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WHAT INFLUENCES INTERNET-BASED LEARNING?

PEI-WEN LIAO
National Taiwan Normal University, Taipei, Taiwan, ROC
JUN YI HSIEH
Taipei Municipal University of Education, Taipei, Taiwan, ROC

The aim in this study was to determine whether Internet-based learning is affected by perceived playfulness, satisfaction, and the performance expectancy effect. The performance expectancy of students based on experience may also be generated directly by the target that caused the emotions. Thus, we used perceived playfulness to explore the impact of performance expectancy. Data collected from 600 university students in Taiwan were tested against the research model using structural equation modeling. The results strongly support the proposed model in predicting performance expectancy when using Internet-based learning. Several implications for social influence, perceived playfulness, satisfaction, and performance expectancy research in relation to Internet-based learning are discussed.

Keywords: performance expectancies, social influence, perceived playfulness, satisfaction, Internet-based learning.

Because it is asynchronous, self-paced, and not confined to a physical classroom situation (Angiello, 2010; Kilkelly, 2010), Internet-based learning has changed the way that students learn. The main purpose in this study was to understand the basis of Internet-based learning in terms of whether perceived playfulness, satisfaction, and the performance expectancy effect could generate both a direct and an indirect (Preacher & Hayes, 2004, 2008) effect on the target

Pei-Wen Liao, Department of Applied Technology and Human Resource Development, National Taiwan Normal University, Taipei, Taiwan, ROC; Jun Yi Hsieh, Department of Social and Public Affairs, Taipei Municipal University of Education, Taipei, Taiwan, ROC.
Appreciation is due to reviewers including: Ana Jiminez-Zarco, Open University of Catalonia, Barcelona, Spain, Email: **ajiminezz@uoc.edu**
Please address correspondence and reprint requests to: Pei-Wen Liao, Department of Applied Technology and Human Resource Development, National Taiwan Normal University, No. 162, Sec. 1, Ho-Ping E. Road, Taipei, Taiwan, ROC. Email: **pearl908m015@hotmail.com**

leading on to follow-up emotions of perceptions of ease of use and increased learning productivity. Thus, the purpose of investigating perceived playfulness in this study was to explore the impact of the performance expectancy.

RESEARCH MODEL AND HYPOTHESES

Performance Expectancy

Expectancies are *beliefs about the future* (Olson, Roese, & Zanna, 1996) and people's beliefs and behaviors depend on their expectancies (Reinhard & Dickhäuser, 2009). In this study we focus on the formation of *performance expectancy*, which can be defined as *subjective ratings of how well one will perform an achievement-related task* (Eccles, 1983; Jussim, 1990; Marshall & Brown, 2004). Information science researchers have examined how different factors contribute to the use of computers. Venkatesh, Morris, Davis, and Davis (2003) used a unified model to explain that performance expectancy, effort expectancy, social influence, and facilitating conditions are the four significant factors that determine technology acceptance and use.

Social Influence

Social influence has frequently been measured as a subjective norm in technology adoption research (Lee, Lee, & Lee, 2006). Technology (non-)adoption is strongly related to the definition of *social influence* as *a change of mind in behaviors, thoughts or feelings from an individual's perspective as revealed by interaction with another individual or a group*. Another term for social influence is *peer group pressure*, or *the pressure on a person to conform to a distinct group resulting in a specific behavior*. Eckhardt, Laumer, and Weitzel (2009) define *social influence* as *not only an individuals perception of the opinion of important others within his or her environment but also as their actual recommendations and behaviors*. The social influence in technology (non-)adoption is strongly related to social comparison theory (Festinger, 1954) and to peer group pressure (Asch, 1951; Sherif, 1935). Eckhardt and colleagues (2009) found that people tend to act in conformity with a distinct group. On the one hand, they continually compare their behavior to that of important others, while on the other hand, they feel pressured to act in a way that will not make them unpopular. Burns and Stalker (1961) integrated social influence in the organizational context into their work on innovation. Venkatesh et al. (2003) define *social influence* as *the extent to which a person perceives that important others believe that he or she should use a new information system*. Prior researchers have suggested that social influence is significant in shaping an individual's intention to use new technology (Moore & Benbasat, 1991; Venkatesh & Davis, 2000). Thus, the following hypothesis was tested:

Hypothesis 1: Social influence will have a positive effect on performance expectancy when using Internet-based learning.

