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Understanding User Satisfaction of Instant Messaging Usage: An Empirical Study

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Abstract

The current paper examines user satisfaction with the social use of instant messaging in building and maintaining social relationships among friends, family members and others. By integrating motivation theory with media capacity theories, we developed and tested a research model to explain how the attributes of media capacity (e.g., social presence and media richness) and users' intrinsic and extrinsic motivations toward using instant messaging influence user satisfaction. The data were collected from students of a public university in China via an online survey. The results suggest that perceived enjoyment, perceived social presence and perceived usefulness are key to the formation of user satisfaction. Perceived social presence and perceived media richness are positively associated with perceived enjoyment. Also, we find that perceived enjoyment, perceived social presence, and perceived media richness have significant effects on perceived usefulness. And, interestingly, perceived enjoyment and perceived social presence, in relation to perceived usefulness, have stronger effects on user satisfaction.

INTRODUCTION

According to Alderfer, people have three hierarchical levels of needs: *existence*, *relatedness* and *growth* (Alderfer, 1972). In general, existence needs have priority over relatedness needs, which, in turn, have priority over growth needs. Once the existence needs are fulfilled, people try to satisfy their relatedness needs via creating interpersonal relationships. In the past, interpersonal relationships can be achieved by a face-to-face channel or other mediated functional alternatives (e.g., telephone). To date, as the Internet is an efficient channel for interpersonal communication, the rise and widespread use of Internet technologies have revolutionized the way people communicate. Newer communication tools, such as email, voicemail, and instant messaging, have become popular in people's work environments and daily lives. Email was the dominant Internet communication medium in the past several years; recently, however, interactive online communication, especially instant messaging (IM) has been widely diffused among Internet users. Statistics show that the number of Chinese Internet users exceeded 298 million in 2008. Among them, over 224 million (almost 74.7%) are IM users (CNNIC, 2009). Moreover, a 2007 report by the Horizon Research Consultancy Group indicated that IM use had surpassed email use in China. IM has so far become the third most popular communication tool, preceded only by mobile phones and landline phones. Millions of Internet users are using IM with their friends and families for online social communication to develop and maintain their relationships.

At first, more and more people gradually immersed themselves into the Internet world, which made actual face-to-face communication decrease greatly. As a result, people complained that the Internet isolated themselves from others. The emergence of IM, however, enabled people to communicate in a way that is more similar to face-to-face communication, thus solving some of the communication problems for geographically dispersed people. Instant Messaging (IM) refers to an Internet-based application that provides real-time

communication between people. When first introduced, IM created the possibility of real-time text-based communication between two or more participants over the Internet. Nowadays, IM has some additional features; that is, IM users can communicate with each other via a combination of text messages, voice and video. In general, today's IM has five unique features: presence awareness, "popup" recipient notification, within-medium polychromic communication, silent interactivity and ephemeral transcripts (Li *et al.*, 2005). These features make IM a better substitution for actual face-to-face communication than any other technology currently in the market.

The wide diffusion of Internet communication technologies has attracted the attention of many researchers. While most existing studies focus on the use of these technologies in organizations (Huang *et al.*, 2007; Kettinger and Grover, 1997), these has been relatively less attention paid toward their use in the voluntary social contexts, such as the use of IM in non-workplace settings. IM services are mostly free and easy to use, leading to a high level of IM adoption (CNNIC, 2009). Since many people use IM, the key issue becomes how to motivate users to continue their IM use. According to the information system (IS) continuance model (Bhattacherjee, 2001), user satisfaction is the dominant factor explaining users' continuous usage of a given technology. Thus, in this study, we focus on user satisfaction as the key dependent variable that is critical for users' continued IM use.

This paper attempts to examine user satisfaction in a social context; our main focus is on the social use of IM in building and maintaining social relationships among friends, family members and others, rather than on the organizational use among employees and customers. Specifically, we explain how the attributes of media capacity (e.g., social presence and media richness) and users' perceptions of IM influence user satisfaction of IM usage.

