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Playfulness in mobile instant messaging: Examining the influence of emoticons and text messaging on social interaction

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ABSTRACT

Mobile instant messaging is the communication technology revolution that is changing the way people communicate. The adoption rate is surging and the massive growth is experienced worldwide. Prior studies on instant messaging have been primarily concerned with its task-relevant or functional aspects, while less attention is paid to social interaction aspects. Drawing from media richness theory, present research highlights that social interaction factors can be facilitated by an enriched communication channel to create closer interpersonal social relationships. Specifically, the findings illustrate that the combined effect of text messaging and emoticon use increases information richness, which leads to perceived playfulness in mobile instant messaging. In addition, the perceived playfulness fostered in the instant messaging process plays a driving role in facilitating social connectedness, identity expressiveness between users and advocacy of mobile instant messaging usage.

1. Introduction

Mobile instant messaging is a type of online chat app that offers real-time text transmission over the internet. Because of its low-cost or free chat service, mobile instant messaging has proven to be an inexpensive alternative that is a more superior substitute to operator-based text messaging via SMS. Many messenger apps offer features such as group chat, graphics exchange, video and audio messages as well as stickers or emoticons. WhatsApp is one of the most popular mobile social apps worldwide with reach particularly strong in markets outside the United States. In February 2014, the social network Facebook acquired the mobile app for 19 billion U.S. dollars. Mobile instant messaging, which provides ubiquitous online chat capability over the Internet, has become a prevalent mode of online communication that is changing how we communicate. The adoption of mobile instant messaging has undergone massive growth in recent years. By August 2014, WhatsApp had more than 600 million monthly active users, which represents a global mobile Internet user penetration rate of 24%. However, by April 2016, the number of users had substantially increased, as it has nearly 1 billion individuals actively using WhatsApp worldwide each month (Statista, 2016). Other mobile instant messaging applications are also gaining widespread acceptance. For example, Facebook Messenger has 900 million monthly active users, WeChat has 697 million monthly active users. Line which was initially established in response to the damaged telecommunications infrastructure in Japan after the 2011 earthquake, has also evolved into a widely prevalent social platform with 215 million monthly active users (Statista, 2016). According to a report by QuestMobile, the most popular activity of smartphone users in China is instant messaging, which accounts for more than one-third of the time such users spend on their smartphones. Online video is the second-most popular activity, consuming less than half the time that Chinese smartphone users spend on instant messaging (eMarketer, 2016). What are the factors behind the wide adoption of mobile instant messaging? Despite the pervasive use of mobile instant messaging worldwide, our understanding of the underlying factors that drive user stickiness of mobile instant messaging, which has transformed how we engage in social interaction, is far from comprehensive.

Prior studies on instant messaging have been primarily concerned with its task-relevant or functional aspects, such as the effect of usefulness on adoption (de Vos, Hofte, & de Poot, 2004) how workers adopt instant messaging in organizational situations (Isaacs, Walendowski, Whittaker, Schiano, & Kamm, 2002; Nardi, Whittaker, & Bradner, 2000), the loss of productivity that may

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occur as a result of instant messaging interruptions and distractions (Thatcher, Wretschko, & Fridjhon, 2008), the use of instant messaging and communicative workload (Brodt, DeSanctis & Emery, 2002) and network security compromises (Swartz, 2005). However, despite the numerous studies on instant messaging, there is a lack of research that addresses the critical issue of how mobile instant messaging influences social interaction. Prior research in instant messaging has discussed how friends communicate and how friendship can be enhanced (Huang & Yen, 2003). However, the effect of perceived playfulness between instant messaging communication users has seldom been carefully investigated.

Playfulness, which may play a fundamental part of human social relationships, receives relatively less attention in the mobile communications literature. Playfulness is the essence of play (Bundy, 1993). Typically associated with children, playfulness is related to creativity, sense of humor, curiosity, pleasure and spontaneity (Guitard, Ferland, & Dutil, 2005). Although adult playfulness is seldom discussed, this fact does not indicate that playfulness does not occur among adults. Computer-mediated communication (CMC) is generally perceived as a relatively more work-related medium because it does not involve facial expressions and nonverbal cues. However, with the help of emoticons, CMC has developed into a playful medium (Danet, Ruedenberg-Wright, & Rosenbaum-Tamari, 1997). Emoticons, which are images used to express emotion, enable individuals to enliven online conversation by displaying emotion and humor, which adds to the amusement and playfulness experienced by users. The literature indicates that engagement in play produces positive affect, such as happiness, joy, excitement and laughter, which reduces everyday stress and offers a temporary escape from routine (Barnett, 1991; Hurwitz, 2002). Additionally, play between friends has been shown to enhance a relationship's emotional capital (Van vleet & Feeney, 2015). Thus, it is likely that on an online platform perceived playfulness in mobile instant messaging can strengthen the connections of friendship. Therefore, we propose that perceived playfulness plays a crucial role that drives the stickiness of mobile instant messaging and the consequent social connectedness between users.

