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COMPARING THE BEHAVIORAL MODELS IN CYBER-WORLD USING SOCIAL ROLES

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Abstract

Cyber-world is a typical form of social syndication. Although the future of cyber-world seems bright, not all efforts have succeeded. Therefore, knowing how to motivate users and keep them continually visiting is an important challenge for creating successful cyber-world Web sites. Since that human behaviour varies according to people's different social roles, this study investigated four social roles (habitual, active, personal, and lurker) in the cyber-worlds. 729 users of *i-Partment* were used to test the research model. This study empirically confirms the existence of different behavioural models, and revealed the implications for theory and practice.

Keywords: Social role, Social presence, Interactive quality

Introduction

The interactive nature of Web 2.0 has resulted in proliferation of users to cyber-worlds and has brought huge profits to the successful cyber-world Web site providers. The number of users of the world's largest cyber-world Web site—*Second Life*, soared from 1.5 million in 2006 to 13 million in 2008 [1], the average of 1 million residents log in monthly [2], and the transaction volume reached US$350 million in 2008 [3]. *Habbo*, a cyber-world Web site built on the hotel model, had more than 120 million characters registered by the end of 2008, and more than 40% if its users are returning visitors [4]. *Habbo* earned US$74 million revenue in 2008, US$60 million of which came from the sale of virtual goods [5]. *i-Partment*, the most successful cyber-world Web site in the greater China area boasted nearly 20 million residents in China and Taiwan by March 2009, and its 2008 revenue exceeded the equivalent of US$295 million, 50% of which came from avatar services and 50% from advertising income. Observing the development and potential of cyber-world Web sites, Garter [6] estimated that 80% of active Internet users would be participating in virtual world Web sites by 2011. Furthermore, Liew [7] has indicated that US$1 to US$2 in monthly average revenue per user (ARPU) for cyber-world Web sites such as Second Life, *Habbo Hotel*, *Club Penguin*, and *Runescape*. The booming population of cyber-world users and the providers' revenue forecasts show that cyber-worlds clearly have great marketing and business potential.

Despite cyber-worlds' bright prospects, many virtual projects do not succeed. Garter [8] indicated that 90% of corporate virtual world projects fail and shutdown within 18 months because they are unable to attract large numbers of people to join and use their sites. Therefore, understanding users' motivations for joining and continuing to visit certain cyber-world Web site is critical to manage a virtual world Web site successfully. As cyber-worlds are recreational applications operated on Web 2.0 internet platform, this study has emphasized the interactive features of Web 2.0 and constructed users' behavioral models from three dimensions: technology, sociability, and quality, as according to Social presence Theory, TAM, and IS successful model. In addition, many scholars have argued that human behaviors differ according to what people's distinct social roles are [9] [10], few studies have analyzed and compared behavioral models for different social roles. Since there are various characters or avatars in cyber-worlds, this study have divided cyber-world users into four types – habitual, active, personal, lurker [11] – according to their interaction levels and has analyzed whether their behavioral models differ of their different roles. This study proposes some overall administrative strategies for cyber-world Web site managers.

Research Model and Hypotheses

Cyber-worlds such as *i-Partment* are interactive communities built on the World Wide Web technology. Thus, it is reasonable to consider the users' acceptance behaviors from a system perspective. Davis et al. [26] regarded that perceived ease of use and usefulness would affect users' intentions to use an information system, and perceived ease of use would affect users' intentions

to use via perceived usefulness. Many researches have adopted TAM as a basic framework for investigating users' acceptance of various technological applications [17] [20]. Subsequent studies have also suggested that perceived ease of use can have a positive impact on users' intentions to use certain systems [27]. From the intrinsic motivation perspective, many studies have indicated that users tend to prefer using enjoyable platforms, such as portal Web site [18] [19] [28], Internet-based learning media [29], and instant messaging [17]. Therefore, this study proposed the following hypotheses.