THEORETICAL FOUNDATIONS AND RESEARCH HYPOTHESES

The research foundations for the present study include social presence theory and media richness theory, which are related to media capacity, motivation theory, and the IS continuance model. Social presence theory (Short *et al.*, 1976) and media richness theory (Daft and Lengel, 1984) have long been used to explain users' media choice and media use. These theories are based on the premise that media have different capacities to carry interpersonal communicative cues. In addition, motivation theory (Davis *et al.*, 1992) proposes that intrinsic and extrinsic motivations determine individuals' usage behaviors of information technologies. Perceived usefulness and perceived enjoymenthave been, respectively, identified as the representative extrinsic and intrinsic motivators for individuals' Internet usage (e.g., Li *et al.*, 2005; Teo *et al.*, 1999). The IS continuance model posits that users' continuance intentions are based on their' satisfaction with prior use and perceived usefulness (PU), and user satisfaction is the most critical determinant in influencing IS continuance intention (Bhattacherjee, 2001).

Social Presence Theory

According to social presence theory (Short *et al*. 1976), *Social presence* refers to extent to which a person is aware of another person in a communication interaction. Media differ in their abilities to convey the psychological perception that other people are physically present (Short et al. 1976). Communication media can thus be classified along a one-dimensional continuum of social presence, where communication is effective if the medium has sufficient social presence required for interpersonal involvement for a task. In general, a face-to-face medium is considered to have the most social presence, whereas written and text-based communication has the least. Moreover, videoconferencing has greater social presence than email. Thus, media with high social presence contribute to building close interpersonal relationships.

Media Richness Theory

Media richness theory (Daft and Lengel, 1984), also referred to as information richness theory, provides a framework to describe a communication medium according to its ability to reproduce the information sent over it. Information richness is defined as the amount of information a medium can convey to change the receiver's understanding within a time interval (Daft and Lengel, 1984). Media richness theory asserts that there are four factors that influence media richness: ability of the medium to transmit multiple cues, immediacy of feedback, language variety, and personal focus of the medium.

Communication media vary in their ability to carry rich information and facilitate understanding. A medium is considered to be richer if communication can clarify ambiguous issues to promote understanding in a timely manner. By contrast, a medium is regarded as less rich if communication takes a longer time to convey understanding. In other words, rich media carry the more information, while lean media carry less information. In general, oral media are believed to be richer than written media; and synchronous media are believed richer than asynchronous media (Markus, 1994). Furthermore, different tasks have different requirements for communication media. For tasks with greater equivocality or ambiguity, the use of richer media leads to better performance.

Media richness theory has been applied to explain media choice and media use (Dennis and Kinney, 1998). Based on media analysis, this theory has been used to help reduce the ambiguity of communication through the selection of suitable media. The theory can also be applied to understand the conditions in which a medium would be effective as wel as the effect of media richness on the use of the mdium (Dennis and Kinney, 1998). As IM has been widely used as a new medium among young people, we draw on media richness theory to understand user satisfaction with IM.

Motivation Theory

Motivation theory describes why and how human behaviors are activated and directed. There are in general two different categories of motivation: intrinsic motivation and extrinsic motivation. Intrinsic motivation is defined as the perception that users will want to perform an activity for no external reason other than for the process of performing the activity itself; extrinsic motivation drives individuals when they want to achieve valued outcomes, such as improved job performance, pay, or promotions (Davis *et al.*, 1992). According to motivation theory, people dedicated both their time and effort to use a given technology based on both intrinsic and extrinsic motivations. As the most representative intrinsic and extrinsic motivators that simulate IS use, perceived enjoyment (PE) characterizes the hedonic aspect of using a technology , whereas perceived usefulness (PU) describes the instrumental aspect of technology use.

IS Continuance Model

It is widely recognized that once indiviuals adopt an IS, whether they continuously use the IS has profound implications with regard to the ultimate success of this system (Bhattacherjee, 2001; Karahanna *et al.*, 1999). Toward this end, the IS continuance model (Bhattacherjee, 2001) is widely applied to study post-adoptive behaviors (e.g., Hong *et al.*, 2006; Hsien and Wang, 2007). The IS continuance model posits that a users' intention to continue using a technology is primarily determined by his or her satisfaction with previous use and perceived usefulness, and satisfaction is the predominant predictor in explaining IS continuance. Furthermore, user satisfaction is positively influenced by perceived usefulness.

Research Model and Research Hypotheses

Given the critical role of user satisfaction in understanding continued IS use, we choose user satisfaction as the core dependent variable in this study. The IS continuance model posits that a user's perceived usefulness directly affects his or her satisfaction with a technology and

IS continuance intention (Bhattacherjee, 2001). Additionally, prior studies have found that perceived enjoyment is the dominant factor explaining individuals' adoption of communication technologies like IM (e.g., Li *et al.*, 2005). Therefore, it is important to integrate instrumental factors (i.e., perceived usefulness) and hedonic factors (i.e., perceived enjoyment) when studying communication technologies.