The objective of this study is to shed light on this important topic by examining the significance of perceived playfulness in mobile instant messaging and its effect on social interaction. Mobile instant messaging, which enables users to communicate and interact with their friends using text messaging and emoticons, may be the key driver that facilitates the experience of perceived playfulness in the process of interaction. According to media richness theory, communication channels capable of delivering multiple cues can provide media richness, which facilitates communication effectiveness (Daft & Lengel, 1984). It is likely that the combined effects of text messaging and emoticon use create media richness, which facilitates the perceived playfulness in the social interaction of mobile instant messaging users. Thus, drawing on media richness theory, we propose a conceptual model that elucidates how perceived playfulness is made manifest through the combined effect of text message and emoticon use to enhance social relationships. Moreover, in addition to facilitating social connectedness, the playfulness triggered by using mobile instant messaging may also encourage users to more freely express themselves. Thus, the positive effect of perceived playfulness on user identity expression and word-of-mouth intention in mobile instant messaging is also examined in the proposed framework.

2. Theoretical foundations and hypotheses

2.1. Media richness theory

According to media richness theory (Daft & Lengel, 1984), communication channels differ with respect to the amount of information that they can convey. Media richness describes a communication channel's capabilities to deliver messages with rich information. The theory postulates that four factors determine a communication channel's capacity for information richness: (1) the ability of the communication channel to convey multiple cues, such as facial expression, body gesture and vocal inflection; (2) instantaneous feedback, such as the immediacy of response to a query; (3) language variety, such as adopting various language symbols; (4) the ability of the communication channel to convey personalization, such as displaying personal emotions (Daft & Lengel, 1984). For effective communication, messages must be communicated on channels that exhibit adequate and appropriate media richness capacities (Purdy, Nye, & Balakrishnan, 2000). Communication channels, such as e-mail, the telephone and instant messaging, exhibit varied attributes with differing richness capacities. Generally, computer-mediated communication lacks nonverbal cues, which limits the range of information exchange and creates distance among users. For instance, e-mail primarily transmits messages using text. Therefore, non-verbal content is lacking. Communication channels that can provide verbal and nonverbal cues are considered to exhibit high information richness.

Although mobile instant messaging resembles other computer-mediated communication, such as email, in its text transmission feature, it has a unique feature that allows users to express emotions and facial expressions using emoticons. Thus, instant messaging, which enables users to send verbal and nonverbal cues through text messages and emoticons, is considered to provide enriched information richness in the online communication process. A number of studies have adopted media richness theory in their investigations of the online environment (Brunelle, 2009; Lai & Chang, 2011; Oh et al., 2009; Pollach, 2008). Past research indicates that the information richness of online stores facilitates the process of the shopping task in a manner that makes online shopping more interesting. Thus, enhancing the information richness of the online channel facilitates the enjoyable, playful shopping experience (Oh et al., 2009). Therefore, media richness theory is adopted in this research to provide theoretical insight into the adoption of text messaging and emoticon use in social interactions and their effect on playfulness in mobile instant messaging.

2.2. Text messaging use and perceived playfulness

Mobile instant messaging enables users to chat ubiquitously online by the use of text-messaging, thus making such messaging closely weaved across the fabric of people's everyday lives. Five features of instant messaging contribute to its popularity: presence awareness, within-medium polychromic communication, “pop-up” receiver notification, quiet interactivity, and fleeting transcripts (Rennecker & Godwin, 2003). Individual can set up a chat room function, which enables individuals to chat in groups of individuals while enabling text message transmissions to be exchanged among multiple users simultaneously. Compared with other communication technologies, the features of instant messaging are more similar to face-to-face communication. Mobile instant messaging has a short transmission time and provides the experience of immediate interaction, thus making it a near synchronous one-on-one CMC (Nardi et al., 2000). The synchronicity instills a sense of co-presence, particularly with tasks that require rapid interactions, such as clarifying quick appointments, initiating impromptu social gatherings, and maintaining close contact with friends (Nardi et al., 2000). The instantaneous exchange of text messages back and forth, creates a sense of being present together among the communicators, although the co-presence is temporal instead of spatial.

Text messaging features enhance the user's enjoyment of the communication process. A previous study posits that instant messaging is a fun tool that provides satisfaction among friends (Li, Lou, Chau, & Li, 2005). Playfulness is defined as a situational interaction characteristic between an individual and the situation (Lieberman, 1977). Previous studies show that people use jokes, creativity and poking fun as a way to construct social relationships (Perry & Rachovides, 2007). Similarly, playful behavior is also displayed in computer-mediated environments, such as mobile instant messaging. Harsh messages, such as scolding, which has a negative impact on friendship, are less likely to occur in the context of mobile instant messaging. Instead, friendship-building interactions, such as leaving and sending messages that playfully poke fun at friends within a group, are evident in messaging practice. The playfulness may take various forms, such as storytelling (Jacucci, Oulasvirta, & Salovaara, 2007), teasing and joking in the instant messaging conversational threads (Kurvinen, 2003) and playfully creating instant messaging comic strips (Salovaara, 2007). In addition, riddles and playing spur-of-the-moment games through instant messaging facilitate the perceived playfulness and fun experiences that individuals create with one another.

According to media richness theory (Daft & Lengel, 1984), media richness indicates the communication channel's capabilities to deliver messages with rich information. Text messaging, which provides immediate and nearly synchronous interaction through words and writing, facilitates media richness in mobile instant messaging. Furthermore, when people use text messaging to communicate with friends in mobile instant messaging, they tend to send messages of different forms of friendship-building interactions, which in turn facilitates information richness. Previous research postulates that the information richness of a virtual store facilitates the consumer's perceived playfulness in the shopping process (Oh et al., 2009). Thus, it is likely that the media richness of mobile instant messaging can reinforce the perceived playfulness in social interaction. Therefore, we hypothesize that the use of text messaging positively influences perceived playfulness of interaction in mobile instant messaging:

H1. Text messaging positively influences perceived playfulness in interaction.

