An Empirical Study of the Usage Performance of Mobile Emoticons : Applying to the Five Construct Model by Huang et al.

Se Hun Lim* · Daekil Kim** · Sean Watts***

Abstract

Emoticons perform an important role as an enhancement to written communication, in areas such as Windows Live Messenger instant messaging, e-mails, mobile Short Message Services (SMS), and others. Emoticons are graphic images used in communications to indicate the feelings of people exchanging messages via mobile technology. In this research, the perceived usefulness of the emoticon in mobile phone text messages is verified with consumers using the five construct model of Huang. A K-means clustering technique for separating three groups based on levels of perceived usefulness of mobile emoticons is used with a structural equation model test using Smart PLS 2.0, and the bootstrap re-sampling procedure. We analyzed relationships among use of emoticons, enjoyment, interaction, information richness, and perceived usefulness. The results show there are relationships among use of emoticons, enjoyment, interaction, perceived usefulness, and information richness, however enjoyment of emoticons did not significantly affect the perceived usefulness of messages with emoticons alone. The results suggest emoticons have different affects on emotion in both mobile, and Messenger contexts. Our study did not consider more detailed media properties, and thus more studies are needed. Our research results contribute to mobile communication activation, provides companies with an understanding of key characteristics of consumers who use emoticons, and provides useful implications for improving management and marketing strategies.

Keywords : Mobile Context, Emoticon, Perceived Usefulness, Interaction, Usage, Short Message

1. Introduction

With the development of information technology and communication (ITC), came development and use of telephones and computers, and now mobile communications play a major role in individual communications [Turel, Serenko, and Bontis, 2007; Turel and Serenko, 2006]. Today, many cell phone users express their thoughts and ideas through text messages [Turel and Serenko, 2006]. Some of these people use emoticons along with these text messages. The reason for adoption of emoticons often relates to the individual characteristics of the cell phone users. For example, some are not adept at using mobile text messaging, so they do not use emoticons; others do not add emoticons to their messages simply because it takes more time to do so. Nevertheless, people of all ages are increasingly adding emoticons to their text messages. The reason for the increased use of emoticons is that their use improves the efficiency of communications by allowing senders to express feelings more vividly than can be done through words alone, whether they feel sad, happy, or some other feeling [Huang et al., 2008].

Current research on the use of emoticons has focused primarily on channels such as e-mails, chat rooms, and internet based instant message level studies [Huang et al., 2008]. These studies have found that the use of emoticons provides interest during communications and thus enhances the efficiency of the message. Using emoticons in e-mail communications is helpful to add the same sense of human warmth and emotion that is experienced in typical face-to-face communications [Blake, 1999; Mackiewicz, 2003].

Emoticons are increasingly used in mobile phone and comparable device text messages. As new devices, such as small computers, are being used in place of traditional mobile phones, "cell phones," "mobile phones," and "mobile communication devices" are used in this article interchangeably. Unfortunately, there is a lack of current research related to emoticon use in mobile phone text messages [Turel, Serenko, and Bontis, 2007; Turel and Serenko, 2006].

The use of emoticons in the mobile communications' environment is becoming a very important area of research because their use is becoming increasingly important as an aid to this form of communication. Thus, more research on the use of emoticons in mobile phone text messages is needed as it will offer greater insight into how the perceived usefulness of wireless communications may be enhanced, particularly since their use is becoming so ubiquitous in today's society. Accordingly, this study focuses on the perceived usefulness of emoticons in the mobile communications' environment. This study followed Huang, Yen, and Zhang's [2008] the five-construct model, which measured the perceived usefulness of emoticons in instant messages and analyzed the relationships among many factors involved in the mobile communications' environment, such as the actual use of emoticons, perceived usefulness, enjoyment, interaction, and richness of information conveyed.

Specifically, this current study focuses on the perceived usefulness of emoticons in the mobile communications context. In this case, the in-

creased perceived usefulness promoted the adoption and use of mobile emoticons. According to Davis [1989], the Technology Acceptance Model (TAM) is composed of three factors, being the perceived ease of use, the perceived usefulness, and intention to adopt IT. The perceived usefulness was identified as the most important factor in IT adoption studies [Venkatesh and Davis, 2003].

Recently, studies absout continuous use of IT, in both the Expectation-Confirmation Model (ECM), and IT Adoption Research applying ECM, treated 'perceived usefulness' as an important factor in adoption and usage of technology [Bhattacherjee, 2001; Kim et al., 2009; Yang, Whang, 2009; Lee, Yang, 2009; Jang, Kim, 2005]. Following these studies, our model analyzed the impact of 'perceived usefulness.' Specifically for obtaining detailed information on consumer behavior related to usage of emoticons, we analyzed three levels of the perceived usefulness of emoticons in mobile communications.

The research results will likely contribute to greater use of mobile communication media. Moreover, it may also provide organizations with a better understanding of the character-istics of general users, and consumers who use emoticons, and offer useful implications for creating better management and marketing strategies.

This study is composed of five chapters. The first chapter is about the purpose and necessity of the use of emoticons in communications. The second chapter analyzes previous studies and develops five research hypotheses. The third chapter describes our research model. The fourth chapter discusses the empirical results of the study and describes the analysis process, which utilized a Partial Least Squares (PLS) approach. The final chapter focuses on the research implications, limitations, and offers direction for future studies.

2. Literature Review of Emoticon

Ever since electronic communication has come into widespread use, emoticons have often been used to convey and underscore emotions as a communication method [Blake, 1999; Mackiewicz, 2003; Derks et al., 2007; Derks, et al., 2008; Wolf, 2000]. <Table 1> provides examples of emoticons that are in current usage.