In addition, IM is an interactive online communication tool that helps people around the world easily communicate with friends, colleagues and strangers and exchange information in real-time. IM is now a better alternative than other communication technologies when face-to-face communication is impossible. Unlike email, IM's presence awareness feature allows a user to quickly determine whether the recipient is available. Thus, IM has a quicker response time than email. Additionally, due to the integration of other media features, IM has a high degree of perceived social presence (PSP) and perceived media richness (PMR). As such, it is important to incorporate media capacity theories (i.e., social presence and media richness theories) to identify the important factors explaining user satisfaction with IM use. The research model is illustrated in Figure 1.
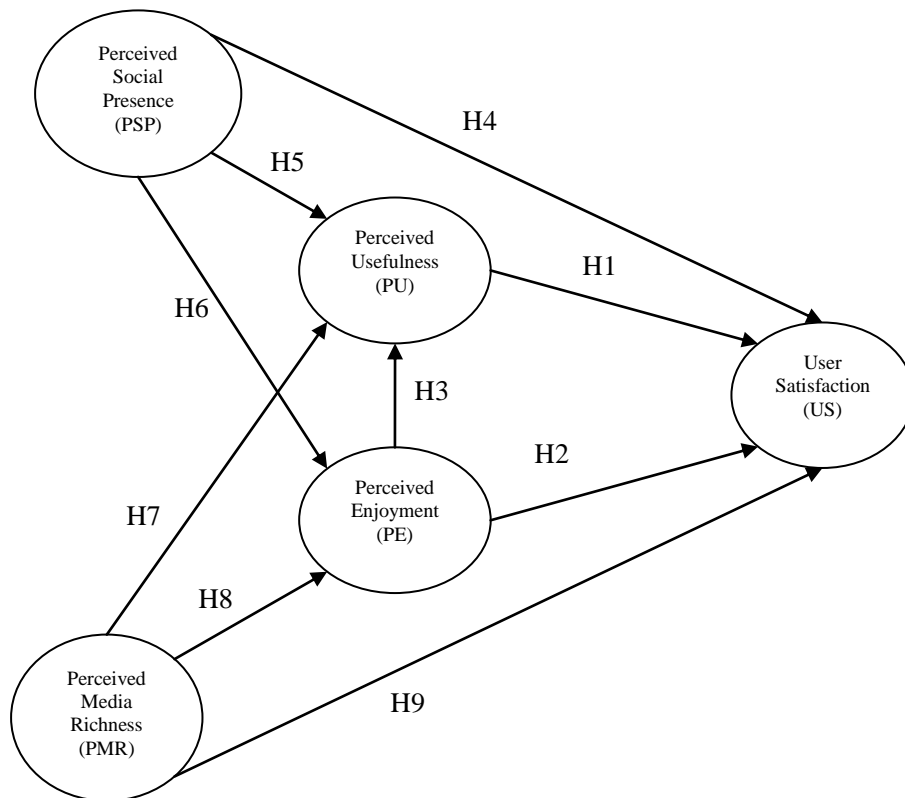
FIGURE 1. Research Model

The most widely accepted definition of perceived usefulness (PU) is related to job performance or business utility in a work context (Davis *et al.*, 1989). However, in the present study, PU captures the instrumentality of a communication technology in social settings. PU is thus defined as users' instrumental belief of whether using the communication technology is useful to build and maintain interpersonal relationships in a voluntary social context (Li *et al.*, 2005). An IM technology that is effective in providing instant feedback and conveying multiple cues is generally perceived as very useful for interpersonal communication (Fulk, 1993; Soe and Markus, 1993), thereby leading to user satisfaction. Previous studies have revealed that PU impacts individuals' affective feelings of technology use (Davis *et al.*, 1989; Karahanna *et al.*, 1999). Moreover, Bhattacherjee (2001) also found a positive relationship between PU and user satisfaction. Based on the above discussion, we propose the following hypothesis:

H1: Perceived usefulness is positively associated with user satisfaction.

Individual IS use in non-workplace settings is also driven by such intrinsic motivator as perceived enjoyment (Hsieh *et al.*, 2008; Van de Heijden, 2004). Perceived enjoyment (PE) is defined as the perception of fun, enjoyment and pleasure inherent in using a communication technology to develop and maintain interpersonal relationships (Davis *et al.*, 1992; Li *et al.*, 2005). Interpersonal communication in a voluntary social context typically involves both instrumental and hedonic purposes. When users perceive their IM use to be enjoyable, their IM use fulfills their hedonic needs, thereby increasing their satisfaction with the technology. As such,

H2: Perceived enjoyment is positively associated with user satisfaction.