2.3. Emoticon use and perceived playfulness

An emoticon is a non-verbal graphical indicator of emotion (Dresner & Herring, 2010) and is commonly used as a surrogate to convey emotional tone and non-verbal gestures, such as facial expressions (Derks, Bos, & Von Grumbkow, 2008). In interpersonal communication, nonverbal cues, such as facial expression and body gestures, send a message that complements the verbal context to ensure clear understanding (Cui, Wang, & Xu, 2010). These nonverbal cues enable the communicators to respond to and support the other's emotion (Wolf, 2000). However, in computer-mediated communication, the absence of nonverbal cues constraints the ability of communicators to disseminate social information (Rice, Bair, & Chen, 1984) and inhibits the sense of social presence (Sproull & Kiesler, 1986). According to media richness theory (Daft & Lengel, 1984), a communication medium that can instantly convey multiple cues and personal emotions can transmit rich information, which facilitates the communication effect. In mobile instant messaging, emoticon use enables the communicator to offer warm emotional expressions and provide rich social cues, which was lacking in the computer-mediated communication (CMC) environment (Tossell et al., 2012). Thus, emoticons increase information richness in communication based on mobile instant messaging. According to Walther (1992), in circumstances in which non-verbal cues are unavailable, communicators often seek to adopt different forms of communication, such as emoticons (Utz, 2000), to express emotions and maintain interpersonal relationships. Emoticons enable the message receiver to accurately comprehend the positive or negative direction of emotion attitude and its level (Lo, 2008). Emoticons are agents for non-verbal emotional expression, such as facial expression and head nodding (Riva, 2002). Although words can depict emotions, emoticons can be used to vividly display non-verbal emotion (Preece & Ghozati, 2001). Thus, they are a potent means to facilitate media richness.

Past studies on media richness indicate that information richness positively influences the experience of playfulness (Oh et al., 2009). Perceived playfulness is characterized as the extent to which the individual's attention is focused, the individual is curious regarding an interaction and finds an interaction enjoyable and interesting (Moon & Kim, 2001). Previous research indicates that the adoption of emoticons in text-based communication increases the enjoyment experience in instant messaging (Huang, Yen, & Zhang, 2008). Emoticons enable individuals to reciprocate emotions, such as by smiling or laughing (Fabri, Moore, & Hobbs, 2005), which in turn enhances the fun and perceived playfulness of mobile instant messaging. Many emoticons are figures with amusing characters and humorous gestures. Individuals can incorporate playful elements into a mundane message by sending emoticons that express humor and fun. Prior studies show that emoticons are also adopted in task-oriented situations to facilitate communication (Luor, Wu, Lu, & Tao, 2010). In addition, emoticons are used more by females to express humor, while males often use them to tease and ridicule (Wolf, 2000). Thus, not only can personal emotions be expressed using emoticons. In addition, individuals can playfully poke fun at friends with illustrative graphical images (Jacucci et al., 2007). Therefore, we hypothesize that emoticon use positively influences perceived playfulness of interaction in mobile instant messaging:

H2. Emoticon use positively influences perceived playfulness in interaction.

2.4. Perceived playfulness and social connectedness

The social aspect of play has been discussed in previous literatures indicating that playfulness may be a meaningful feature in social relationships (Salen & Zimmerman, 2004). The relational benefits that result from play include feelings of acceptance, feeling appreciated by others and feeling compatible during play (Van Vleet & Feeney, 2015). Previous studies indicate that games can provide individuals an opportunity to spend time together (Voida & Greenberg, 2009) and that the experienced playfulness enhances the pleasure of this shared time. The enjoyment derived from having fun together and displaying affection among people creates connections, social relationships and friendship (Perry & Rachovides, 2007). Previous studies assert that engaging in play is likely to create a positive affective experience that contributes to the emotional capital of a relationship (Feeney & Lemay, 2012). In addition, feelings of trust and intimacy can be generated between partners (Baxter, 1992).

Social connectedness is defined as an enduring and ubiquitous sense of the self in relation to others (Lee & Robbins, 2000). This sense of connectedness enables individuals to establish a feeling of connection with others and to identify with those who may be perceived as different from them (Kohut, 1984). Social connectedness is developed from the study of belongingness (Baumeister & Leary, 1995; Lee & Robbins, 1995). Based on the belongingness theory, individuals are motivated to develop and foster positive social relationships so that they can experience a sense of

belongingness. Baumeister and Leary (1995) assert that the sense of belongingness that individuals build and maintain through social relationships enhances their psychological well-being. Although social connectedness is occasionally operationalized as the objective presence of social ties, it is more often viewed as a subjective psychological component (de Jong Gierveld, 1998). Those who interact more often with others in their social network are more likely to feel social support, establish social connectedness and build interpersonal relationships. Additionally, prior research indicates that in interpersonal interaction, a sense of humor and fun in the communication context can decrease social distance between interactants, which can further enhance interpersonal relationships and build connectedness (Graham, 1995). Therefore, it is hypothesized that perceived playfulness of interaction created by using text messaging and emoticons in mobile instant messaging positively influences social connectedness:

H3. Perceived playfulness positively influences social connectedness.