【H1a】Perceived ease of use is positively related to perceived usefulness in *i-Partment*.

【H1b】Perceived ease of use is positively related to intention to use *i-Partment*.

【H1c】Perceived usefulness is positively related to intention to use *i-Partment*.

【H1d】Perceived enjoyment is positively related to intention to use *i-Partment*.

Social presence is the critical factor that keeps people interacting in social activities [12]. Since *i-Partment* is a kind of cyber-world instinct with social interaction, this study has regarded social presence is indispensable for promoting people's activities. Hassanein and Head [20] confirmed that users' social presence has a positive effect on perceived usefulness in the on-line shopping environment. In addition, users' enjoyable experiences can be increased by improving users' social presence in online environment [13] [15] [20]. Moreover, users' perceptions of social presence positively affect customers' intention to visit e-commerce Web sites [31]. Hence, this study proposed the following hypotheses.

【H2a】Social presence is positively related to perceived usefulness in *i-Partment*.

【H2b】Social presence is positively related to perceived enjoyment in *i-Partment*.

【H2c】Social presence is positively related to intention to use *i-Partment*.

TAM was widely applied in the studies related to users' acceptance of new information systems. However, Davis [16] suggested that users' perceptions may also be influenced by other external variables. In prior studies, researchers investigated related antecedents of users' perceptions in system usage [32] [33] [34] [35]. In addition, information quality, response time and system accessibility were important factors affecting users' perceptions on Web sites [17] [23]. This study has summarized related studies of the TAM and found that system and information characteristics are important factors in affecting users' perceptions [24][36]. Furthermore, Hwang & Kim [37] considered that perceived web quality was the antecedent of affective reactions, such as enjoyment and anxiety. Accordingly, this study proposed the following hypotheses.

【H3a】System quality is positively related to perceived ease of use in i-Partment.

【H3b】System quality is positively related to perceived usefulness in i-Partment.

【H3c】Information quality is positively related to perceived ease of use in i-Partment.

【H3d】Information quality is positively related to perceived usefulness in i-Partment.

【H3e】Information quality is positively related to perceived enjoyment in i-Partment.

In cyber-worlds, people value platform-based and sociability-based interactive qualities. Huang et al. [22] regarded that individuals' personal interactions positively affect perceived enjoyment and perceived usefulness in instant message systems. Open channels with two-way communication functions, such as interactive Web sites or advertisements [38] enable human-computer and interpersonal interactions and strengthen users' social presence [39]. Since prior studies have primarily investigated applications of interactive quality according to their technical and social dimensions [25] [40], this research has divided interactive quality into two dimensions – platform-based and sociability-based, and proposed the following hypotheses.

【H4a】Platform-based interactive quality is positively related to perceived usefulness in *i-Partment*.

【H4b】Platform-based interactive quality is positively related to social presence in *i-Partment*.

【H4c】Platform-based interactive quality is positively related to perceived enjoyment in *i-Partment*.

【H4d】Sociability-based interactive quality is positively related to perceived usefulness in *i-Partment*.

【H4e】Sociability-based interactive quality is positively related to social presence in *i-Partment*.

【H4f】Sociability-based interactive quality is positively related to perceived enjoyment in *i-Partment*.

Methodology

Measurement Development

This study used an online questionnaire to examine the research model and test the proposed hypotheses. The items were based on the TAM [20], the IS success model [24] [41] [42], and social

psychology literatures and contents [14] [40] were slightly modified to fit the context of the Web 2.0 interactive environment. Since different social role leads to different social behaviors, this study has adopted Ip & Wagner's [11] role categorization (i.e. habitual, active, personal, and lurker), and investigated the difference in behavioral models of different roles in cyber-worlds.

In this study, the respondents selected one type of social roles based on their habits of using i-Partment. A pilot test of 50 samples was conducted to examine the reliability and validity of the measurements, and the results showed that the measurement has acceptable reliability and validity.