The joyful feeling during interpersonal communication is an important element that helps establish and maintain interpersonal relationships (Li *et al.*, 2005). Thus, it is plausible that the enjoyable feeling derived from IM usage could make users feel that IM is useful for building and maintaining interpersonal communication, suggesting a positive link from PE to PU. Empirically, Venkatesh (2000) has found that intrinsic motivators like perceived enjoyment and playfulness affect extrinsic motivators like perceived usefulness. Li *et al*. (2005) also found a positive relationship between PE and PU. Thus,

H3: Perceived enjoyment is positively associated with perceived usefulness.

According to social presence theory, media are different in terms of their capabilities to psychologically construct the perception that other people are physically present (Short *et al.*, 1976). Using a medium that is higher in social presence is beneficial for social tasks like building personal relationships. Thus, a medium with a higher level of social presence is more likely to be perceived as being useful for building and maintaining social relationships.

In addition, social presence can be considered a function of a medium's capability to deliver both verbal and non-verbal cues (Chen *et al.*, 2004). IM and email are both

primarily text-based technologies. Compared with email, IM adds richer features, such as real-time communication, presence awareness, and graphic emotional icons. These features make the communication more fun and pleasurable, and people are more likely to be satisfied with the communication. Based on the above discussion, we propose the following:

H4: Perceived Social Presence is positively associated with user satisfaction.

H5: Perceived Social Presence is positively associated with perceived usefulness.

H6: Perceived Social Presence is positively associated with perceived enjoyment.

Media richness theory claims that media richness is most likely to affect a user's perception of a media's usefulness (Daft and Lengel, 1986). Media richness is reflected through a combination of four criteria: speed of communication, multiple cues, language variety and degree of personalization. Email is typically considered low in media richness, while face-to-face meeting is high in media richness. Compared with email and face-to-face meeting, instant messaging is a communication medium in between. IM exhibits many interactive features that are closer to face-to-face meeting, but it also exhibits features, such as text exchange, that are similar to leaner media (e.g., email) on the media richness scale. Thus, IM is a combination of different medium features. The feature combination of IM is more likely to be associated with users' perceptions of the medium's usefulness, and is more likely to satisfy their communication needs compared with other media. Moreover, as a good substitute for face-to-face communication, IM exhibits high perceived media richness. IM's rich features, particularly its text-based exchange and voice communication capabilities, make the communication process more enjoyable for individual users. Therefore, we propose the following hypotheses:

H7: Perceived Media Richness is positively associated with perceived usefulness.

H8: Perceived Media Richness is positively associated with perceived enjoyment.

H9: Perceived Media Richness is positively associated with user satisfaction.

RESEARCH METHOD

Measures

The five constructs in the research model were measured using scales adapted from prior studies to the investigative context of IM use. We adapted the items for user satisfaction and perceived usefulness from Bhattacherjee (2001), the items for perceived enjoyment from Davis *et al.* (1992) and Venkatesh (2000), items for perceived social presence from Short *et al.* (1976) and Yoo and Alavi (2001), and the items for perceived media richness from Carlson and Zmud (1999). All of the items were measured on five-point Likert scales ranging from "strongly disagree" to "strongly agree." Appendix A lists the final items used in the study.

Data Collection

Prior to the large-scale data collection, we conducted a series of pre-tests to examine the construct validity and reliability. At first, the questionnaire was translated and back-translated between English and Chinese by certified professional translators (Brislin *et al.*, 1973). Next, the Chinese questionnaires were distributed to three professors and fifteen undergraduate students at a public university in China for verification. Modifications were made based on their feedbacks. The revised questionnaire was then used for the official online survey.

We used an online survey to collect data. The respondents were undergraduate and post-graduate students in business courses taught by the first and third authors in the business school of a public university in China. Because these students frequently use the Internet for their assignments, the online survey was an ideal way to collect data. The first and third authors informed their students about the survey during class. Out of a total of 465 invited students, 247 student complete questionnaires, resulting in an effective response rate of 53.1%. Table 1 presents the demographic characteristics of the responded subjects.

