived useful. Also, organizational support has significantly influence on perceived ease of use. In addition, perceived ease of use has the most influence on usage intention, followed by perceived useful. Further investigation reveals that organizational support, self efficacy, and computer anxiety all have indirect influences on usage intention. This research can provide e-learning designers and managers of the hospital with the implication that we must focus not only on the technological aspect (perceived ease of use and perceived useful), but also on the social psychological aspect (organizational support, self efficacy, computer anxiety).

Key words: E-learning, organizational support, self efficacy, computer anxiety, perceived ease of use, perceived useful.

INTRODUCTION

In the era of information explosion and with the progress of technology, the information system combines internet and breaks the limit in time and space, effectively reducing the educational training cost, and becomes a learning approach in the new century. As far as the medical institution is concerned, the Department of Health in Taiwan regulates that medical professionals should receive continuing education during their practices and that they must meet the requirements of earning all the required credits. The intention for the Department of Health to establish this norm is nothing more than, by means of such a norm, medical professionals who control people's health can be reminded that they must form a habit of continuously receiving the latest knowledge and information to further benefit patients and the public. However, most of the relevant medical professionals fail to have further studies at the fixed time due to their work schedule. Therefore, with the low-cost, timeliness, flexibility and convenience of online learning, relevant medical professionals can obtain more learning opportunities and learning initiatives.

Using information and communication technologies, e-learning has emerged as the innovative education style. The great advantage of using such technology in connection with on-site is that it increases flexibility, through resources that facilitate learning, anytime and anywhere (Liaw, 2008). The contents of instruction include text, graphics, audio, video, and so on. Recently, many businesses have invested many resources to build up e-learning systems to better manage their workforce. The healthcare industry is knowledge intensive by nature because a large proportion of employees in healthcare

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organizations are knowledge workers, such as physicians, nurses, pharmacists, radiologists, physical therapeutists etc. By using available e-learning system effectively, healthcare knowledge workers can reduce travel cost and learn the newest medical knowledge online. Therefore, e-learning systems have been widely employed in health institutions in Taiwan.

The high competitive environment leads to the implement of e-learning in health institutions. To reinforce the professionalism of knowledge workers in hospitals, managers must try their best to improve their original systems by enhancing system processing capabilities and employees' usage intention. Also, users' acceptance is the most important determinant of continuance intentions when using this technology (Roca and Gagne, 2008). Accordingly, the purpose of this study is to investigate the factors that affect employees' usage intention in e-learning, and to find out the important antecedents so as to offer an empirical reference to the managers of hospitals.

LITERATURE REVIEW

E-learning

E-learning adopts the digital learning approach to offer fast learning by electronic teaching contents through the internet technology. Under the strategy of individualized teaching, it can increase the motivation of learning, making learning anytime and anywhere possible by surfing the internet, and can share the knowledge. Employing the features of information network, e-learning can integrate the contents of training courses and multimedia material to offer individual learning or group learning without being restricted by both traditional classrooms and fixed class schedules. Long and Stevenson (1999) indicate that e-learning transmits the computer-based instruction via the internet, allowing learners to obtain knowledge by taking advantage of training methods presented by the media such as the internet browser, no mater what computers (personal or public) they use. Besides, it enables improvements in communication efficiency, between students and teacher, as well as among students (Martines and Kellermanns, 2004). Furthermore, Rosenberg (2001) also argued that e-learning has several benefits: (1) it lowers cost, (2) its content is more timely and dependable, (3) it is a just-in-time learning approach, (4) it builds universal communities, and (5) it provides an increasingly valuable learner service.

Theory of reasoned action (TRA) and technology acceptance model (TAM)

The theory of reasoned action (TRA) is developed to predict and explain human beings' consciously intended behavior in social psychological field (Fishbein and Ajzen, 1975). According to TRA, an individual's specified behavior is determined by behavioral intention to perform the behavior, whereas, the intention is jointly determined by the person's attitude and subjective norm concerning the behavior. The attitude toward behavior is an individual's evaluative affect about performing the behavior, and the subjective norm is an individual's perception that important referents of him think he should or should not perform the target behavior.