Subjects

We invited *i-Partment* members to participate in our survey. Over a one-month period, we had 729 valid subjects, of which, 152 (20.9%) considered themselves habitual participants, 236 (32.4%) felt they active members, 233 participated mainly to satisfy personal needs, and 108 were lurkers. Partial least squares (PLS) was used to analyze the data.

Results

The Measurement Model

The individual item reliability of measurement was measured by Cronbach's α. In this study the Cronbach's α values of all constructs, ranging from 0.81 to 0.96, exceeded the threshold of 0.7 [43] and thus captured a high degree of variance in each construct. The internal consistency of measurement model was measured by composite reliabilities (CRs). In this study, all composite reliabilities were above the benchmark of 0.8 [44], showing a high internal consistency of scales. In addition, the average variance extracted (AVE) for all constructs exceeded the threshold value of 0.5 [44] [45]. Therefore, all constructs in the model had satisfactory construct reliability.

Content validity is concerned the representations of the items of a specific construct [46]. All constructs in our study were derived from prior studies and related literature, thus, addressing strong content validity. As for the construct validity of the measurement model, the convergent validity was measured by a factor loading analysis. In this study, all loadings of measurement items corresponded to their constructs, and all loadings were above the threshold value of 0.6 [47] and larger than the items loadings on other constructs. As shown in Table 1, the correlations between any two constructs were lower than the square root of the AVEs within the construct, satisfying Fornell and Larker's [45] criterion for good discriminant validity. Consequently, all constructs in the model had satisfactory validity.

Table 1 Discriminant validity (N=729)

	AVE	INT	IQ	PIQ	SIQ	PE	PEN	PU	SP	SQ
INT	0.81	**0.90**								
IQ	0.70	0.61	**0.84**							
PIQ	0.65	0.64	0.70	**0.81**						
SIQ	0.73	0.69	0.67	0.77	**0.85**					
PE	0.72	0.65	0.60	0.70	0.69	**0.85**				
PEN	0.94	0.77	0.60	0.63	0.71	0.63	**0.97**			
PU	0.82	0.69	0.64	0.67	0.76	0.69	0.72	**0.91**		
SP	0.76	0.73	0.61	0.66	0.75	0.67	0.76	0.80	**0.87**	
SQ	0.68	0.64	0.77	0.71	0.70	0.67	0.60	0.63	0.61	**0.83**

* The diagonal values represent the square root of AVEs

The Structural Model—Path Analysis Results of Full Sample

A test of the structural model was performed using the PLS procedure, and the results for all subjects (n = 729) are indicated in Fig. 2. The structural model showed that SQ (β = 0.50, p < 0.001) and IQ (β = 0.22, p < 0.001) significantly affected PE **(R^2=0.47)**. Additionally, PE (β = 0.16, p < 0.001), IQ (β = 0.13, p < 0.01), SIQ (β = 0.24, p < 0.001), and SP (β = 0.43, p < 0.001) had a significant direct effect on PU **(R^2=0.72)**. Likewise, PIQ (β = 0.20, p < 0.001) and SIQ (β = 0.60, p < 0.001) significantly affected SP **(R^2=0.58)**. Whereas IQ (β = 0.10, p < 0.05), SP (β = 0.49, p < 0.001) and SIQ (β = 0.23, p < 0.001, H4f supported) had strong effects on PEN **(R^2=0.63)**, the effects of PIQ were weak in this study. As expected, PE (β = 0.17, p < 0.001, H1b supported), PU (β = 0.10, p < 0.05, H1c supported), SP (β = 0.20, p < 0.001, H2c supported), and PEN (β = 0.44, p < 0.001, H1d supported) significantly affected INT **(R^2=0.66)**. Unexpectedly, SQ and PIQ had no direct influence on PU, and PIQ had no direct influence on PEN. Therefore, H3b, H4a, and H4c were not supported.