TABLE 1: Sample Demographics

IM users	Category	Percentage (%)
Gender	Male	40.9
	Female	59.1
Age	18-22 years old	77.7
	23-29 years old	22.3
Experience with IM	< 1 year	2.8
	1-3 year	38.5
	4-6 year	40.9
	7-9 year	16.2
	> 9 year	1.6

DATA ANALYSIS AND RESULTS

Structural Equation Modeling (SEM) was applied for data analysis using AMOS 17.0. The measurement model was evaluated prior to the structural model.

Measurement Model

The measurement model was assessed using a confirmatory factor analysis (CFA) (Hair et al. 1998). One item of perceived social presence and one item of perceived media richness were dropped because of low loadings. All fit indices (Table 2) meet the commonly applied thresholds in prior literature (Gefen and Straub 2000 at CAIS; Chau, 1997). Table 3 presents the descriptive statistics of the constructs.

TABLE 2: Fit Indices of Measurement Model

Goodness of Fit Indices	Measurement Model	Desired Levels
χ^2/df	1.99	$\langle$ 3.0
CFI	0.97	$\rangle$ 0.90
TLI	0.96	$\rangle$ 0.90
RMSEA	0.06	0.05-0.08
Standardized RMR	0.04	$\langle$ 0.05
GFI	0.91	$\rangle$ 0.90
AGFI	0.87	$\rangle$ 0.80
Number of Latent Variables	5	
Total Number of Items	17	

TABLE 3: Descriptive Statistics

Construct	Mean	Std. Dev.
Perceived Social Presence (PSP)	3.76	0.72
Perceived Media Richness (PMR)	4.17	0.74
Perceived Enjoyment (PE)	3.99	0.78
Perceived Usefulness (PU)	3.95	0.74
User Satisfaction (US)	3.83	0.78
Notes: All constructs are five-point scales with the following anchors: 1=strongly disagree, 3=Neutral, 5=Strongly agree.		

We further evaluated internal consistency, convergent validity, and discriminant validity by examining the Cronbach's alpha, composite reliability, and average variance extracted (AVE) of each construct (Table 4). The values of Cronbach's alpha and composite reliabilities were all higher than the recommended 0.707 (Nunnally and Bernstein, 1994), thereby suggesting an adequate level of internal reliability. The value of AVE of each construct was all above 0.50 and greater than its squared correlations with other constructs, thereby supporting discriminant validity (Fornell and Larcker, 1981). Tthe above results collectively suggest that the measurement model is appropriate.

TABLE 4: Confirmatory Factor Analysis

Latent Construct	Indicator	Standard Loading	Cronbach's Alpha	Composite Reliability	Average Variance Extracted
Perceived Social Presence （PSP）	PSP1 PSP2 PSP4	0.93 *** 0.89 *** 0.76 ***	0.90	0.90	0.74
Perceived Media Richness (PMR)	PMR2 PMR3 PMR4	0.53 *** 0.82 *** 0.90 ***	0.78	0.80	0.59
Perceived Enjoyment (PE)	PE1 PE2 PE3	0.88 *** 0.94 *** 0.90 ***	0.93	0.93	0.82
Perceived Usefulness (PU)	PU1 PU2 PU3 PU4	0.87 *** 0.91 *** 0.90 *** 0.80 ***	0.92	0.93	0.76
User Satisfaction (US)	US1 US2 US3 US4	0.81 *** 0.92 *** 0.90 *** 0.85 ***	0.93	0.93	0.76

* p< 0.10; ** p< 0.05; *** p< 0.01.

TABLE 5: Discriminate Validity

Construct	PSP	PMR	PE	PU	US
PSP	**0.86**				
PMR	0.47	**0.77**			
PE	0.77	0.47	**0.91**		
PU	0.62	0.50	0.63	**0.87**	
US	0.75	0.40	0.79	0.62	**0.87**

Structual Model

The structural model was also tested using AMOS 17.0. The overall fit and the explanatory power of the research model were examined, and the results are shown in Table 6 and Figure 2. The overall goodness-of-fit was examined against the following six common fit measures: chi-square/degree of freedom, GFI, AGFI, CFI, SRMR and RMSEA. The results in Table 6 suggest a good fit between the structural model and the data.