Emoticons are used in e-mails, chat rooms,

〈Table 1〉 Various Emoticons

""".!!.*"""*)) "*..LOVE..*" ((*.*"!!"*.*))	.....◖┴┴┐ ~~ . ㅐ ▣▫☑☑¦ ♪ ★==●●●33	┌──♪E■♫┐ │ ┣(^0^)(^0^)/ ┣┴♫┘ ┗┴ ┤ ┗⊙────⊙⊙┘
😳 Cannot send messages >_<+ 😖 Did you get messages? -o-/ 😔 Ignored. @_@"	😊 Sent messages ^.^= 😡 Messages would come. n.n" 😐 No messages _._%	(*^--------^*) Big smile~~ (~.^) Wink~ ☞◊◊☜ Wash your hand

Source : http://www.nate.com and http://blog.paran.com/sosara/7361803.

Windows Live Messenger, mobile phone text messages, and other wireless formats. Each communication method has its own unique character.

E-mail has been a popular communication tool used to convey information in a closed environment from one person to another or from one person to many people, and these messages use various characters and emoticons. Chatting, or "a chat room," is also a communication tool used in both closed and opened environments. By chatting, it is possible to transfer messages in real-time to others by the use of various short or even longer messages with emoticons.

Windows Live Messenger is a more limited communication tool than chatting, but also conveys brief messages. It is commonly used to send instant messages, with emoticons, between people signed on to the same Messenger group [Huang et al., 2008; Deng et al., 2009; Turel, Serenko, and Bontis, 2007; Lee, 1994].

Mobile communications' text messages are becoming increasingly popular as a communication tool, often compared to e-mail, chats, and Messenger [Turel, Serenko, and Bontis, 2007]. Mobile phone messages are comparable to e-mail, chats, or Windows Messenger, since they communicate via brief instant messages, with abbreviated spellings of words and emoticons, in a closed environment.

When mobile phone text messages are compared to Messenger instant messages, the mobile phone text message method is best for communicating brief and clear messages in real time, is the method most commonly used in companies, and has become most popular as a real-time communication tool. Moreover, the use of emoticons in mobile phone text messages is becoming quite common and widespread. According to recent developments in IT research summarized below, emoticons are used not only with text-based forms of Short Message Services (SMS), but also with graphic-based forms of Multimedia Messaging Services (MMS). Thus, the purpose of this study is to verify the perceived usefulness of the emoticons as a communication tool in the mobile environment.

More research on the use or the perceived usefulness of emoticons is needed [Wolf, 2000; Rivera, Cooke, and Bauhs, 1996; Huang et al. 2008]. According to <Table 2>, which presents a review of existing studies related to mobile data services, very few studies have focused on emoticons use in sending mobile phone text messages [Derks et al., 2007; Turel et al., 2007]. Until recently, most of the studies related to communication in mobile environments have been about text message exchanges, mobile data services, and wireless internet service satisfaction [Deng, et al., 2009; Turel and Serenko, 2008; Okazaki, 2006; Lu et al., 2008].

Furthermore, previous studies related to the use of emoticons have been based on e-mails and Live Messenger [Rivera et al., 1996; Huang et al., 2008; Derks et al., 2007; Walther and Addario, 2001]. Therefore, the impact and effect of emoticons, when added to text messages in mobile communication's environments, should be further explored and studied. The study results could provide very valuable information that would enhance the perceived usefulness of real-time communication.

〈Table 2〉 Research about Emoticons and Mobile Messages

Researchers	Research Method	Contents
Rivera et al. [1996]	Empirical Analysis	Emotional icon effectiveness in remote communication
Huang et al. [2008]	Empirical Analysis	Research about the perceived usefulness of Live Messenger emoticons in communication
Derks et al. [2007]	Empirical Analysis	Analysis of relationships between emoticons and social interaction on the internet
Walther and Addario [2001]	Empirical Analysis	Research on the influence of emoticons in communication via computers
Derks et al. [2008]	Empirical Analysis	Analysis of emoticons and online messages
Turel and Serenko, [2006]	Empirica study	Research about factors that influence satisfaction with wireless service in Canada
Okazaki [2006]	Empirica study	Research about wireless internet adoption
Lu et al. [2008]	Empirica study	Research about adoption of mobile data services
Turel, Serenko and Bontis [2007]	Empirica study	Research about adoption of wireless internet simple message services
Deng et al. [2009]	Empirica study	Research about mobile instant message user satisfaction

3. Research Model and Hypothesis

3.1 Research Model

The purpose of this study was to examine and verify the impact of perceived usefulness of emoticons in mobile message exchanges. This study is based on the five-construct model of Huang et al. [2008], which used and applied TAM and MRT to verify the perceived usefulness of the emoticons in Messenger instant messages. This current study analyzed relationships among the following factors in mobile communications: use of emoticons, enjoyment, interaction, information richness, and perceived usefulness (see <Figure 1>) and analyzed the three levels of the perceived usefulness of the mobile emoticons.

〈Figure 1〉 Research Model

3.2 Research Hypothesis

This study is about the use of emoticons to express emotions while sending text messages in a mobile communications' environment. Based on the current rapid increase in wireless communication services, and their ubiquity in this environment, this study will provide important information for companies, especially those needing improved communication, such as in global business, and those that promote mobile businesses. The results could serve to strengthen communications, either from company to company or person to person, via wireless text messages that include the use of emoticons. Therefore, this study suggests five research hypotheses to verify the perceived usefulness of emoticons in the mobile environment.

First of all, user experiences play a very important role in technology adoption. Above all, enjoyment promotes technology adoption [Webster and Martocchio, 1992; Agarwal and Karahanna, 2002]. First of all, user experiences play a very important role in technology adoption. Above all, enjoyment promotes technology adoption [Webster and Martocchio, 1992; Agarwal and Karahanna, 2002]. Recently, mobile phones have enhanced users' enjoyment by providing both text- and graphic-based emoticons for use in communications [Li, Chua, and Hao, 2008; Huang et al., 2008].