2.5. Perceived playfulness and identity expressiveness

Identity expressiveness is characterized as behavior that involves expressing self-identity and social-identity (Thorbjørnsen, Pedersen, & Nysveen, 2007). Self-identity expressiveness assert how individuals communicate their identity and opinions to others, whereas social expressiveness asserts an individual's capacity to verbally and adeptly participate in social interaction with others. Thus, identity expressiveness encompasses the portrayal of self-identity and the construction of social identity. The social media environment provides a setting for individuals to communicate that enable them to express themselves and have fun when interacting with others. When individuals engage in play, this behavior provides a context that is free from seriousness. Previous research indicates that playfulness is related to expressiveness (Glynn & Webster, 1992). When individuals are in a playful frame of mind, the stress-free mood enables them to be more self-expressive. The playfulness lends itself to a more relaxed and casual atmosphere in which individuals can freely expressive themselves and friends become more proficient at understanding one another's subtle cues. In the online environment, consumers seek not only to express themselves but also to experience fun and entertainment in the social interaction (Jung, Youn, & McClung, 2007). Consumers pursue amusing experiences to alleviate the boredom associated with daily tasks and satisfy the need for entertainment (Pantzar, 2003). For example, previous research on human-computer interaction indicates that games that enable individuals to freely choose from among diverse avatar and to use the selected avatar for self-expression (Dunn & Guadagno, 2012; Taylor, 2001) increase the fun and the sense of playfulness experienced by the user. Similarly, emoticons are images with various entertaining characteristics that can provide amusing and emotional expressions. The user can easily adopt distinctive emoticons for self-expression. Therefore, it is hypothesized that when individuals use text messaging and emoticons to communicate, the fun and perceived playfulness in the interactive communication enabled by mobile instant messaging is likely to facilitate the identity expressiveness of individuals:

H4. Perceived playfulness positively influences identity expressiveness.

2.6. Perceived playfulness and word of mouth

The significance of word of mouth in social interaction has been noted in extant literatures (Brown & Reingen, 1987; Chen, Wang, & Xie, 2011). When individuals experience perceived playfulness by using mobile instant messaging, it is likely that the sense of fun and enjoyment derived from the process will facilitate individuals to continue using mobile instant messaging. The desire to share opinions and experiences can drive individual word-of-mouth behavior (Hennig-Thurau, Gwinner, Walsh, & Gremler, 2004) in various situations, such as circumstances when individuals have positive and satisfying usage experience (Anderson, 1998). Previous studies assert that play may lead to a sense of satisfaction which is built through the communal experience of positive emotions (Aune & Wong, 2002). Thus, when an individual experience fun and enjoyment in the usage of mobile instant messaging, it is likely that individuals will engage in advocating the use of mobile instant messaging, e.g., by inviting his or her networking circles to socially interact on the same online communication platform. Therefore, it is hypothesized that perceived playfulness of interaction positively influences word-of-mouth (WOM) intention:

H5. Perceived playfulness positively influences word-of-mouth intention.

The research framework is shown on Fig. 1.

3. Research methodology

3.1. Samples

An online survey was conducted to collect data. A link to a questionnaire was posted at Youthwant.com, a website that provides lifestyle information and topics for online discussion. Youthwant.com is one of the largest online questionnaire platforms in Taiwan, where members as well as nonmembers can participate in the online surveys it presents. Individuals with experience using mobile instant messaging for social interaction were invited to complete the online survey. To empirically test our hypotheses, we chose Line as the context for mobile instant messaging because it is the most popular mobile social apps in Taiwan. A total of 201 valid responses were obtained. The sample characteristics are presented in Table 1. Of our respondents, 63.7% were female. The sample was not restricted to students. Specifically, 13.4% of the respondents were students, 43.8% were office workers, 19.4% were freelancers, 7.5% belonged to the category “military members, government employees and teachers”, 4.5% were housekeepers, and 11.4% were “other”. A total of 80.1% of our respondents belonged to the “senior high school/vocational school” and “college” categories. The respondents had varying levels of monthly income and were of various ages. All respondents had sufficient experience using mobile instant messaging. That is, 85.6% of our respondents used mobile instant messaging several times daily, and 62.6% of our respondents had used mobile instant messaging for more than one year.

3.2. Measures

All the measures are adapted from established scales to suit the context of using mobile instant messaging for social interaction. The items for measuring text-messaging are adapted from Mahatanankoon (2007). The items are: “I send text messages to my friends and family using my mobile phone”, “I receive text messages from my friends and family via mobile instant messaging”, “I use text messaging a lot when communicating with my friends via mobile instant messaging”. Emoticon use is measured referring to items developed by Huang et al. (2008). The items are: “When I use mobile instant messaging to communicate, I use a great deal of emoticons to represent my feelings or emotions”; “When my