TABLE 6: Fit Indices of Structural Model

Goodness-of-Fit Indices	Structural Model	Desired Levels
χ^2/df	2.07	〈 3.0
CFI	0.97	〉0.90
TLI	0.96	〉0.90
RMSEA	0.07	0.05-0.08
Standardized RMR (SRMR)	0.04	〈 0.05
GFI	0.90	〉0.90
AGFI	0.86	〉 0.80
Number of Latent Variables	5	
Total Number of Items	17	

Figure 2 illustrates the path coefficients and explanatory power for the structural model. We found that eight of the nine proposed hypotheses were supported. Perceived usefulness (H1) (β=0.15), perceived enjoyment (H2) (β=0.48), and perceived social presence (H4) (β=0.30) all had significant effects on user satisfaction, explaining 69% of its variance. Contrary to our expectation, perceived media richness had no significant effect on user

satisfaction, thereby rejecting H9.

The results also show that perceived enjoyment (β=0.30), perceived social presence (β=0.29) and perceived media richness (β=0.22) had significant effects on perceived usefulness, explaining 48% of its variance. H3, H5 and H7 were thus supported. Finally, perceived social presence (β=0.70) and perceived media richness (β=0.15) had significant effects on perceived enjoyment, explaining 61% of its variance; H6 and H8 were also supported.
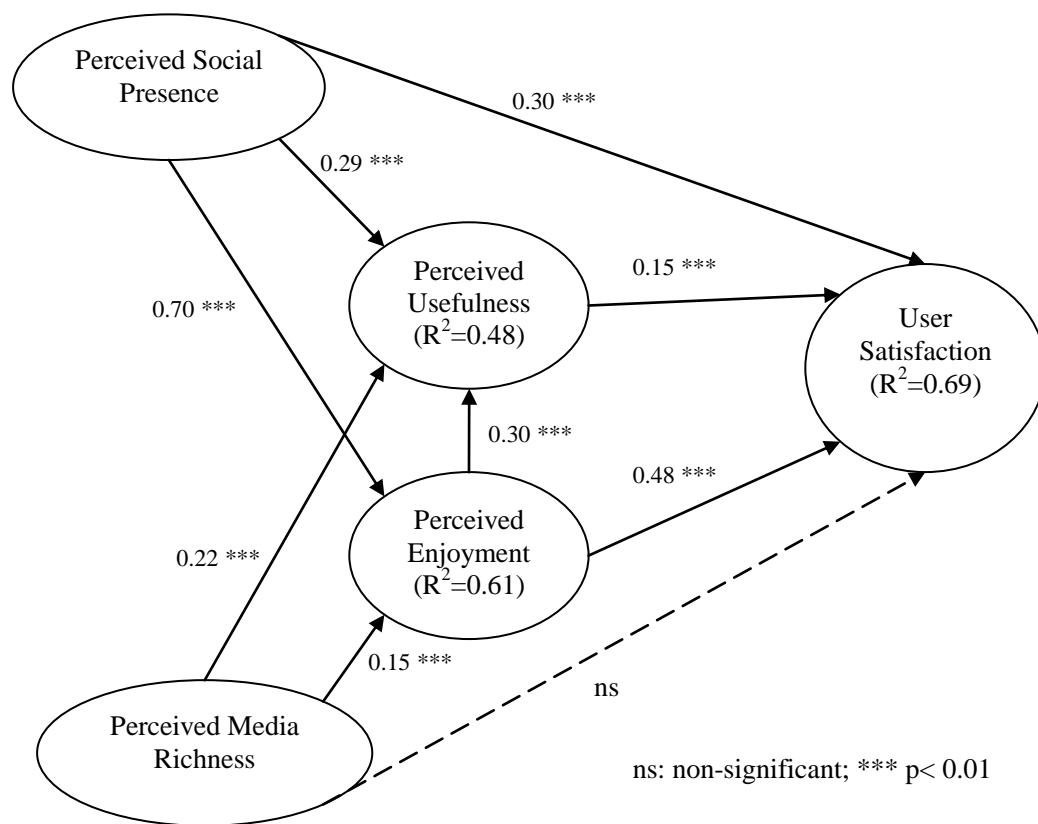

FIGURE 2. Results of Hypotheses Testing

DISCUSSION

This study seeks to provide a research model to explain user satisfaction with IM use in voluntary social contexts. The results lend support to eight of the nine proposed links. Specifically, perceived enjoyment, perceived social presence, and perceived usefulness collectively explained 69% of the variance in user satisfaction, an explanatory power that is

much higher than that of the IS continuance model (Bhattacherjee, 2001). Moreover, we found that perceived usefulness (β=0.15) had a weaker power than perceived enjoyment (β=0.48) and perceived social presence (β=0.30) in explaining user satisfaction. This differential effect may be attributed to the technology under investigation in this study. Specifically, IM is a medium that is mainly used for interpersonal communication in social settings. Thus, IM users are more likely to be affected by the hedonic aspects of the technology and by their perceived interpersonal involvement in the communication process rather than by perceived usefulness.