Once emoticons usage is shown to be effective, users will increase their use of emoticons [Huang et al., 2008]. In various studies related to the TAM, the perceived usefulness of a given technology device will strengthen the intention to use that technology [Davis, 1989]. A recent study suggests that perceived usefulness strengthens technology adoption in various fields of IT, such as web sites and mobile environments [King and He, 2006; Hassanein and Head, 2007; Schepers and Wetzels, 2007].

Huang et al., [2008] analyzed relationships in the use of emoticons in Instant Messages based on the following factors : the use of emoticons, enjoyment, interaction, perceived usefulness, and richness of information. Accordingly, the present study suggests that the use of emoticons in a mobile communications' environment will positively influence enjoyment; enjoyment will positively influence interaction; and interaction will positively influence information richness and perceived usefulness.

According to the Media Richness Theory (MRT), abundant communication media strengthens the message. For example, when we communicate with others using various facial expressions, body language, and tones, the effect of our communication is better than when we just use words without adding these nonverbal signals. Likewise, when people communicate with each other online by adding various emoticons, graphics, or sounds, the effect of their communication is greater than if they just sent simple messages in text alone [Daft and Lengel, 1985; Otondo, Van Scotter, Allen, and Palvia, 2008; Kishi, 2008; Lee, 1994]. Therefore, it is likely that the use of emoticons in mobile communications environments will enhance those communications as well.

Moreover, mobile text messaging supports increased activation of personal communication through mutual text message exchanges. The

sender can express his/her emotions with emo-
ticons to the receiver in a mobile text message,
which allows the receiver to form a greater
sense of intimacy with the sender. The receiver
then responds to the message with similar use
of emoticons.

According to Leung's [2002] study, using emo-
ticons in Messenger would be a good method
to more fully express one's emotions. Moreover,
according to the five construct model by Huang
et al. [2008], the use of emoticons in Messenger
contributed to an increase in the perceived use-
fulness of the communications. Therefore, in this
study, the use of emoticons in mobile phone and
related communications would likewise streng-
then the perceived usefulness of communica-
tions. This study established the following five
hypotheses according to Huang et al. [2008] and
prior studies.

- [H1] The use of emoticons in mobile text
  message exchanges will positively af-
  fect enjoyment.
- [H2] The enjoyment from the use of emoti-
  cons in mobile text message exchanges
  will positively serve to increase inte-
  raction.
- [H3] The enjoyment from the use of emoti-
  cons in mobile text message exchanges
  will positively affect the perceived use-
  fulness of the mobile communications.
- [H4] The interaction with the use of emoti-
  cons in mobile text message exchanges
  will positively affect information rich-
  ness.
- [H5] The interaction with the use of emoti-

cons in mobile text message exchanges
will positively affect the perceived use-
fulness of the mobile communications.

Davis [1989] developed TAM based on the
Theory of Reasoned Action (TRA) and the Theory
of Planned Behavior (TPB) [Ajzen, 1988; Ajzen
and Fishbein, 1980; Fishbein and Ajzen, 1975].
TAM explained and predicted the intention to
adopt IT using perceived ease of use and per-
ceived usefulness. In IT adoption studies, the
perceived usefulness is an important factor for
explaining and predicting IT usage and intention
to adopt IT. Therefore, in this study, we ana-
lyzed relationships among the use of emoticons,
interaction, enjoyment, and information richness
using Structural Equation Model (SEM).

4. Measurement and Survey

4.1 Measurement

In this study, we conducted measurements,
based on previous studies that measured the
perceived usefulness of emoticons in mobile
phone text messages. The factors considered in
this study include use of emoticons, enjoyment,
interaction, information richness, and perceived
usefulness. We modified Huang et al.'s [2008]
measurements, which considered emoticon per-
ceived usefulness in instant messages and re-
ferred to previous studies related to mobile data
services [Turel et al., 2007]. Our "variables" and
"definitions" of our measurements are pre-
sented in <Table 3> and additional research
"Measurement Definitions and Details" are at-
tached in [Appendix 1].

〈Table 3〉 Definitions and Details of Measurement Variables

Variables	Definitions	Items
Use of Emoticons (EU)	The use of emoticons in mobile communications to provide feelings or emotions	[EU1], [EU2], [EU3]
Enjoyment (E)	Enjoyment refers to pleasure or satisfaction with communication, using mobile emoticons.	[E1], [E2]
Interaction (I)	Interaction refers to levels of communications between users of mobile emoticons	[I1], [I2], [I3]
Information Richness (IR)	The information richness refers to the value of various expressions provided by emoticons in mobile communications	[IR1], [IR2], [IR3].
Perceived Usefulness (PU)	According to Davis [1989] and Venkatesh et al. [2003], the perceived usefulness affected intention to use and adopt IT. In this study, the perceived usefulness in mobile phone text messages expresses a sense of accomplishment obtained from communication.	[PU1], [PU2]

4.2 Survey Process

To empirically explore the effect of the use of emoticons on text message, before conducting the main survey, the measurement items were reviewed by seven panels, consisting of management information systems professors, instructors, and Ph.D. students. The survey was conducted in November, 2009. A total number of 308 surveys were sent, and 205 of the surveys were returned. The usable responses from 205 were 188, indicating that the valid response rate was 61%. The survey consisted of questions based on a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree). All statistical analyses were conducted by using SPSS 12.0 and SMART PLS 2.0 in this study.

5. Empirical Results

5.1 Basic Statistical Analysis

Of 188 survey respondents, they were classified by age, gender, university year (grade level),daily internet usage, and average monthly cost of mobile phone service. Details are shown in 〈Table 4〉.