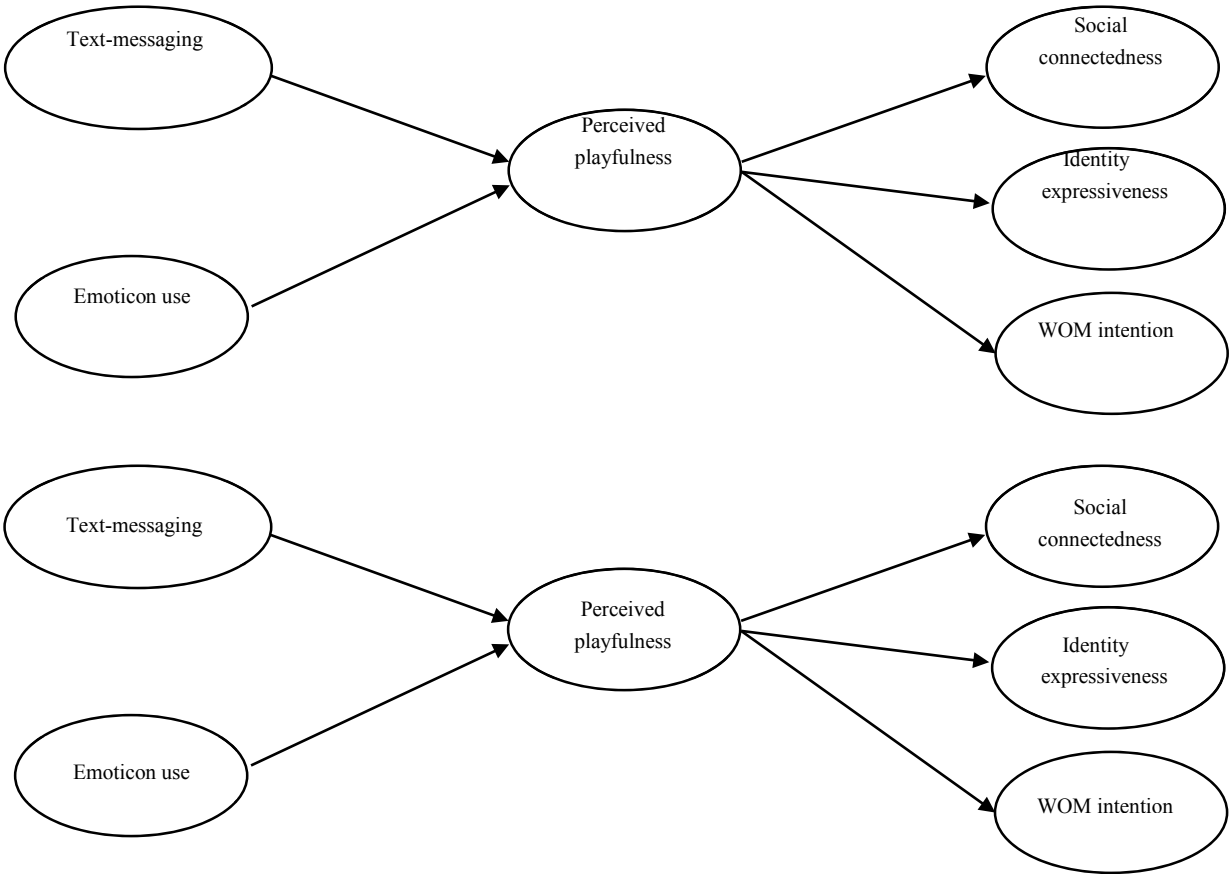

Fig. 1. Research framework.

friends use mobile instant messaging to communicate with me, they often use emoticons to represent their feelings or emotions"; "Emoticon conveys more than just text, other information cues are also conveyed." The items for measuring perceived playfulness are adapted from Cheong and Park (2005). The items are: "When interacting with others using mobile instant messaging, I do not realize the time elapse"; "I feel good when interacting with others using mobile instant messaging"; "It is fun to interact with others using mobile instant messaging". WOM intention is measured referring to the scale developed by Goodwin and Ross (1992) and Hartline and Jones (1996). The items are "How likely are you to spread positive WOM about using mobile instant messaging?"; "I would recommend using mobile instant messaging to my friends"; "If my friends were looking for communication apps, I would tell them to try mobile instant messaging". The items for measuring social connectedness are adapted from Lin, Gregor, and Ewing (2008), the items are: "I am able to relate to my friends on mobile instant messaging"; "I am able to connect with the people that use mobile instant messaging"; "I see my mobile instant messaging friends as friendly and approachable". Identity expressiveness is measured referring to the items used by Pagani, Hofacker, and Goldsmith (2011), the items are: "Using mobile instant messaging is part of how I express my personality"; "I use mobile instant messaging to express my personal values"; "I often talk to others about mobile instant messaging"; "Other people are often impressed by the way I use mobile instant messaging". Since respondents who have more Internet experience tend to use mobile instant messaging apps for social interaction, Internet experience is used as a control construct. Internet experience is measured using the items developed by Cheong and Park (2005), the items are: "I think that I am familiar with the Internet"; "I spend many hours using the Internet" and "I frequently use the Internet". All the constructs were measured using three items except identity expressiveness, which was measured using four items. All of the item responses used seven-point Likert scales.

3.3. Analytical methods

The two-step approach (e.g., Anderson & Gerbing, 1988) is conducted to empirically examine the research hypotheses. The first step is to examine the model fit for the measurement model and to assess reliability, convergent validity, and discriminant validity by using confirmatory factor analysis (CFA). The fit indices included the chi-square statistic with the *p*-value, RMSEA, SRMR, CFI, and NNFI. The criteria of 'RMSEA <0.08' (Hair, Black, Babin, & Anderson, 2010, p. 667), "SRMR <0.10" (Hair et al., 2010, p. 668), "NNFI $\geq$0.9" (Bentler & Bonett, 1980, p. 600), and "CFI $\geq$0.9" (Hair et al., 2010, p. 669) are recommended. Composite reliability (CR) is used as a reliability index. The threshold of "CR $\geq$ 0.7" is recommended (Hair et al., 2010, p. 710). Coefficient alpha (i.e., Cronbach's α), which is the most commonly used internal consistency reliability coefficient, is also used to assess scale reliability (Peterson, 1994). The recommended coefficient alpha level is 0.7 or higher (Nunnally, 1978). Convergent validity is supported if all the factor loadings are significant (Anderson & Gerbing, 1988). Discriminant validity is supported if the confidence interval ($\pm$two standard errors) around the correlation estimate between the two constructs does not include 1.0 (Anderson & Gerbing, 1988).