The Structural Model—Path Analysis Results of Split Sample

This study compared the variances of characteristics between four subgroups—habitual users, active users, personal users, and lurkers--using an one-way ANOVA analysis for all constructs. The results show that the four subgroups' attributes have significant differences in all constructs. We analyzed the PLS path analysis of split samples to understand the different adoption behavior of four social roles. Table 2 showed the path analysis results for habitual, active, personal, and lurker members.

Table 2 Path analysis of four subgroups (habitual /active / personal / lurker)

	Habitual(N=152)	Active

		(N=236)			
		R^2	β	R^2	β
H1b	PE -> INT	**0.75**	0.08	**0.59**	**0.16***
H1c	PU -> INT		**0.35*** **		0.09
H2c	SP -> INT		0.13		**0.27***
H2d	PEN -> INT		**0.37*** **		**0.36***
H3a	SQ -> PE	**0.54**	**0.32*** **	**0.45**	**0.47***
H3c	IQ -> PE		**0.46*** **		**0.24***
H3b	SQ -> PU	**0.83**	**0.15*** **	**0.73**	0.08
H3d	IQ -> PU		0.00		**0.24***
H4a	PIQ -> PU		0.00		**0.07***
H4d	SIQ -> PU		**0.27*** **		**0.37***
H1a	PE -> PU		**0.18*** **		0.01
H2a	SP -> PU		**0.40*** **		**0.47***
H4b	PIQ -> SP	**0.73**	**0.17*** **	**0.53**	**0.19***
H4e	SIQ -> SP		**0.70*** **		**0.58***
H3e	IQ -> PEN	**0.78**	**0.17***	**0.62**	0.01
H4c	PIQ -> PEN		**0.27*** **		**0.11***
H4f	SIQ -> PEN		**0.38*** **		**0.15***
H2b	SP -> PEN		**0.71*** **		**0.60***

		Personal(N=133)		Lurker(N=108)	
		R^2	β	R^2	β
H1b	PE -> INT	**0.68**	**0.19*** **	**0.63**	**0.17***
H1c	PU -> INT		0.06		0.09
H2c	SP -> INT		**0.25*** **		0.07
H2d	PEN -> INT		**0.43*** **		**0.56***
H3a	SQ -> PE	**0.46**	**0.62*** **	**0.45**	**0.57***
H3c	IQ -> PE		**0.17***		**0.13***
H3b	SQ -> PU	**0.67**	**0.10***	**0.71**	0.06
H3d	IQ -> PU		**0.20*** **		0.04
H4a	PIQ -> PU		0.07		**0.15***
H4d	SIQ -> PU		**0.18*** **		0.03
H1a	PE -> PU		**0.27*** **		**0.30***
H2a	SP -> PU		**0.32*** **		**0.56***
H4b	PIQ -> SP	**0.58**	**0.27*** **	**0.47**	**0.12***
H4e	SIQ -> SP		**0.54*** **		**0.59***
H3e	IQ -> PEN	**0.61**	**0.15*** **	**0.56**	**0.14***
H4c	PIQ -> PEN		**0.14*** **		**0.15***
H4f	SIQ -> PEN		**0.22*** **		**0.27***
H2b	SP -> PEN		**0.38*** **		**0.30***

*** p< 0.001; ** p<0.01; * p<0.05

As to the influence of users' perceptions on the intention to use, PE was a significant determinant for active, personal, and lurker users. By contrast, only habitual users weighted PU significantly in determining INT. Moreover, SP was a significant factor influencing INT for active and personal users, and PEN significantly affected INT in general. In this study, the last dependent construct (INT) was explained by R^2 value of 0.75 for habitual users, 0.59 for active users, 0.68 for personal users, and 0.63 for lurkers. Overall, the determinants that this study proposed had good explanatory powers of INT in four subgroups.