〈Table 4〉 Classification of Survey Respondents

Items (Total = 188)	Frequency	Percent
Gender	Male (n = 104)	55.3%
	Female (n = 84)	44.7%
Age	Under 20 (n = 7)	3.7%
	20s (n = 181)	96.3%
Grade Level	First~year (n = 76)	40.4%
	Second~year (n = 47)	25.0%
	Third~year (n = 44)	23.4%
	Fourth~year (n = 22)	11.2%
Daily Internet Usage	Below 2 hour (n = 58)	30.9%
	2~4 hour (n = 90)	47.9%
	4~6 hour (n = 26)	13.8%
	Over 6 hour (n = 14)	7.4%
Average monthly cost	Below 20000 Won (n = 7)	3.7%
	20000~30000 Won (n = 33)	17.6%
	30000~40000 Won (n = 39)	20.7%
	Over 40000 Won (n = 109)	58%

〈Table 5〉 Composite Reliability and AVE

	AVE	Composite Reliability	Cronbachs Alpha	Communality
EU	0.793852	0.920296	0.869037	0.7938552
E	0.852368	0.920079	0.827143	0.852368
I	0.837735	0.939301	0.902638	0.837735
PU	0.842740	0.941440	0.907176	0.842940
IR	0.878001	0.935038	0.861055	0.878001

〈Table 6〉 Factor Analysis

	EU	E	I	PU	IR
EU1	0.905411				
EU2	0.944419				
EU3	0.818450				
PU1				0.936194	
PU2				0.9387840	
IR1					0.913064
IR2					0.922359
IR3					0.918579
I1			0.900347		
I2			0.952597		
I3			0.891705		
E1		0.930456			
E2		0.915962			

5.2 Validity and Reliability

Reliability of measurements were verified using a Composite Scale Reliability Index (CSRI) and Cronbach α based on Fornell, Larcker's work [1981] and Nunnally and Bernstein [1994], to achieve internal consistency of measurements. Convertgent validity exists when values of

〈Table 7〉 Correlation and Squares Root of AVE

	EU	E	I	PU	IR
EU	**0.890984***				
E	0.611416	**0.923238***			
I	0.595671	0.734439	**0.915279***		
PU	0.640400	0.566537	0.594111	**0.918009***	
IR	0.594163	0.577188	0.758330	0.635895	**0.937017***

*Squares Root of AVE : Diagonal Value.

measurement variables are over 0.7. Discriminant validity exists when Averaged Variance Extracted (AVE) square root values are higher than other correlation measuring variables [Barclay et al., 1995; Chin, 1998a; Chin, 1998b Fornell and Larcker, 1981]. Generally, the variables used in the study are confirmed to be sufficient based on the results of <Table 5> and <Table 6>, which exceed the suggested criteria values.

In order to examine the discriminate validity of the variables used in the study, correlation analysis was conducted. <Table 7> shows that all variables for our sample groups are less than 0.8, and thus were valid in the study. The square roots of AVE values are less than the other correlation values. Therefore, our variables satisfied the discriminate validity of our study.

5.3 Empirical Results of Structural Model

<Table 8> show the results of the structural equation model test using Smart PLS 2.0. This modeling has been employed to test the pro-

posed research model based on the sample groups. Test of significance for all paths were conducted using the bootstrap re-sampling procedure. Chin (1998a) mentioned that bootstrap re-sampling simulation times were from 100 times to 1000 times the PLS structural model. The results of the structural path analysis of the research model provide support of the five hypotheses. We simulated re-sampling procedure 1000 times for analyzing the sample groups. In terms of explanatory power of the model, R squares values PLS analysis for each endogenous variable was used to verify research hypotheses in this study [Hulland, 1999].

The analytical results of PLS showed that the use of emoticons is a determinant of enjoyment. Enjoyment is found to be a significant influence on interaction. Interaction is an influence on perceived usefulness. Interaction is found to be a significant influence on information richness. However, enjoyment is not found to be an influence on perceived usefulness, and its hypothesis [H3] has not been accepted.

〈Table 8〉 Results of Structural Model

Hypothesis	β	T-Statistics	% Explained in Variance*	Results
[H1] Emoticons usage → Enjoyment	0.611499	11.433257***	37.39%	Accept
[H2] Enjoyment → Interaction	0.734565	20.743527***	53.95%	Accept
[H3] Enjoyment → Perceived Usefulness	0.044066	0.638538	N/S	Reject
[H4] Interaction → Perceived Usefulness	0.725953	12.737229***	35.37%	Accept
[H5] Interaction → Information Richness	0.594789	11.055087***	57.59%	Accept

Note) 1. ***p-value < 0.001, **p-value < 0.01, *p-value < 0.05.
　　　2. N/S : Not Supported.
　　　3. *For example : [H5] Interaction is found to be a significant influence on information richness
　　　　 (p < 0.001***, t = 11.055087), and explains about 57.59% of the variance in information richness.

5.4 Analyzing the Three Levels of the Perceived Usefulness

As previously explained, we preformed a multi level analysis of the perceived usefulness of emoticons in the mobile context. First, we employed a K-means clustering technique for separating three groups based on levels of perceived usefulness of mobile emoticons. Details are shown in <Table 9>~<Table 11>.

〈Table 9〉 Initial Cluster Centers[1]

Items	Cluster 1	Cluster 2	Cluster 3
Perceived Usefulness 1	2	7	1
Perceived Usefulness 2	6	7	1

Note) First estimate of the variable means for each of the clusters.

〈Table 10〉 Iteration History[2]

Iteration	Change in Cluster Centers		
	Cluster 1	Cluster 2	Cluster 3
dimension 1	2.499	1.936	1.589
dimension 2	0.112	0.108	0.074
dimension 3	0	0	0

〈Table 11〉 Final Cluster Centers

Items	Cluster 1	Cluster 2	Cluster 3
Perceived Usefulness 1	4	5	2
Perceived Usefulness 2	4	6	2

Note) Final estimate of the variable means for each of the clusters.