Table 1
Sample characteristics.

Variable	Level	Count	Proportion (%)
Gender	Male	73	36.3
	Female	128	63.7
Job	Students	27	13.4
	Office workers	88	43.8
	Free lancers	39	19.4
	Military men, government employees, and teachers	15	7.5
	Housekeepers	9	4.5
	Other category	23	11.4
Education	Junior high School and below	12	6.0
	Vocational or senior high school	70	34.8
	College	91	45.3
	Graduate school and above	28	13.9
Monthly income	10,000 and below	32	15.9
	10,001–20,0000	31	15.4
	20,001–30,0000	68	33.8
	30,001–50,0000	41	20.4
	50,001–70,0000	20	10.0
	Above 70,000	9	4.5
Age	20 and below	8	4.0
	21–30	50	24.9
	31–40	58	28.9
	41–50	64	31.8
	Above 50	21	10.4
Frequency of using mobile instant messaging	Several times a day	172	85.6
	Once a day	16	8.0
	Five times a week	8	4.0
	Three times a week	2	1.0
	Once a week	1	0.5
	Once more than a week	2	0.9
Duration of using mobile instant messaging	One month and below	3	1.5
	One to three months	11	5.5
	Four to six months	25	12.4
	Seven to nine months	16	8.0
	Ten months to one year	20	10.0
	More than one year	126	62.6

Note: Sample size is 201.

Alternatively, average variance extracted (AVE) estimates (Fornell & Larcker, 1981) were calculated for the constructs. Discriminant validity is achieved if both AVE estimates of a given pair of constructs are greater than the square of the construct correlation. The second step is to test the hypotheses using structural equation modeling (SEM). The paths of the control construct on the endogenous constructs are included in SEM.

4. Results

4.1. Measurement model

The CFA results are reported in Tables 2 and 3. Model fit was found to be acceptable ($\chi^2 = 407.16$, $df = 188$, $p < 0.001$, $\chi^2/df = 2.17$; CFI = 0.97; NNFI = 0.97; RMSEA = 0.08; SRMR = 0.06). All constructs are significantly converged ($p < 0.001$). Furthermore, as shown in Table 2, the squares of the estimates of the correlation coefficients are smaller than the corresponding AVE estimates for all pairs of constructs, and none of the 95% confidence intervals for the construct correlations includes one. Therefore, discriminant validity is achieved. Reliabilities for constructs are all acceptable. The alpha coefficients and CR estimates for text-messaging ($\alpha = 0.83$, CR = 0.84), emoticon use ($\alpha = 0.75$, CR = 0.77), perceived playfulness ($\alpha = 0.89$, CR = 0.91), WOM intention ($\alpha = 0.93$, CR = 0.93), social connectedness ($\alpha = 0.88$, CR = 0.88), identity expressiveness ($\alpha = 0.87$, CR = 0.87), and Internet experience ($\alpha = 0.86$, CR = 0.86) are all greater than 0.70, which indicates acceptable reliability.

Common method variance (CMV) is examined because the data collected in this study are self-reported. Harman's single factor test was implemented using CFA, whereby all of the items were modeled as indicators of a single factor that represents the common method (e.g., Mossholder, Bennett, Kemery, & Wesolowski, 1998). CMV is substantial if the hypothesized model fits the data well. The resulting poor fit ($\chi^2 = 1587.15$, $df = 209$, $p < 0.001$, $\chi^2/df = 7.59$; CFI = 0.86; NNFI = 0.85; RMSEA = 0.18; SRMR = 0.12) indicates no severe CMV problem.

4.2. Structural model

Analytical results of the structural model by using SEM are reported in Table 4. Model fit is acceptable ($\chi^2 = 499.75$, $df = 197$, $p < 0.001$, $\chi^2/df = 2.54$; CFI = 0.97; NNFI = 0.96; RMSEA = 0.08; SRMR = 0.07). All the path coefficients in the conceptual model are significant. Specifically, text-messaging positively influences perceived playfulness, which supports H1. Emoticon use positively influences perceived playfulness, which supports H2. Perceived playfulness positively influences social connectedness (H3), identity expressiveness (H4) and WOM intention (H5). Therefore, all the hypotheses are supported by the data. Also, the effects of control construct on endogenous constructs are examined. Internet experience positively influences identity expressiveness ($\gamma = 0.14$, t = 2.28), but have no influence on perceived playfulness ($\gamma = -0.05$, t = −0.79), social connectedness ($\gamma = -0.02$, t = −0.31), and WOM intention ($\gamma = -0.02$, t = −0.42).

A competing model analysis is conducted to examine whether the effect of emoticon use on perceived playfulness and the effect of text-messaging on perceived playfulness is comparable. A

Table 2
Examining convergent validity.