Conclusions

Discussion

This study has investigated users' adoption intentions, users' perceptions, and the antecedents affecting users' perceptions in one kind of Web 2.0 applications: cyber communities. The results of this study have revealed the importance of perceived ease of use, perceived usefulness, perceived enjoyment, and social presence in shaping adoption intention. Findings are in line with prior research related to online shopping, virtual community, and weblogs [10] [31]. Moreover, this study has verified that different social roles result in different users' behaviors. The result is consistent with prior

studies that emphasized how members' behaviors vary when in different social roles [10] [11].Comparing the differences among four split samples, this study discussed key findings from following points.

Differences of the Determinants of Users' Intention to Use Virtual World Websites

First, perceived enjoyment was the only one factor that significantly affected all users' intentions to use in all four split samples. The reason may be that virtual worlds are entertaining applications; therefore, being able to enjoy it is a basic requirement. ***Second***, perceived ease of use significantly affected the intention to use in four subgroups except the habitual members (H1b supported). The result indicates that perceived ease of use is an essential factor for influencing most users' intention to use. However, habitual member was the social role participating virtual world websites most actively, therefore, most of habitual members less emphasized on regarding for ease of using a system. Even though the interface or functions of a website are not easy to use, habitual members may get over the barrier and use the website with some extent of enthusiasm. ***Third***, perceived usefulness significantly affected users' intention to use just in habitual samples (H1c supported). This result reveals that habitual members particularly emphasize the usefulness of cyber-world Web sites for improving the ability and efficiency of interpersonal interaction on the interactive platforms. ***Fourth***, social presence had a significant direct effect on the active and personal subgroups' intention to use (H2c supported). The result indicates that active and personal members especially value their social presence and may keep stay with cyber-world Web sites primarily for the social interactions these sites offer. By contrast, habitual members have an enthusiastic intention to use and actively visit cyber- world Web sites, where as lurkers mainly focus on operating their own virtual space or visiting others' virtual spaces, they demonstrate less interest in interacting with other members. Therefore, social presence has less importance for habitual and lurker members than it does for active and personal members.

Differences of the Relationships between Uses' Perceptions

As for the differences among the relationships of users' perceptions, two findings are discussed as follows. ***First***, perceived ease of use had a significant and direct influence on perceived usefulness for four subgroups except for active members (H1a supported). Only in the habitual subgroup did perceived usefulness significantly affect the intention to use. The result indicates that perceived ease of use has an indirect effect on intention to use via perceived usefulness. ***Second***, social presence significantly affected perceived usefulness and perceived enjoyment in all four samples (H2a and H2b supported). The result is consistent with prior research [20][30] and reveals that even though social presence is not significant in increasing users' intention to use a virtual world Web site, it has ann indirect effect on users' intention to use via perceived enjoyment in all four subgroups and perceived usefulness in the habitual subgroup.

Differences of the Antecedents of Uses' perceptions

This study investigated the antecedents affecting users' perceptions of Web 2.0 applications by considering the system quality, information quality and interactivity quality. Some findings are exhibited as follows. ***First***, perceived ease of use was significantly affected by system quality and information quality in all four subgroups (H3a and H3b supported). This result implies that a high level of quality in system and information may enable users to feel that a specific cyber-world Web site is easy to use. ***Second***, perceived usefulness had different antecedents in the four subgroups. System quality was more important for habitual and personal members, and information quality was more significant for active and personal subgroups. As for interactivity quality, the platform function was significant in affecting perceived usefulness for the active and lurker members, and all but the lurkers emphasized the sociability function's effect on perceived usefulness. ***Third***, platform-based and sociability-based functions had significant effects on social presence in all four subgroups**,** possibly because platform-based and sociability-based functions are essential for establishing social relationships in online environments, and members' social presence increases by using platform-basd and sociability-based functions of cyber-world Web sites. ***Fourth***, platform-based and sociability-based functions had significant effects on perceived enjoyment. The result indicates that both platform-based and sociability-based functions have features that create and enrich users' enjoyable experience. Furthermore, the relationship between information quality and perceived enjoyment were significant in habitual, personal and lurker members. Even so, each social role appeared to emphasize different information content.