The results of the K-means clustering of the three levels of perceived usefulness in mobile emoticons were as follows : high level of perceived usefulness (n = 63), mid level (n = 48), and low level (n = 77) as shown in <Table 12>. We performed an ANOVA test on the three groups of perceived usefulness of emoticons. The ANOVA results showed significant differences of the three groups of perceived usefulness as outlined in <Table 13>.[3]

〈Table 12〉 Number of Cases in each Cluster

	Cluster 1	77
Cluster	Cluster 2	63
	Cluster 3	48
	Valid	188
	Missing	0

〈Table 13〉 ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Perceived Usefulness 1	Between Groups	316.524	2	158.262	294.03	0.00
		99.577	185	0.538		
		416.101	187			
Perceived Usefulness 2	Between Groups	334.264	2	167.132	272.464	0.00
		113.481	185	0.613		
		447.745	187			

---

1) According to SPSS 18.0 solution help, "Initial cluster centers means first estimate of the variable means for each of the clusters. By default, a number of well-spaced cases equal to the number of clusters is selected from the data. Initial cluster centers are used for a first round of classification and are then updated."

2) Convergence achieved due to no or small change in cluster centers. The maximum absolute coordinate change for any center is .000. The current iteration is 3. The minimum distance between initial centers is 5.099.

3) According to SPSS 18.0 solution help, "ANOVA table appeared displays an analysis-of-variance table which includes univariate F tests for each clustering variable. The F tests are only descriptive and the resulting probabilities should not be interpreted. The ANOVA table is not displayed if all cases are assigned to a single cluster."

The SEM approach analysis of the three levels of perceived usefulness of emoticons are shown in <Table 14>~<Table 16>.

The 'low level' PLS results showed that the use of emoticons is a determinant of enjoyment at a level of significance of 0.001 (t = 11.874676), and explains about 19.19% of the variance in enjoyment. Enjoyment is a significant influence on interaction. Interaction is an influence on perceived usefulness. Interaction is a significant influence on information richness. However, the relationship between enjoyment and perceived usefulness was not supported.

The 'high level' PLS results showed that the use of emoticons affect enjoyment. Enjoyment is a significant influence on interaction. Interaction is an influence on perceived usefulness. Interaction is a significant influence on information richness. However, there was no support for a relationship between enjoyment and the perceived usefulness, and its hypothesis has accordingly not been supported.

The 'mid level' PLS results showed that the use of emoticons affect enjoyment at a level of significance of 0.001 (t = 14.273502), and explains about 23.60% of the variance in enjoyment. Enjoyment is found to be a significant influence on interaction. Interaction is an influence on the

〈Table 14〉 Results of Structural Model : Low Level of Perceived Usefulness

Hypothesis	β	T-Statistics	% Explained in Variance*	Results
[H1] Emoticons usage → Enjoyment	0.438080	11.874676***	19.19%	Accept
[H2] Enjoyment → Interaction	0.833236	52.984016***	69.43%	Accept
[H3] Enjoyment → Perceived Usefulness	−0.252396	3.724364***	N/S	N/S
[H4] Interaction → Perceived Usefulness	0.797671	17.081163***	36.45%	Accept
[H5] Interaction → Information Richness	0.582443	17.256048***	33.92%	Accept

Note) 1. ***p-value < 0.001, **p-value < 0.01, *p-value < 0.05.
      2. N/S : Not Supported.
      3. *For example : [H5] Interaction is found to be a significant influence on information richness.
         (p < 0.001***, t = 17.256048), and explains about 33.92% of the variance in information richness.

〈Table 15〉 Results of Structural Model : High Level of Perceived Usefulness

Hypothesis	β	T-Statistics	% Explained in Variance*	Results
[H1] Emoticons usage → Enjoyment	0.461426	12.923913***	21.29%	Accept
[H2] Enjoyment → Interaction	0.515342	18.878435***	25.56%	Accept
[H3] Enjoyment → Perceived Usefulness	−0.100098	2.558919***	N/S	N/S
[H4] Interaction → Perceived Usefulness	0.559777	15.161999***	26.56%.	Accept
[H5] Interaction → Information Richness	0.165553	3.467660***	20.27%	Accept

Note) 1. ***p-value < 0.001, **p-value < 0.01, *p-value < 0.05.
      2. N/S : Not Supported.
      3. *For example : [H5] Interaction is found to be a significant influence on information richness.
         (p < 0.001, t = 3.467660), and explains about 20.27% of the variance in information richness.

〈Table 16〉 Results of Structural Model : Mid Level of Perceived Usefulness

Hypothesis	β	T-Statistics	% Explained in Variance*	Results
[H1] Emoticons usage → Enjoyment	0.485833	14.273502***	23.60%	Accept
[H2] Enjoyment → Interaction	0.462402	10.185687***	21.38%	Accept
[H3] Enjoyment → Perceived Usefulness	0.022042	0.364765	N/S	Reject
[H4] Interaction → Perceived Usefulness	0.423615	9.985785***	18.86%	Accept
[H5] Interaction → Information Richness	0.322591	6.791175***	10.41%	Accept

Note) 1. ***p-value < 0.001, **p-value < 0.01, *p-value < 0.05.
   2. N/S : Not Supported.
   3. *For example : [H5] Interaction affects information richness.
      (p < 0.001***, t = 6.791175), and explains about 10.41% of the variance in information richness.

perceived usefulness. Interaction affects information richness. However, there is no support of a relationship between enjoyment and perceived usefulness, and its hypothesis has not been accepted.

6. Conclusions

6.1 Discussion

The results of this study were similar to those of Huang et al. [2008], who measured the use of emoticons and perceived usefulness in sending instant messages. Likewise, the relationships among the use of emoticons, perceived usefulness, enjoyment, interaction, and information richness in using emoticons when sending instant text messages, were similar as well.