Item	Factor loading	T-value
Text-messaging		
I send text messages to my friends and family using my mobile phone.	0.83	13.56
I receive text messages from my friends and family via mobile instant messaging.	0.88	14.88
I use text messaging a lot when communicating with my friends via mobile instant messaging.	0.69	10.68
Emoticon use		
When I use mobile instant messaging to communicate, I use a great deal of emoticons to represent my feelings or emotions.	0.72	10.72
When my friends use mobile instant messaging to communicate with me, they often use emoticons to represent their feelings or emotions.	0.80	12.25
Emoticons convey more than just text: other information cues are also conveyed.	0.66	9.68
Perceived playfulness		
When interacting with others using mobile instant messaging, I do not realize the time elapse.	0.71	11.52
I feel good when interacting with others using mobile instant messaging.	0.93	17.15
It is fun to interact with others using mobile instant messaging.	0.96	18.29
WOM intention		
How likely are you to spread positive WOM about using mobile instant messaging?	0.85	14.82
I would recommend using mobile instant messaging to my friends.	0.97	18.45
If my friends were looking for communication apps, I would tell them to try mobile instant messaging.	0.90	16.28
Social connectedness		
I am able to relate to my friends on mobile instant messaging.	0.89	15.57
I am able to connect with the people that use mobile instant messaging.	0.79	13.08
I see my mobile instant messaging friends as friendly and approachable.	0.83	14.06
Identity expressiveness		
Using mobile instant messaging is part of how I express my personality.	0.79	12.91
I use mobile instant messaging to express my personal values.	0.81	13.49
I often talk to others about mobile instant messaging.	0.84	14.14
Other people are often impressed by the way I use mobile instant messaging.	0.70	10.94
Internet experience		
I think that I am familiar with the internet.	0.71	11.10
I spend many hours using the internet.	0.94	10.00
I frequently use the internet.	0.80	12.92

Note: Standardized loadings are reported. All factor loadings are significant at $p < 0.001$.

Table 3
Correlation matrix and descriptive statistics of the constructs.

Construct	1	2	3	4	5	6
1.Text-messaging	**0.65**					
2. Emoticon use	0.62 (0.06)	**0.53**				
3. Perceived playfulness	0.60 (0.05)	0.63 (0.06)	**0.76**			
4. Social connectedness	0.50 (0.06)	0.63 (0.06)	0.83 (0.03)	**0.70**		
5. Identity expressiveness	0.31 (0.07)	0.63 (0.06)	0.69 (0.04)	0.75 (0.04)	**0.62**	
6. WOM intention	0.59 (0.05)	0.56 (0.06)	0.80 (0.03)	0.76 (0.04)	0.64 (0.05)	**0.82**
Mean	5.94	5.56	5.36	5.31	5.54	5.02
SD	0.75	0.89	0.97	0.97	1.07	1.10

Note: The values on the diagonal (in bold) are average variance extracted (AVE) estimates. The values in the parentheses are standard errors.

Table 4
Structural model estimates.

Hypothesized relationship	Estimate	T value	Conclusion
H1 Text-messaging → Perceived playfulness (+)	0.33^{***}	3.63	Supported
H2 Emoticon use → Perceived playfulness (+)	0.45^{***}	4.35	Supported
H3 Perceived playfulness → Social connectedness (+)	0.86^{***}	10.83	Supported
H4 Perceived playfulness → Identity expressiveness (+)	0.70^{***}	8.44	Supported
H5 Perceived playfulness → WOM intention (+)	0.83^{***}	10.26	Supported

Note: $^{***}p < 0.001$.

competing model is constructed in which the two path coefficients in the original model (i.e., the effect of emoticon use on perceived playfulness and the effect of text-messaging on perceived playfulness) are set equal. The model fit of the competing model is compared to the model fit of the original model. The results indicated that the effects of emoticon use and text-messaging on perceived playfulness are not significantly different (the chi-square difference with one degree of freedom was 1.16 ($p = 0.28$)). Hence, the result justifies that text-messaging and emoticon plays equally important role in facilitating perceived playfulness in the interaction of mobile instant messaging.

5. Discussion

5.1. Major findings

This research examined the significant role of perceived playfulness in mobile instant messaging and its effect on social interaction. Playfulness, which may play a fundamental part in social relationships, receives relatively little attention in the mobile communications literature. Thus, this research aimed to fill a research gap. Drawing from media richness theory (Daft & Lengel, 1984), present research highlights that social interaction factors can

be facilitated by an enriched communication channel to enable users to build closer interpersonal social relationships. It is found that text messaging with friends in mobile instant messaging facilitates perceived playfulness. Emoticon use in mobile instant messaging also facilitates perceived playfulness. In addition, the perceived playfulness derived from adopting emoticon use and text messaging in turn drives social connectedness, identity expressiveness and word-of-mouth intention. In sum, our result contributes to show that text messaging and emoticon use work together in mobile instant messaging to facilitate the establishment of perceived playfulness among users, which leads to a strengthened social connectedness, enhanced identity expressiveness and increased advocacy intention among friends to use mobile instant messaging. The implications of these findings for academic research and practitioners are discussed below.

5.2. Theoretical implications

The academic implications of this study are threefold. First, although instant messaging has received substantial academic attention, our understanding of the underlying psychological factors that drive the pervasive use of mobile instant messaging remains limited. The social interaction approach of present research, which highlights perceived playfulness fostered by mobile instant messaging, complements previous researches that studied instant messaging from task relevant or functional perspective. Playfulness, which may play a vital role in social relationships, has been neglected in previous mobile communications studies. Playfulness is generally associated with children and correlated with creativity, sense of humor, curiosity, pleasure and spontaneity (Guitard et al., 2005). This study shows that the media richness of the mobile instant messaging platform enables adults to experience playfulness and fun in online chatting. This outcome enriches the research on mobile instant messaging and extends our knowledge of the underlying factors that drive user stickiness in mobile instant messaging.