Implications for Theory

The current research demonstrates that users' intentions to use cyber-world Web sites are

determined by technical and social factors. Although the TAM has been widely adopted in various applications [16], it has had limited value for explaining specific systems. Since the recreational characteristics of cyber-world Web sites, perceived enjoyment was regarded as an important factor affecting users' adoption of innovative technology [21] and has also integrated social presence into the TAM by considering the social elements of cyber-world Web sites. For all samples, users' intentions to use were significantly determined by perceived ease of use, perceived usefulness, social presence, and perceived enjoyment. In which, perceived enjoyment was the strongest factor influenced on intention, followed by social presence. This result reveals that our proposed research model can explain users' acceptance behaviors of new technology more completely than TAM in the context of cyber-world Web sites.

Implications for Practice

The current research also has important practical implications for administrators managing cyber-world Web sites. The insightful findings of this study can help us better understand how different social roles accept new technologies. Practitioners should make use of this finding and provide flexible services to fulfill users' special needs. For example, habitual members place great emphasis on the usefulness of the platform for social interaction. Thus, practitioners should ensure that the platform is reliable, convenient to access, and the response time is acceptable, and provides sociable functions that enable users to make contact with others and develop good relationships. In response to the importance that active and personal members place on social presence, practitioners should enhance platform and sociability-based interactive qualities by providing controllable interactive functions (i.e. information choice, functions or services based on users' requirements) and enable users to create a sense of place (i.e. providing functions to conduct users' ways to establish cyber-lives or cyber-spaces, such as gardens or farms, that they can share with others). In addition, practitioners should ensure that their cyber-world Web sites are easy to use and enjoyable to keep lurkers interested and entertained.

Limitations

Although this research has revealed interesting findings, the results of this study should be cautious with some limitations. ***First***, the target of this study is one of the outstanding cyber-world Web sites in the greater China area in Asia — *i-Partment*. Therefore, the results might not overlook "cultural diversity" of other countries' users who may display the same acceptance behavioral models. ***Second***, this study categorized the samples into four social roles, a slight bias concealed from the reason that users may play multi-social roles on cyber-world Web sites. ***Finally*** this research model has focused on cyber-worlds, the only one type of Web 2.0 applications. In the future, the users' acceptance behavioral model may be extended by considering other factors, or by applying it in different contexts to search for general conclusions.

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References

[1] Budde, P. Global - Digital Media - Virtual Worlds, April, 2008 (http://www.researchandmarkets.com/reportinfo.asp?cat_id=0&report_id=574517&q=virtual world&p=1; visited March 8, 2009)

[2] SecondLife. (2009). Economic Spastics, 2009 (http://secondlife.com/statistics/economy-data.php?d=2009-04-13; visited April 14, 2009)

[3] Linden, M. State of the Economy, 2009 (https://blogs.secondlife.com/community/features/blog/2009/04/09/state-of-the-economy ; visited April 11, 2009)

[4] Henriksson, O. Sulake Reports Strong Growth and Profits for 2008, 2009 (http://www.sulake.com/press/releases/2009-03-30-Sulake_reports_strong_growth_and_profits_for_2008.html;visited April 1, 2009)

[5] Kee, T. Habbo Sold $60 Million in Virtual Goods in 2008, 2009 (http://www.paidcontent.org/entry/419-habbos-virtual-goods-boom-worth-almost-60-million-in-2008/;visited April 1, 2009)

[6] Garter. Gartner Says 80 Percent of Active Internet Users Will Have A "Second Life" in the Virtual World by the End of 2011, 2009 (http://www.businesswire.com/portal/site/google/index.jsp?ndmViewId=news_view&newsId=20070424006287&newsLang=en;visited April 1, 2009)

[7] Liew, J. Successful MMOGs can see $1-2 in monthly ARPU, 2009 (http://lsvp.wordpress.com/2008/06/09/successful-mmogs-can-see-1-2-in-monthly-arpu/; visited April 1, 2009)

[8] Garter. Gartner Says 90 Per Cent of Corporate Virtual World Projects Fail Within 18 Month, 2009 (http://www.gartner.com/it/page.jsp?id=670507 ; visited April 1, 2009)

[9] Golder, S.A., & Donath, J. (2004 September). Social Roles in Electronic Communities. *Proceedings of the Association of Internet Researchers 5.0*, Brighton: England, pp.19-22.