The technology acceptance model (TAM) adapts the original TRA to predict and explain a person's adoption of information technology (Davis et al., 1989). TAM identifies two relevant beliefs, that is, perceived ease of use and perceived usefulness. Perceived ease of use is defined as the extent to which an individual believes that using the system will be free of effort, while perceived usefulness is defined as the extent to which an individual believes that using the system will enhance the job performance. According to TAM, the usage of information technology is influenced by behavioral intention to use the information technology, while behavioral intention is determined jointly by perceived usefulness and attitude toward information technology usage. Besides, the attitude toward information technology usage is jointly determined by perceived ease of use and perceived usefulness. Also, perceived usefulness is influenced by perceived ease of use and external variables. TAM has been widely applied in practice, extended in academics, and empirically tested in the field of information management in the last decade.

Organizational support, self efficacy, and computer anxiety

Perceived organizational support (POS) refers to employees' perception concerning the extent to which the organization values their contribution and cares about their well being (Eisenberger et al., 1986). The higher organizational support employees perceive, the lower the absence rate is. Perceived organizational support theory is a very important perspective in organizational behavior literature. Rhoades and Eisenberger (2002) argues that employees who perceive higher organizational support will find their job more pleasurable, be in a better mood performing their tasks, and suffer fewer strain symptoms like anxiety.

Ein-Dor and Segev (1986) contend that if information system was supported and promised by various ranks of managers, users and designers will feel positive. Both users and designers will believe that they will be highly valued by the managers and supervisors and win the priority of sufficient financial support.

Davis et al. (1989) propose that organizational support is an important factor to affect perceived usefulness.
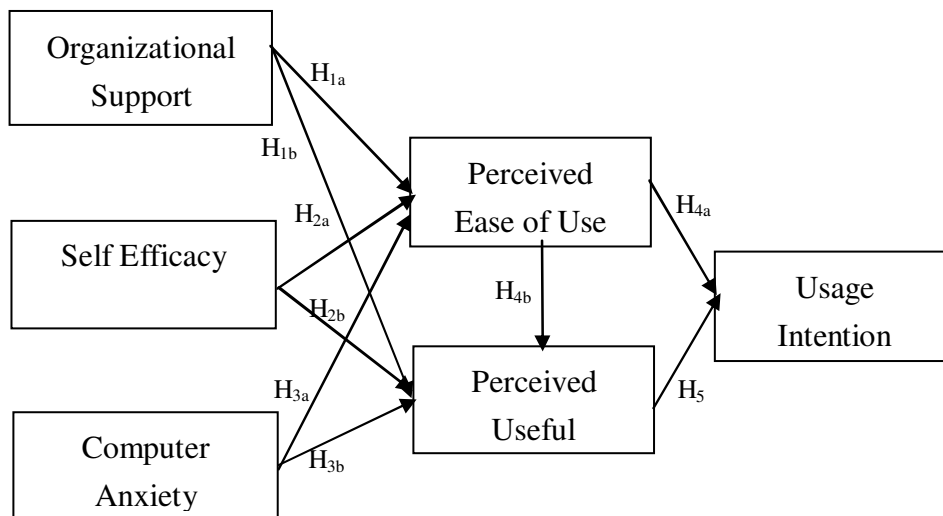
Figure 1. The proposed research model.

Other studies also indicate that organizational support is positively related to perceived ease of use, perceived usefulness, perceived enjoyment, and subjective norm (Igbaria et al., 1996). In addition, previous study has shown that senior management support has a direct impact on training transfer performance (Lim et al., 2007).

Compeau and Higgins (1995) defined self efficacy as "a judgment of one's capability to use a computer". Venkatesh and Davis (1995) defined self efficacy as "judgments of how well one can execute courses of action required to deal with prospective situations". According to Venkatesh and Davis's findings, computer self efficacy is the important determinants of perceived ease of use. In online training environment, computer self-efficacy is also an important trainee characteristic for e-learning situations (Chau and Wang, 2000). Lim et al. (2007) also found that self efficacy has a positive impact on learning achievement of e-learning.