The use of emoticons in sending mobile phone and related communications devices' text messages is important for enhancing messages, improving communications, and even replacing words. People will increase their use of emoticons when they feel that including them is more effective in conveying their emotions and makes it easier to do so.

The results of this study support the above facts. Using emoticons also increases enjoyment. Globally, organizations, especially global organizations, should plan to encourage use of, and enhance the convenience of using emoticons. Mobile phone vendors should develop an easier way for consumers to use emoticons (i.e., programs, manual devices, and keyboard shortcuts). Moreover, organizations should make plans to increase the use of emoticons in mobile devices to provide greater enjoyment and effective use by consumers, ultimately for improved management communications and marketing strategies.

Furthermore, current consumers are attracted to the use of emoticons more for its playfulness in personal interactions, more than for its perceived usefulness. This result indicates that emoticons are a useful tool for personal communication, and limitations should be considered when conveying important business messages. For example, in Korea, China, and Confucian communities where the philosophy of conservatism is deeply entrenched in relation to conveying one's emotions to higher rank or elder individuals, emoticons could, in special cases,

be viewed as a rude act that is contrary to the established conventions of polite discourse.

This study shows use of emoticons enhances and improves communications. However, there are always limitations and more studies are needed. Companies should seek to gain more knowledge about the characteristics of consumers who use emoticons and begin to develop marketing strategies that hold appeal for people who share these characteristics.

Moreover, the use of emoticons for interaction in mobile environments has a greater influence on information richness than it does on the perceived usefulness. As mentioned previously, this result shows that emoticons could replace some text language as a rich communications tool. Thus, technology manufacturers should develop plans to increase the perceived usefulness of emoticons as they relate to real-life situations.

Also, in the mobile environment, enjoyment of emoticons isn't found to be a significant influence on the perceived usefulness of messages. However, in a Messenger context, enjoyment impacted the perceived usefulness. This difference between mobile and Messenger contexts exist in the input interface. Generally speaking, Messenger allows input of emoticons more easily than mobile devices. Therefore, for enhancing the impact of enjoyment on perceived usefulness in mobile contexts, the input interface should be improved by hardware and software venders. Moreover, there are no differences in the three levels of perceived usefulness. This result shows that users of mobile phones already perceive emoticons as usefulness tools. Thus, the results of relationships within the

three groups should appear the same. The results show that the mobile communications companies should consider this in management plans and marketing strategies.

The results were varied regarding the perceived usefulness levels of mobile emoticons. Results were homogeneous in proving there are relationships among emoticon use, enjoyment, interaction, perceived usefulness, and information richness in mobile phone communications. Organizations can benefit from use of emoticons, but need to improve the ease of input of emoticons in mobile devices.

6.2 Implications

This study analyzed the impact of emoticons on the use of mobile phone text messages among Korean university students. The method of analysis was based on the model established by Huang et al. [2008], which measured the perceived usefulness of emoticons in instant messages.

Increasingly, people are using emoticons to help convey their text messages. The present study analyzed the perceived usefulness. Increasing use of emoticons has implications for the future. Technology companies should take note of consumers' favorable perception of the use of emoticons and begin to design marketing strategies that appeal to emoticon users. More studies are needed to deal with the use of emoticons within the mobile communications environment from a business perspective.

This study has examined the perceived usefulness of emoticons as a communication tool,

and the academic implications of the study suggest a theoretical basis, and a clear need, for ongoing studies of the use of emoticons within the mobile communications environment.

6.3 Limitations and Direction of Future Studies

This study does have a few limitations. First, there is a lack of studies on the use of emoticons in wireless messaging. This study was for exploratory purposes, and the need exists for a more in-depth analysis. Further, this study conducted empirical analysis only among college students, which means that the survey should be expanded to other populations in future studies. Moreover, generalizations drawn from these findings should be verified through empirical studies of a more varied group.

Second, many variables influence the use of emoticons in wireless Internet environments. For example, demographic characteristics, play a role in the use of emoticons in wireless messages [Ngai et al., 2007; Ong and Lui, 2006]. Due to sample size constraints, this study has not attempted to analyze all possible variables in a variety of situations. Future studies should focus on diversification of these research results by introducing variables from a variety of situations and their application to business contexts.

Third, the use of emotions relates to ease of communication, symbolic expressions, economic value of communication, overcoming linguistic and cultural barriers, etc. This study didn't reflect these factors. Future studies should be designed accordingly.

Fourth, this study measured the perceived usefulness of mobile emoticons. However, we didn't reflect interface design, or nature of emoticons. Our results primarily show a comprehensive view. There are differences in the emotion effects between e-mail and Messenger contexts [Huang et al., 2008]. Similarly, there are differences of emotional effects between e-mail and mobile contexts. Future studies should consider more detailed media properties and categories.

Fifth, for analyzing the three levels of perceived usefulness of mobile emoticons, we used to SMART PLS software. SMART PLS software didn't provide the comparison on function for three groups along with the perceived usefulness levels. Thus, we didn't validate difference of relationships in the perceived usefulness levels. Therefore, future study need to validate differences of relationships along with the three levels of perceived usefulness using various statistics tools.

Sixth, another limitation of this study is that it was conducted with only college and university students, and did not consider characteristics, such as the phone's performance, personal use of emoticons preferences, degree of emoticons usage, familiarity of emoticons, etc. Although this study contributes significantly to global management communications and marketing strategies, additional research is needed covering these characteristics.

References

[1] Ajzen, I., *Attitudes, personality and behavior.* Chicago, IL : The Dorsey Press, 1988.

[2] Ajzen, I. and Fishbein, M., *Understanding attitudes and predicting social behavior,* Englewood Cliffs, NJ : Prentice-Hall, 1980.

[3] Agarwal, R. and Karahanna, E., "Time flies when you're having fun : cognitive absorption and beliefs about information technology usage", *MIS Quarterly*, Vol. 24, No. 4, 2000, pp. 665-694.