[10] Hsu, C.L., & Lin, J.C.C. "Acceptance of blog usage-The roles of technology acceptance, social influence and knowledge sharing motivation," *Information and Management*, 45, 2008, pp.65-74.

[11] IP, R.K.F., & Wagner, C. "Weblogging: A study of social computing and its impact on organizations," *Decision Support Systems*, 45(2), 2008, pp.242-250.

[12] Walther, J.B. "Interpersonal effects in computer-mediated interaction: A relational perspective," *Communication Research*, 19, 1992, pp.52-90.

[13] Tu, C.H., & Isaacs, M. "An examination of social presence to increase interaction in online class," *American Journal of Distance Education*, 16, 2002, pp.131-150.

[14] Kumar, N., & Benbasat, I. "The influence of recommendations and consumer reviews on evaluations of Websites," *Information System Research*, 17(4), 2006, pp.425-439.

[15] Tu, C.H. "On-line learning migration: from social learning theory to social presence theory in a CMC environment," *Journal of Network and Computer Applications*, 23(1), 2000, pp.27-37.

[16] Davis, F.D. "Perceived usefulness, perceived ease of use, and user acceptance of information technology," *MIS Quarterly*, 13 (3), 1989, pp.982-1003.

[17] Lin, J.C.C., & Lu, H.P. "Towards an Understanding of the Behavioural Intention to Use a Web Site," *International Journal of Information Management*, 20, 2000, pp. 197-208.

[18] Moon, J.W., & Kim, Y.G. "Extending the TAM for a World-Wide-Web context," *Information and Management*, 38, 2001, pp. 217-230.

[19] Hsu, C.L., & Lu, H.P. "Consumer behavior in online game communities: A motivational factor perspective," *Computers in Human Behavior*, 23(3), 2007, pp.1642-1659.

[20] Hassanein, K., & Head, M. "Manipulating perceived social presence through the web interface and its impact on attitude towards online shopping," *International Journal of Human-Computer Studies*, 65, 207, pp.689-708.

[21] Weibel, D., Wissmathy, B., Habegger, S., Steiner, Y., & Groner, R. "Playing online games against computer vs. human-controlled opponents: Effects on presence, flow, and enjoyment," *Computer in Human Behavior*, 24(5), 2008, pp.2274-2291.

[22] Huang, A.H., Yen, D.C., & Zhang, X. "Exploring the potential effects of emoticons," *Information and Ma*nagement, 45(7), 2008, pp. 466-473.

[23] DeLone, W.H., & McLean, E.R. "Information system success: The quest for the dependent variable," *Information Systems Research*, 3(1), 1992, pp.60-95.

[24] DeLone, W.H., & McLean, E.R. "The DeLone and McLean model of information system success: A ten-year update," *Journal of Management Information System*, 19 (4), 2003, pp.9-30.

[25] Ballantine, P.W. "Effects of interactivity and product information on consumer satisfaction in an online retail setting," *International Journal of Retail & Distribution Management*, 33(6), 2005, pp.461-471.

[26] Davis, F.D., Bagozzi, R.P., & Warshaw, P. R. "Extrinsic and intrinsic motivation to use computers in workplace," *Journal of Applied and Social Psychology*, 22(14), 1992, pp.1111-1132.

[27] Serenko, A. "A model of user adoption of interface agents for email notification," *Interacting with Computers*, 20(4-5), 2008, pp. 461-472.