Computer anxiety refers to an individual's anxiety aroused in the process of using or facing the computer. Computer anxiety has significant influences on an individuals' intention to use the computer. The cause is mainly that an individual's unfamiliarity with the computer makes him worried that he might appear clumsy in front of others or worried that his ignorance may cause damage to the computer. Hence, it is learned that computer anxiety results from the individual's unfamiliarity with the computer and develops the anxious state accordingly. Computer anxiety which belongs to situational anxiety can be improved by proper computer training or increasing computer experiences.

The causes of computer anxiety include: (1) individuals dread to cause damage to the computer and are also worried that they may make mistakes, (2) the uneasiness in the mind which result from individuals' feeling ignorant or awkward when they interact with the computer, (3) the

fear of computer is reflected from the fear of technology or math, (4) individuals are worried that radiation might affect them and cause their health to deteriorate when they work in front of computer, (5) the fear that individuals have toward new or unfamiliarity things leads to the fear of computer technology, (6) individuals are worried that the computer will make a threat to or limit their development of intelligence, (7) individuals feel troubled that the time to use computer is so insufficient that they fail to take care of relevant matters with the pre-scheduled time and cause the state of psychological uneasiness, (8) some individuals consider themselves inferior to computer in intellectual development and they also often tend to give up the opportunities of independent thinking (Doronina, 1995).

Computer anxiety is associated with negative perceptions about computers, problems in playing with them, and avoidance of the technology (Igbaria and Iivari, 1995). Igbaria et al. (1996) proved that computer anxiety is negatively related to computer usage, perceived usefulness, perceived enjoyment, and social pressure. Also, van Raaij, and Schepers (2008) have shown that computer anxiety has direct effects on perceived ease of use.

Based on the review of the literature, Figure 1 presents the conceptual framework from which the proposed research model is formed.

RESEARCH METHODS

We adopted the questionnaire survey for data collection, and examined our hypotheses by applying the structural equation modeling (SEM) method to validate the model. The measurement instruments for variables in the questionnaire were developed from previous studies to enhance the variability and reliability. Responses to the various variables related to the perceptions of the individual

Table 1. Results of confirmatory factor analysis.

Construct	Cronbach's α	Composite reliability	Average variance extracted
Organizational support	0.91	0.91	0.78
Self efficacy	0.70	0.80	0.51
Computer anxiety	0.93	0.93	0.83
Perceived ease of use	0.90	0.90	0.75
Perceived useful	0.87	0.88	0.72
Usage intention	0.90	0.90	0.76

subjects were measured using Likert-type scale.

We mail the invitation letters to the executives of hospitals to express our need for the research purpose. Of these hospitals contacted, six teaching hospitals (located in eastern, northern, central, southern Taiwan) were willing to participate in the survey. The survey was conducted to a convenient sample of 1300 employees for two months. Of the 1300 samples, the samples with incomplete responses and missing data were deleted. Finally, the eligible samples of 1071 employees were yielded, and the total response rate is 82.38%.

RESULTS

The data analysis proceeds according to the two-step approach recommended by Anderson and Gerbing (1988). First, we assess the measurement model which consists of the seven latent factors, includes the assessment of reliability, discriminant validity, and convergent validity of the scales. Second, we validate the structural model which represents the series of path relationships linking the seven constructs.

Sample characteristics

Of these respondents, 901 respondents are women (84.1%), 41.7% are age 30 and below. Most respondents are at the age group of 21 to 30 years (41.7%). Most respondents hold bachelor's degrees (85.8%). A majority of the respondents are nurses (43.8%). Most respondents lived in northern Taiwan (49.8%). The times of using the e-learning is mostly ≥ 1 per week (52.3%).

Measurement model results

To validate the measurement model, three types of validity were assessed: content validity, convergent validity, and discriminant validity. Content validity was done by interviewing senior system users and pilot-testing the instrument. And the convergent validity was validated by examining Cronbach's α, composite reliability and average variance extracted from the measures (Hair et al., 1998). As shown in Table 1, the Cronbach's α of every subscales range from 0.70 to 0.93, which are above the acceptability value 0.7 (Nunnally, 1978). Besides, the composite reliability values range from 0.80 to 0.93, and

the average variances extracted by our measures range from 0.51 to 0.83, are all within the commonly accepted range greater than 0.5 (Hair et al., 1998). In addition, all measures are significant on their path loadings at the level of 0.001. Therefore, the convergent validities of all six constructs are confirmed.