[4] Barclay, D. W., Higgins C., and Thompson, R., "The partial least squares (PLS) approach to causal modeling : Personal computer adaptation and use as an illustration", *Technology Studies*, Vol. 2, No. 2, 1995, pp. 285-309.

[5] Bhattacherjee, Anol, "Understanding Information Systems Continuance : An Expectation-Confirmation Model", *MIS Quarterly*, Vol. 25, No. 3, 2001, pp. 351-370.

[6] Blake, G., "E-mail with feeling", *Research Technology Management,* Vol. 42, No. 6, 1999, pp. 12-13.

[7] Chin, W. W., "The Partial Least Squares Approach to Structural Equation Modeling, in G. A. Marcoulides (Ed.)", *Modern Methods for Business Research, Lawrence Erlbaum Associates,* 1998a, pp. 295-336.

[8] Chin, W. W., "Issues Opinion on Structural Equation Modeling", *MIS Quarterly*, Vol. 22, No. 1, 1998b, vii-xi.

[9] Daft, R. and Lengel, R., "Organizational information requirements, media richness and structural design", *Management Science,* Vol. 32, No. 5, 1986, pp. 554-571.

[10] Davis, F. D., "Perceived usefulness, perceived ease of use and user acceptance of information technology", *MIS Quarterly,* Vol. 13, No. 3, 1989, pp. 319-340.

[11] Deng, Zhaohua, Lu, Yaobin, Wei, Kwok Kee, and Zhang Jinlong, "Understanding customer satisfaction and loyalty : An empirical study of mobile instant messages in China", *International Journal of Information Management,* Vol. 29, No. 6, 2009, pp. 458-475.

[12] Derks, D., Bos, A. E. R., and Jasper, V. G., "Emoticons and social interaction on the Internet : The importance of social context", *Computers in Human Behavior*, Vol. 23, 2007, pp. 842-849.

[13] Derks, D., Bos, A. E. R., and Jasper, V. G., "Emoticons and Online Message Interpretation", *Social Science Computer Review*, Vol. 26, No. 3, 2008, pp. 379-388.

[14] Fishbein, M. and Ajzen, I., *Belief, attitude, intention, and behavior : An introduction to theory and research. Reading*, MA : Addison-Wesley, 1975.

[15] Fornell, C. and Larcker, D., "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error", *Journal of Marketing Research,* Vol. 18, 1981, pp. 39-50.

[16] Kim, Dan, J., Ferrin, Donald, L., and Rao, H., Raghav, Trust and Satisfaction, the Two Wheels for Successful e-Commerce Transactions : A Longitudinal Exploration, *Information Systems Research*, Vol. 20, No. 2, 2009 pp. 237-257.

[17] King, W. R. and He, J., "A meta-analysis of the technology acceptance model", *Information and Management*, Vol. 43, No. 6, 2006, pp. 740-755.

[18] Kishi, M., "Perceptions and use of electronic media : testing the relationship between organizational interpretation differences and media richness", *Information and Management*, Vol. 45, No. 5, 2008, pp. 281-287.

[19] Lee, S., "Electronic mail as a medium for rich communication : an empirical investigation using hermeneutic interpretation", *MIS Quarterly*, Vol. 18, No. 2, 1994, pp. 143-157.

[20] Lee, S. R. and Yang, S. W., "An Integrative Study on Continued Use of Web-Based Information Systems : Focusing on Online Shopping Sites", *Journal of Information Technology Application and Management,* Vol. 16, No. 1, 2009, pp. 51-71.

[21] Hackbarth, G., Grover, V., and Yi, M., "Computer playfulness and anxiety : positive and negative mediators of the system experience effect on perceived ease of use", *Information and Management*, Vol. 40, No. 3, 2003, pp. 221-232.

[22] Hassanein, K. and Head, M., "Manipulating perceived social presence through the web interface and its impact on attitude towards online shopping", *International Journal of Human-Computer Studies*, Vol. 65, No. 8, 2007, pp. 689-708.

[23] Huang, A. H., Yen, D. C., and Zhang, X., "Exploring the potential effects of emoticons", *Information and Management*, Vol. 45, No. 7, 2008, pp. 466-473.

[24] Hulland, J., "Use of partial least squares (PLS) in strategic management research : a review of four recent studies", *Strategic Management Journal,* Vol. 20, No. 2, 1999,

pp. 195-204.

[25] Jang, W, K. and Kim, T. K., "A Study on the Adoption of Accounting Information Systems in Mandatory Environments : Using TAM and TPB", *Journal of Information Technology Application and Management*, Vol. 12, No. 1, 2005, pp. 173-189.

[26] Leung, L., Loneliness, self-disclosure, and ICQ ("I Seek You") use, *Cyber Psychology and Behavior*, Vol. 5, No. 3, 2002, pp. 241-251.

[27] Li, D., Chua, P. Y. K., and Hao, L., "Understanding individual adoption of instant messaging : an empirical investigation", *Journal of the Association for Information Systems,* Vol. 6 No. 4, 2005, pp. 102-129.

[28] Lu, J., Liu, C., Yu, C., and Wang, K., "Determinants of accepting wireless mobile data services in China", *Information and Management*, Vol. 45, No. 1, 2008, pp. 52-54.

[29] Mackiewicz, J., "Which rules for online writing are worth following? : a study of eight rules in eleven handbooks", *IEEE Transactions on Professional Communication,* Vol. 46, No. 2, 2003, pp. 129-138.

[30] Ngai, E. W. T., Poon, J. K. L., and Chan, Y. H. C., "Empirical examination of the adoption of WebCT using TAM", *Computers and Education,* Vol. 48, 2007, pp. 250-267.

[31] Nunnally, J. and Bernstein, I., *Psychometric theory,* New York, NY : McGraw-Hill, 1994.