Second, previous studies examine the use of emoticons and text messaging separately (e.g., Huang et al., 2008; Mahatanankoon, 2007). This study contributes to the literature by examining the combined effects of emoticon use and text messaging, thus adopting a more comprehensive perspective. Two paths are identified by which mobile instant messaging facilitates the establishment of perceived playfulness. One is driven by close to real-time text communication, which enables users to use jokes and humor and to poke fun in the instant-messaging conversational threads, which fosters the fun and playfulness that individuals create with one another. This phenomenon can be viewed as a text-messaging path that resembles the verbal mode. The other path is driven by emoticons, which are non-verbal graphical indicators of emotion. Emoticon use enables individuals to display rich social cues, a dimension that is otherwise lacking in the computer-mediated environment. The emoticon images often represent appealing characters and humorous gestures, thus complementing text messaging in mobile instant messaging to foster perceived playfulness and fun in the interactive communication process. The results of the competing model analysis in the study further indicate that emoticon use and text-messaging plays equivalent role in facilitating perceived playfulness. Which provides further evidence to illustrate the combined effects of text messaging and emoticon use facilitates perceived playfulness of social interaction in mobile instant messaging.

Third, the findings of this study are in line with those from Huang et al. (2008)'s study, which indicated that emoticon use in instant messaging is positively related to enjoyment and personal interaction. However, this study complements their study by revealing that the combined use of text messaging and emoticons results in fun and perceived playfulness, which in turn not only facilitates social connectedness but also promotes identity expressiveness by enabling users to send nonverbal messages to more clearly express their emotions in CMC. It has often been assumed that due to a lack of social cues and nonverbal behavior, computer- mediated communication is less social (Rutter, 1987). If CMC filters out social cues, it is likely that it creates psychological distance (Rutter, 1987). Our study extends this view. That is, the richness of informational and emotional cues that results from combining text messaging and emoticon use creates perceived playfulness that not only decreases psychological distance but also can enhance social connectedness. Additionally, our results show that the fun and perceived playfulness experienced in mobile instant messaging facilitates advocacy and word of mouth among networking circles to join in using mobile instant messaging.

In sum, this study reveals that social interaction can be fostered in mobile instant messaging through a verbal path and a non-verbal graphical path. Perceived playfulness, which is driven verbally (i.e., text messaging) and non-verbally (i.e., emoticon use) in mobile instant messaging, plays a central role in facilitating social relationships. Our results indicate that perceived playfulness is made manifest through the combined effect of emoticon use and text messaging. The findings accentuate that social interaction factors can be facilitated by the enriched communication channel to enable users to build closer interpersonal social relationship. In addition, the use of emoticons and text messaging can enhance social connectedness and promote opportunities for self-expression. This study contributes to the literature by highlighting the significant role of perceived playfulness in strengthening interpersonal connections in mobile instant messaging, which may be the key underlying factor that drives user stickiness in instant messaging.

5.3. Managerial implications

The present research provides rich managerial implications. First, it explains why certain mobile instant messaging companies have become highly prevalent and experienced substantial growth. Our results indicate that fun and perceived playfulness play a potent role in driving popularity. Thus, our findings indicate that the success of mobile instant messaging apps depends on whether they enable users to experience fun and enjoyment when interacting with friends using text messaging and emoticons. Therefore, practitioners should seek to increase the fun and playfulness of the mobile instant messaging platform, such as by providing games, riddles, jokes and videos that users can exchange with their friends. Such entertaining content can provide topics for users to chat about, which increases the opportunity to use text messaging and emoticons in social interaction, thus further reinforcing perceived playfulness. Second, practitioners should design a wide variety of emoticons for users to choose from. Designers should create emoticons that are rich in emotional expression and incorporate humorous elements. The success of Line mobile instant messaging is a good example because its popularity is based on its large collection of emoticons. Other mobile instant messaging apps provide relatively fewer emoticon choices. Third, this research indicates that the use of text messaging and emoticons facilitates identity self-expression. Thus, another practical suggestion is for designers to create apps that enable individuals to design their own emoticons. Enabling individuals to design emoticons not only helps them express their emotions more accurately than ready-made emoticons but also provides enjoyment through the custom design process. Previous research indicates that consumers enjoy engaging in easily performed creative projects (Dahl & Moreau, 2007). Therefore, companies can design apps that provide easy

functions to customize self-design emoticon. Enabling individuals to design their own emoticons will satisfy the need for identity expressiveness and likely enhance playfulness, which will result in further use.

5.4. Limitations and future research

Present study calls attention to examine perceived playfulness in mobile instant messaging and its effect on social interaction. Future research can investigate other factors that may influence playfulness and the consequent effect on social interaction. In addition, due to the wide variety of emoticons in terms of characters and expressions, future studies can explore in more details the effects of various types of emoticon in driving playfulness. The limitations of this study have to be noted. First, future research may benefit from extending the sampling methods to capture a larger sample size and cover a more diverse population of respondents. Second, the individual personality factors that influence the adoption of emoticon use and the sense of enjoyment experienced in mobile instant messaging are not examined in this study. Thus, future studies can examine the moderating role of personality factors that clearly affect the adoption of emoticon use and text messaging to facilitate playfulness and enjoyment in social interaction. Third, this study is cross-sectional. Future researchers can consider conducting a longitudinal study to examine individuals' evolving behavior in mobile instant messaging over an extended time period.

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