Perceived Playfulness

Playfulness can be defined as *the extent to which an individual believes that using a product or service is as enjoyable in its own right, apart from any performance consequence that may be anticipated* (Davis, Bagozzi, & Warshaw, 1992). As the Internet is often used not only for work but also for entertainment, many have argued that to understand behavioral intentions the entertaining features need to be addressed in the technology acceptance model (TAM). Playfulness has been found to have a significant role in developing the intention to use and attitudes toward Internet-based learning systems (Agarwal & Karahanna, 2000; Childers, Carr, Peck, & Carson, 2001; Moon & Kim, 2001; Pihlström & Brush, 2008; Teo, Lim, & Lai, 1999; Zhang & Mao, 2008). Past researchers have suggested that the use of information technology (IT) is influenced by constructs related to perceived playfulness (Agarwal & Karahanna, 2000; Chung & Tan, 2004; Davis et al., 1992; Igbaria, Schiffman, & Wieckowski, 1994). *Perceived playfulness* is defined as *a state of mind that includes three dimensions: the extent to which the individual (1) perceives that his or her attention is focused on the interaction with mobile-learning (concentration); (2) is curious during the interaction (curiosity);* and *(3) finds the interaction intrinsically enjoyable or interesting (enjoyment)* (Moon & Kim, 2001). Previous researchers have found that people with obsessive passion often engage in behaviors associated with negative outcomes, such as problematic gambling (Mageau, Vallerand, Rousseau, Ratelle, & Provencher, 2005; Ratelle, Vallerand, Mageau, Rousseau, & Provencher, 2004) and online game addiction (Wang & Chu, 2007). Vallerand et al. (2003) found that people with an obsessive passion for a particular activity are unable to stop participating in that activity. This obsessive passion may lead to rigid persistence. Van der Heijden (2004) contends that for hedonic systems, perceived enjoyment (a dimension of perceived playfulness) is a stronger predictor of behavioral intention to use than is perceived usefulness. As an individual's intention to use Internet-based learning will be influenced by his or her perceptions of the playfulness of the systems, the following hypothesea were tested:

Hypothesis 2: Social influence will have a positive effect on perceived playfulness when using Internet-based learning.

Hypothesis 3: Perceived playfulness will have a positive effect on performance expectancy when using Internet-based learning.

Satisfaction

User information satisfaction (UIS) instruments are examples of user satisfaction measures (Bailey & Pearson, 1983; Doll & Torkzadeh, 1998; Doll, Raghunathan,

Lim, & Gupta, 1995; Ives, Olson, & Baroudi, 1983; McHaney, Hightower, & Pearson, 2002; McHaney, Hightower, & White, 1999). However, measures of user satisfaction (US) and students' evaluation of teaching effectiveness (SETE) developed for the organizational information systems (IS) or classroom teaching context may no longer be appropriate for the electronic learning (e-learning) context, because the role of an e-learner is different from that of a traditional end user or student. US instruments focus on teaching quality or user information satisfaction rather than on learner satisfaction with regard to asynchronous e-learning systems. Bitner (1990) identified customer satisfaction as a transaction-specific judgment. Therefore, we developed the following hypotheses:

Hypothesis 4: Social influence will have a positive effect on satisfaction when using Internet-based learning.

Hypothesis 5: Perceived playfulness will have a positive effect on satisfaction to when using Internet-based learning.

Hypothesis 6: Satisfaction will have a positive effect on performance expectancy when using Internet-based learning.

Research model

In the initial phase of this study we developed a conceptual foundation to understand the interaction of social influence, perceived playfulness, satisfaction, and performance expectancy. Social influence is expected to be influenced by perceived playfulness, satisfaction, and performance expectancy. Consequently, the perceived playfulness and satisfaction should have both a direct and a mediator effect. Furthermore, member loyalty and intention to use should be positively influenced by member satisfaction. Figure 1 depicts the research model of this study.