In addition, media choice theory and social presence theory provide additional insights for explaining perceived usefulness and perceived enjoyment with regard to IM use. In particular, perceived social presence and perceived media richness collectively explained 61% of the variance in perceived enjoyment, with perceived social presence being the dominant variable in shaping users' perception of enjoyment. This finding suggests that users are likely to be attracted to IM use based on their perception about their partners' physical presence, which can strengthen their intrinsic motivation toward using the communication tool.

At the same time, perceived enjoyment, together with perceived social presence and perceived media richness, explained 48% of the variance in perceived usefulness. Different from information systems in workplace settings (e.g., ERP systems), IM's social nature enables an individual user to build and maintain interpersonal relationships with others in real time. However, perceived usefulness focused more on the intrumental effectiveness of IM users, rather than the social nature of IM. As such, we found that the users' perceptions of the medium's capabilities (in shaping social presence and conveying media richness) and hedonic utility jointly informed users' perceived usefulness.

Contrary to our hypothesis, perceived media richness did not significantly impact user

satisfaction. The effect of perceived media richness on user satisfaction was mediated by perceived enjoyment and perceived usefulness. One possible explanation for this lack of direct effect is that face-to-face communication may actually replace IM communication. For our student subjects, their IM contacts are mostly comprised of their classmates or schoolmates from the same university. In this regard, face-to-face communication could be more convenient and instant, as compared to IM. In addition, users may sometimes need a leaner communication channel to exchange their opinions with their communication partners. For example, students may like to communicate with their teachers via email rather than through an IM service so as to avoid being rude or interrupting their teachers. Therefore, using IM in this situation may not be appropriate. This may be another reason why perceived media richness did not show a significant direct effect on user satisfaction. Future research is needed to further investigate this insignificant effect.

Implications for Research

The present study created a research model for user satisfaction with IM use by incorporating the motivational model with media capacity theories. Our theoretical integration has provided a good explanation of user satisfaction about IM usage (69%). We found that perceived enjoyment, social presence, and perceived usefulness were significant determinants of user satisfaction with IM in the post-adoption stage. Our research model provides an important perspective for future studies of computer-mediated communication technologies.

Similar to the IS continuance model (Bhattacherjee, 2001), the causal link between PU and user satisfaction was verified in this study. In this vein, the present study extends the generalizability of the PU-Satisfaction link in the IS continuance model to a broader set of information technologies. In addition, the present study found that perceived enjoyment,

compared to perceived usefulness, is a stronger determinant for user satisfaction with IM in the voluntary social contexts. Future research may consider including other intrinsic motivators, such as perceived enjoyment, as part of the IS continuance model, especially for information technologies with strong relationship development and maintenance purposes.

The effects of intrinsic motivation and extrinsic motivation on users' technology usage intentions and behaviors have been supported in past research (Davis *et al.*, 1992; Li *et al.*, 2005). Our study suggested that intrinsic and extrinsic motivations also affect the formation of users' affective feeling (i.e. satisfaction). The identified effects of intrinsic and extrinsic motivations on user satisfaction warrant further investigation by researchers in the area of technology adoption and post-adoption.

Similar with some prior studies (Hong *et al.*, 2006; Hsieh and Wang, 2007), we also found that the effect of PU assumes a minor role during the post-adoption stage. Our focus was on IM's social communication to maintain interpersonal relationships instead of its ability to enhance users' work performance. We encourage interested scholars to further explore how IM use is carried out in workplace settings and how IM use influences employees' performance.

Implications for Practice

IM use in today's workplace is still a heated topic. For example, in many organizations, IM is referred to as interruption management instead of instant messaging (Garrett and Danziger, 2008). In addition, one study found that employees were interrupted by an IM every eleven minutes in the workplace and that 57% of these interruptions were unrelated to their tasks at hand (Mark *et al.*, 2005). While some researchers have suggested that instant messaging contributes to an increase in task interruption (Czerwinski *et al.*, 2000a, 2000b), others have argued that strategic use of instant messaging can actually reduce interruption

(Garrett and Danziger, 2008). Thus, an important study for both theory and practice is to investigate how employees' IM use affects their work performance and how managers can design suitable policies and regulations in organizations to ensure that employees use IM appropriately.