[28] Heijden, H. "Factors influencing the usage of Websites: the case of generic portal in The Netherlands," *Information and Management*, 40, 2003, pp.541-549.

[29] Lee, M.K.O., Cheung, C.M.K., & Chen, C.Z. "Acceptance of Internet-based learning medium: the role of extrinsic and intrinsic motivation," *Information and Management*, 42, 2005, pp.1095-1104.

[30] Lombard, M., & Ditton T. "At the Heart of It All: The Concept of Presence," *Journal of Computer-Mediated Communication*, 3(2), 1997(http://jcmc.indiana.edu/vol3/issue2/lombard.html ;visited October 30, 2008)

[31] Lingyun, Q., & Dong, L. "Applying TAM in B2C E-Commerce Research: An Extended Model," *Tsinghua Science and Technology*, 13(3), 2008, pp.265-272.

[32] Igbaria, M., Guimaraes, T., & Davis G.B. "Testing the determinants of microcomputer usage via a structural equation model," *Journal of Management Information Sy*

stem, 11(4), 1995, pp.87-114.

[33] Davis, S.A., & Bostrom, R.P. "Training end-users: an experimental investigation of the roles of computer interface and training methods," *MIS Quarterly*, 17(1), 1993, pp.61-85.

[34] Igbaria, M., Parasuraman, S., and Pavri, F. "A path analytic study of the determinants of microcomputer usage," *Journal of Management Systems*, 2(2), 1989, pp.1-14.

[35] Thompson, R.L., Higgins, C.A., & Howell, J.M. "Personal computing: toward a conceptual model of utilization," *MIS Quarterly*, 15(1), 1991, pp.124-143.

[36] Wixom, B.H., & Todd, P.A. "A theoretical integration of user satisfaction and technology acceptance," *Information Systems Research*, 16(1), 2005, pp.85-102.

[37] Hwang, Y., & Kim, D.J. "Customer self-service systems: The effects of perceived Web quality with service contents on enjoyment, anxiety, and e-trust," *Decision Support Systems*, 43, 2007, pp.746-760.

[38] Fortin, D.R., & Dholakia, R.R. "Interactivity and Vividness Effects on Social Presence and Involvement with a web-based Advertisement," *Journal of Business Research*, 58(3), 2005, pp.387-396.

[39] Dholakia, R., Zhao, M., Dholakia, N., & Fortin, D. "Interactivity and Revisits to Websites: a Theoretical Framework," *Proceedings of 2001 American Marketing Association Winter Conference*, 12, 2001, pp.108-115.

[40] McMillan, S.J., & Downes, E. J. "Defining Interactivity: A Qualitative Identification of Key Dimensions," *New Media & Society*, 2(2), 2000, pp.157-179.

[41] Lin, H.F., & Lee, G.G. "Determinants of success for online communities an empirical study," *Behaviour & Information Technology*, 25(6), 2006, pp.479-488.

[42] Wu, J.H., & Wang, Y.M. "Measuring KMS success: A respecification of the DeLone and McLean's model," *Information and Management*, 43, 2006, pp.728-739.

[43] Nunnally, J.C. *Psychometric Theory* (2nd ed.), New York: McGraw-Hill, 1978.

[44] Hairs, J.F., Anderson, R.E., Tatham, R.L., & Black, W.C. *Multivariate Data Analysis* (5th Ed.), New York: Macmillan, 1998.

[45] Fornell, C. R., & Lacker, D.F. "Structural Equation Model with Unobservable Variables and Measurement Error," *Journal of Marketing Research*, 18, 1981, pp.39-50.

[46] Cronbach, L. Test validation, In R. L. Thorndike (Eds.), *Educational Measurement* (2nd Ed.), Washington, DC: American Council on Education, 1971.

[47] Gefen ,D., & Straub, D.W. "A practical guide to factorial validity using PLS-Graph: tutorial and annotated example," *Communications of AIS*, 16(25), 2005, pp.91-109.