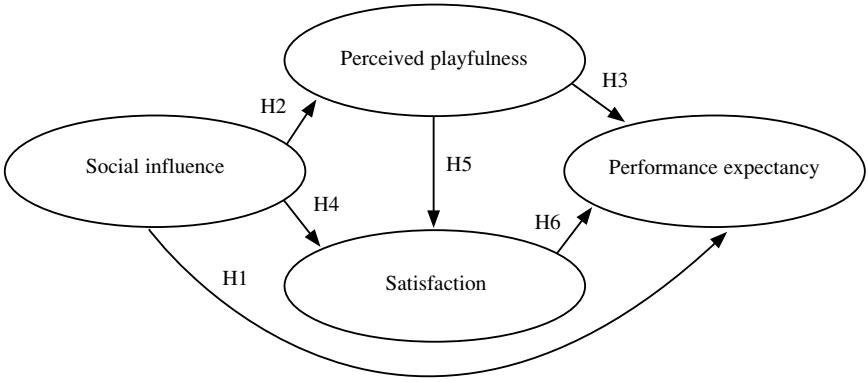

Figure 1. Research model.

METHOD

SAMPLE

The total sample consisted of 600 students. Approximately one-third (34.5%) were male (n = 207), and 65.5% were female (n = 393), with 11.4% aged over 25 years (n = 69), 42.7% aged 21-24 years (n = 256), and 45.8% aged under 20 years (n = 275).

MEASURES

Our questionnaire was based on those used in the studies by Wang (2003) and Wang, Wu, and Wang (2009) (see Table 1). To ensure the content validity of the scales, the items selected must represent the concept about which generalizations are to be made. Therefore, the items were modified to make them relevant to the Internet context. Pretesting of the measures was conducted in which both users and experts familiar with the Internet tested the selected items for validity and reliability. As a result, the items were adjusted to make their wording more precise. We used 7-point Likert scales with anchors ranging from 1 = *strongly disagree* to 7 = *strongly agree* for all construct items. The original items used in this study are listed in Table 1 below.

TABLE 1
THE QUESTIONNAIRE DESIGN

Variables	Items		Sources
Social influence	SI1	People who influence my behavior think that I should use the Internet.	Wang, Wu, and Wang (2009)
	SI2	People who are important to me think that I should use the Internet.	
Perceived playfulness	PP1	When using the Internet, I forget about the work I must do.	Wang, Wu, and Wang (2009)
	PP2	Using the Internet stimulates my curiosity.	
Satisfaction	SC1	The Internet provides content that exactly fits my needs.	Wang (2003)
	SC2	The Internet provides useful content.	
	SC3	The Internet provides up-to-date content.	
Performance expectancy	PE1	The content provided by the Internet is easy to understand.	Wang, Wu, and Wang (2009)
	PE2	Using the Internet increases my learning productivity.	

RESULTS

Measurement Model

A confirmatory factor analysis using LISREL version 8.51 was conducted to test the measurement model. Six common model fit measures were used to assess the model's overall goodness-of-fit: the ratio of chi-square (χ^2) to degrees of freedom (*df*), goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), normalized fit index (NFI), comparative fit index (CFI), and root mean square residual (RMSR). Reliability and convergent validity of the factors were estimated using composite reliability and average variance extracted (see Table 2). The interpretation of the composite reliability is similar to that of Cronbach's alpha, except that it also takes into account the actual factor loadings rather than assuming that each item is equally weighted in the composite load determination.

TABLE 2
Reliability, Average Variance Extracted, and Discriminant Validity

Item	*M*	*SD*	SI	PP	SC	PE
SI	4.890	1.132	.605			
PP	4.704	.867	-.030	0.973		
SC	5.566	.879	.368**	.193**	0.795	
PE	5.303	1.013	.415**	.174**	.674**	0.690

Note: Diagonal elements are the average variance extracted. Off-diagonal elements are the shared variance.