From the perspective of IM service providers, the significant effects of perceived enjoyment, perceived social presence, and perceived usefulness on user satisfaction suggest that the hedonic outcomes, presence awareness, and instrumental utility of the communication technology must be properly accounted for. The strong effect of perceived enjoyment on user satisfaction suggests that the pleasure and enjoyment of IM is the critical satisfaction driver in the post-adoption stage. The enjoyment aspect of IM could come from IM's ability to show smiley faces, avatars, icons, and other interactive features. Given their importance to user satisfaction, these interactive features should be strengthened and kept updated frequently. Therefore, IM service providers must continuously explore design methods to improve the entertainment aspects of IM use.

Finally, IM often shows a "popup" window for recipient notification and presence awareness, which is critical to the formation of user satisfaction in the post-adoption stage. Thus, IM designers should further develop IM technology while keeping its media capabilities in mind, especially the features related to social presence.

Limitations

Like most empirical studies, this research bears several limitations. First, the data were collected from university students, and thus they may not fully capture the behavioral patterns of users in other age groups or contexts. Cautions should be exercised when generalizing our findings to other groups (e.g., the senior) or other contexts (e.g., workplace settings).

Second, the sampled subjects are students at a business school from the same university

in China. Since they frequently meet in class or on campus, they may frequently communicate with each other in a face-to-face channel as opposed to through IM only. Compared with the face-to-face communication, IM is lower in perceived media richness. Therefore, it may not be surprising that users' perceived media richness of IM did not show a direct effect on users' satisfaction with prior use.

Third, students in this study might have used different IM tools from different service providers. Among the responded subjects, QQ, Fetion, and MSN are the most popular IM tools. It is dubious whether these tools may differ in their key features so as to compromise the findings. To address this concern, we have compared these tools and found no obvious differences in terms of their core features.

Fourth, an IM tool is a computer-mediated communication technology, and users' continuous use of IM, as compared to information systems in organizations, may mostly depend on their habits (Limayem *et al.*, 2007) and satisfaction (Bhattacherjee, 2001), rather than on their continuous intentions. Future research should therefore examine users' habits and their relationship with user satisfaction in predicting continuous usage.

Conclusions

In sum, integrating motivation theory, media richness theory, and social presence theory, this paper provides empirical evidence to understand user satisfaction of IM use. The research model incorporates motivational factors (i.e., perceived enjoyment (PE) and perceived usefulness (PU)) and media capability factors (i.e., perceived social presence (PSP) and perceived media richness (PMR)). PE, PSP, and PU together explained a large percentage (69%) of the variance of user satisfaction. Our results further suggest that for a communication channel, the perceptions of enjoyment and social presence are even more important than usefulness in influencing users' satisfaction with prior use. As one of the first

studies to investigate user satisfaction with prior usage of IM in the voluntary social context, this study has indentified the important media capability factors that predict user satisfaction.

Appendix A: Measures and Scales

Perceived Social Presence (PSP)
PSP1: I feel the communication environment of the instant messaging service is warm.
PSP2: I feel the communication environment of the instant messaging service is sensitive.
PSP3: I feel the communication environment of the instant messaging service is personal. *(Deleted)*
PSP4: I feel the communication environment of the instant messaging service is sociable.

Perceived Media Richness (PMR)
PMR1: The instant messaging service allows my communication partner and me to give and receive timely feedback. *(Deleted)*
PMR2: The instant messaging service allows my communication partner and me to tailor our messages to our own personal requirements.
PMR3: The instant messaging service allows my communication partner and me to communicate a variety of different cues (such as emotional tone, attitude, or formality) in our messages.
PMR4: The instant messaging service allows my communication partner and me to use rich and varied language in our messages.

Perceived Usefulness (PU)
PU1: Using the instant messaging service improves my communication performance.
PU2: Using the instant messaging service increases my communication outcomes.
PU3: Using the instant messaging service enhances my communication effectiveness.
PU4: Overall, I find the instant messaging service useful to my communication.

Perceived Enjoyment (PE)
PE1: I find using the instant messaging service to be enjoyable.
PE2: The actual process of using the instant messaging service is pleasant.
PE3: I have fun using the instant messaging service.

User Satisfaction (US)
US1: I am very satisfied with using the instant messaging service.
US2: I am very pleased with using the instant messaging service.
US3: I am very contented with using the instant messaging service.
US4: I am very delighted with using the instant messaging service.

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