Besides, according to Fornell and Larcker (1981), discriminant validity can be tested among all constructs by comparing the average variance extracted (AVE) of each construct with the squared correlation of that construct and all the other constructs. All squared correlations between two constructs are less than the average variance extracted of both constructs. Therefore, the results confirm that the discriminant validity of constructs in the study is satisfactory.

Structural model results

To validate the measurement model, we used AMOS 6.0 to assess the analysis. As shown in Table 2, the goodness-of-fit indices are within accepted thresholds. Generally, these fit indexes are all greater than or equal to 0.9 for GFI, AGFI, NFI, and CFI. Besides, χ^2 / d.f. value is less than 5 and RMSEA value is less than 0.08. Accordingly, the summary of the overall goodness-of-fit indices indicate a reasonable fit of the model and data.

Figure 2 illustrates the results of the structural model with the estimated standardized path coefficients and path significance among constructs (non-significant paths as dotted lines). As predicted, all proposed hypotheses are supported. The results of the structural model show that both technological factors (perceived ease of use, perceived useful) and social psychological factors (organizational support, self efficacy, and computer anxiety) are key aspects affecting usage intention of e-learning. The results also demonstrate that social psychological factors have significant impact on usage intention mediated by perceived ease of use and perceived useful.

DISCUSSION

Based on TAM model, this study proposed a research model to better understand the hospital employees' usage intention of health websites. The model considered the relationships among technological factors (perceived

ease of use, perceived useful) and social psychological

Table 2. Fit indices for the structural model.

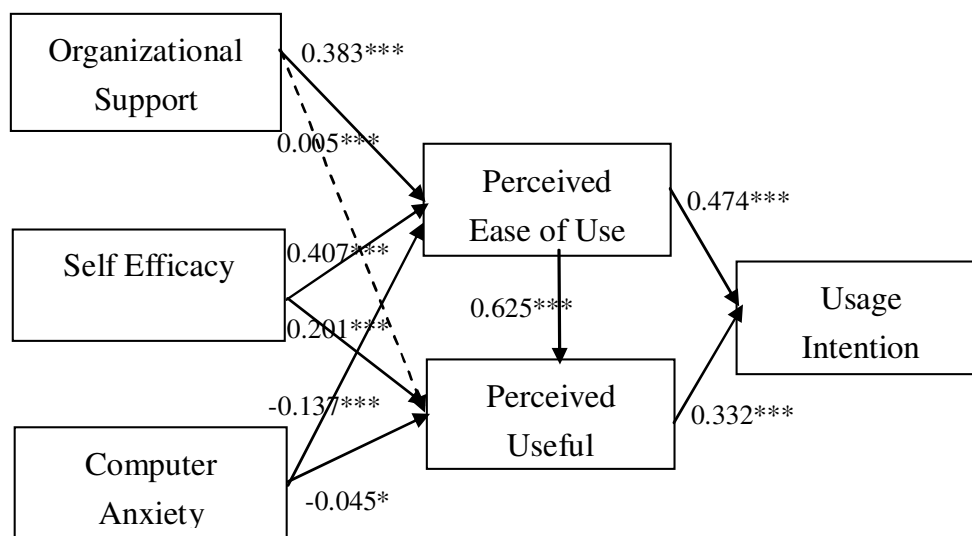| Structural model statistic	Fit index	Recommended threshold
χ^2	717.705	-
χ^2 / d.f.	5.019	< 8
GFI	0.93	> 0.9
RMSEA	0.061	< 0.08
AGFI	0.91	> 0.9
NFI	0.95	> 0.9
CFI	0.96	> 0.9

Figure 2. Final proposed model.

factors (organizational support, self efficacy, and computer anxiety). Moreover, the model aims to interpret that not only technological factors, but also social psychological factors are important determinants of e-learning adoption.

By including the social psychological factor in e-learning adoption model, the proposed model extends beyond traditional IT-based view of e-learning systems, and can provide academics and practitioners with better assessment of e-learning systems. This research can provide e-learning designers and managers of the hospital with the implication that we must focus not only on the technological aspect (perceived ease of use and perceived useful), but also on the social psychological aspect (organizational support, self efficacy, and computer anxiety).

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