Composite reliability for all the factors in our measurement model was above .90. The average extracted variances were all above the recommended .50 level (Hair, Anderson, Tatham, & Black, 1992), and accounted for more than one-half of the variance. Convergent validity can also be evaluated by examining the factor loadings and squared multiple correlations from the confirmatory factor analysis (see Table 3). Following the recommendation made by Hair et al., a factor loading greater than .50 was considered to be significant.

TABLE 3
Factor Loadings, *t* Values, and Error Terms

Construct and item	Factor loading	Error terms	*t*	AVE	CR
Social influence					
SI1	.58	.66	12.61	.450	.617
SI2	.75	.44	15.19		
Perceived playfulness					
PP1	.42	.82	8.73	.432	.578
PP2	.83	.32	12.60		

Table 3 continued

Construct and item	Factor loading	Error terms	*t*	AVE	CR
Satisfaction					
SC1	0.76	0.42	20.24		
SC2	0.76	0.42	20.42	0.567	0.797
SC3	0.74	0.46	19.45		
Performance expectancy					
PE1	0.73	0.46	18.56	0.534	0.696
PE2	0.73	0.47	18.38		

Note: $\chi^2 = 92.88$, $df = 21$, GFI = 0.97, CFI = 0.95, NNFI = 0.92, RMSEA = 0.076.

Structural Model

A similar set of fit indices was used to examine the structural model ($\chi^2 = 92.88$, $df = 21$, RMSEA = 0.076, GFI = 0.97, CFI = 0.95, NNFI = 0.92). A comparison of all fit indices with their corresponding recommended values provided evidence of a good model fit. Thus, we could examine the path coefficients of the structural model. Properties of the causal paths, including standardized path coefficients, *t* values, and variance explained, for each equation in the hypothesized model, are presented in Figure 2. Hypotheses H1, H2, H4, H5, and H6 were supported in that social influence, perceived playfulness, satisfaction, and self-efficacy all had a significant effect on performance expectancy.

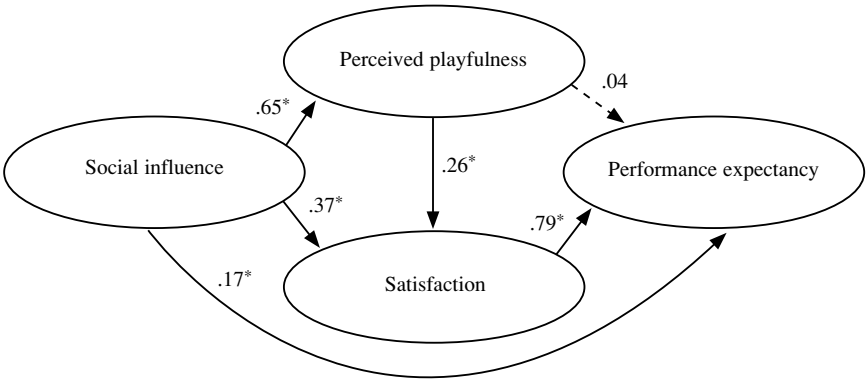

Figure 2. Results of hypotheses testing.
* $p < .05$.

Social influence was found to have a significant influence on performance expectancy (β = .17). Hypotheses H2 and H5 were also supported. Social influence was found to have a significant influence on perceived playfulness (β = .65) and perceived playfulness had a positive effect on satisfaction

(β = .26). Hypotheses H4 and H6 were supported in that social influence was found to have a significant influence on satisfaction (β = .37), which had a positive effect on performance expectancy (β = .79). However, as the effect of perceived playfulness on performance expectancy was not significant, with a *t* value of .59, H3 was not supported.

DISCUSSION

We found that social influence had a positive direct effect on perceived playfulness, satisfaction, and performance expectancy. Satisfaction with social influence plays an important mediating role, in that social influence through satisfaction on performance expectancy (.37*.79 = .29) had a greater impact than the direct relationship between social influence and performance expectancy (.17). Although perceived playfulness had no direct effect on performance expectancy, through satisfaction on performance expectancy a value of .21 (.26*.79 = .2054) was gained, indicating that there is a mediating relationship. Internet-based learning should increase students' satisfaction with learning, and since satisfaction has a very important mediating role, students' performance expectancy would be expected to increase.

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