[32] Ong, C. S. and Lui, J. Y., "Gender Differences in Perceptions and Relationships among Dominants of E-Learning Acceptance", *Computers in Human Behavior*, Vol. 22, 2006, pp.

816-829.

[33] Otondo, R., Van Scotter, J., Allen, D., and Palvia, P., "The complexity of richness : media, message, and communication outcomes", *Information and Management,* Vol. 45, No. 1, 2008, pp. 21-30.

[34] Okazaki, S., "What do we know about mobile Internet adopters? A cluster analysis", *Information and Management,* Vol. 43, No. 2, 2006, pp. 127-141.

[35] Rivera K., Cooke, N. J., and Bauhs, J. A., "The effects of emotional icons on remote communication", *Conference companion on Human factors in computing systems : common ground*, 1996, pp. 99-100.

[36] Schepers, J. and Wetzels, M., "A meta-analysis of the technology acceptance model : investigating subjective norm and moderation effects", *Information and Management,* Vol. 44, No. 1, 2007, pp. 90-103.

[37] Turel, O., Serenko, A., and Bontis, N., "User acceptance of wireless short messaging services : deconstructing perceived value", *Information and Management,* Vol. 44, No. 1, 2007, pp. 63-73.

[38] Turel, O. and Serenko, A., "Satisfaction with mobile services in Canada : an empirical investigation", *Telecommunications Policy,* Vol. 30, No. 5/6, 2006, pp. 314-331.

[39] Wolf, A., "Emotional expression online : gender differences in emoticon use", *Cyber Psychology and Behavior*, Vol. 3, No. 5, 2000, pp. 827-833.

[40] Venkatesh, V., Morris, M. G., Davis, G. B., and Davis, F. D., "User acceptance of information technology : Toward a unified view", *MIS Quarterly,* Vol. 27, No, 3, 2003, pp. 425-478.

[41] Wu, J. H. and Wang, S. C., "What drives mobile commerce? An empirical evaluation of the revised technology acceptance model", *Information and Management,* Vol. 42, No. 5, 2007, pp. 719-729.

[42] Walther, J. B. and D'Addario, K. P., "The impacts of emoticons on message interpretation in computer-mediated communication", *Social Science Computer Review,* Vol. 19, 2001, pp. 324-347.

[43] Webster, J. and Martocchio, J. J., "Microcomputer playfulness : development of a measure with workplace implications", *MIS Quarterly,* Vol. 16, No. 2, 1992, pp. 201-226.

[44] Yang, S. W. and Whang, J. H., "The effect of factors on continuous use of video telephony service for mobile device", *Journal of Information Technology Application and Management,* Vol. 17, No. 1, 2009, pp. 107-125.

▪ http://www.nate.com (Nate on SMS Service).
▪ http://blog.paran.com/sosara/7361803.

<Appendix 1> Measurement Details

Variables	Our Measurement Details	Items of Huang et al.[2008]
Emoticon Usage	[EU1] When I use mobile phone text messaging services, I can use emoticons to express my emotions.	When I use instant messaging to communicate, I use a great deal of symbols to represent my feelings or emotions.
	[EU2] My friends who send me instant messages in mobile phone often use symbols to represent their feelings or emotions.	My friends who send me instant messages often use symbols to represent their feelings or emotions.
	[EU3] Instant messaging in mobile phone conveys more than just text; other information cues are also conveyed.	Instant messaging conveys more than just text; other information cues are also conveyed.
Information Richness	[IR1] I think emoticons more correctly conveys messages and meanings (feelings and emotions) in mobile phone messages than e-mail messages.	Instant messaging is better than e-mail for clarifying ambiguous (hard to understand) issues.
	[IR2] Instant messaging in mobile phone is better than e-mail for explaining confusing matters.	Instant messaging is better than e-mail for explaining confusing matters.
	[IR3] Instant messaging in mobile phone is better than e-mail for resolving disagreements.	Instant messaging is better than e-mail for resolving disagreements.
Perceived Usefulness	[PU1] The use of emoticons in mobile phone text messages is useful for social networking communication applications.	Instant messaging is useful for social networking.
	[PU2] Instant messaging in mobile phone is more useful than e-mail for interacting with friends.	Instant messaging is more useful than e-mail for interacting with friends.
Interaction	[I1] Communications with emoticons in mobile phone text messages produces friendships more quickly than messages without emoticons.	Instant messaging allows friendships to develop more quickly.
	[I2] Instant messaging in mobile phone makes me feel closer to my friends or team members.	Instant messaging makes me feel closer to my friends or team members.
	[I3] Instant messaging in mobile phone is more personal than e-mail.	Instant messaging is more personal than e-mail.
Enjoyment	[E1] The use of emoticons in mobile phone messages during communications with friends provides significant enjoyment.	My friends and I often have a good time when we use instant messaging to communicate.
	[E2] I enjoy the process of using instant messaging in mobile phone.	I enjoy the process of using instant messaging.

■ Author Profile

Se Hun Lim

Se Hun Lim is an Assistant Professor of Management Information Systems at Sangji University. He received his Ph.D. degree at Chung-Ang University. His research interests include application of logistics IT, and interaction design.

Daekil Kim

Daekil Kim was formerly an Assistant Professor of Applied Computing at Ming Chuan University, Taiwan. He completed his Ph.D. in Management Information Systems from the Claremont Graduate University. Dr. Kim attended the Heinz School, Carnegie Mellon University for his M.S., and completed his Bachelor of Science in Business Administration from the University of Arizona. His research interests include IT innovation, Web Services, RFID and e-health.

Sean Watts

Sean Watts is a global business executive from Canada, and Assistant Professor of East Asian Management and Entrepreneurship at Yonsei University, Korea, where he received his MBA. He researches management, organizational behaviour, and entrepreneurial activities.