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Exploring the potential effects of emoticons

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ABSTRACT

Instant messaging (IM) has shown signs of becoming one of the main stream communication applications for users, like e-mail. Many people maintain constant contacts with multiple friends and relations via IM simultaneously whenever they are online, whether working on other applications or not. In addition to allowing instant exchange of text information, a unique feature of IM is its use of graphical icons that express emotions, known as emotional icons or emoticons. We explored their potential effects. Our model, based on prior theory and research, was tested using data collected from student users; it was analyzed to reveal potential effects of emoticons on various factors related to the use of IM. Our study used structural equation modeling (SEM) analysis; the results showed that the user of emoticons felt a positive effect on enjoyment, personal interaction, perceived information richness, and perceived usefulness. Our results suggested, however, that emoticons were not just enjoyable to use, but also a valuable addition to communication methods.

1. Introduction

In the past decade, e-mail has been the popular communication tool of millions of users and a large number of articles have attempted to explain its characteristics and impact on users and organizations [2]. Recently, IM has been gaining popular acceptance. Many users, especially the younger generation, use IM extensively often for many hours per day. The spread of IM is expected to continue and it is likely to become an important communication channel between coworkers.

Although similar to e-mail and other communication devices, IM has many unique characteristics: one is its use of emotional icons: emoticons. They convey emotions using simple graphical icons to represent individual identity, presence, awareness, and emotions [6,8]. Although other applications may also use emoticons, the extent of their use and the degree of their sophistication is mainly in IM.

2. Development of IM

Delivering messages instantly is certainly not new. Telegraphs and telephones have been available for more than a century. Computer applications capable of sending instant text messages over networks have been available since the 1960s. On the Internet, an early application provided instantaneous interaction was the chat room. This provided the communication in a semi-public environment. The first well known IM application was ICQ, introduced in 1996. Since then, many IM applications have been created, e.g., AIM® of AOL, Yahoo! Messenger®, Skype, and MSN Messenger® from Microsoft®.

Typical IM software is a small client-side application residing on a user computer. It offers the same privacy as e-mail or a chat room. Users may configure their IM to communicate automatically when online. The server provides an IM client with the status of a user on the "buddy list" and necessary parameters to facilitate communication. It provides users with near-synchronous one-to-one communication and near-immediate confirmation of messages sent, making the exchange highly interactive.

IM can be useful in business; people may rapidly switch between it and other tasks and its applications can provide presence awareness by notifying users that their coworkers are online and ready to discuss mutual problems. Early versions of IM worked like a telephone. Information was exchanged instantly and

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Table 1
A comparison of IM and other Internet-based communication tools

Attributes	E-mail	Chat	IM
Interactive mode	Asynchronous	Nearly synchronous	Nearly synchronous
Invitation	Private	Private or open	Private
Message type (in most cases)	Longer	Medium	Shorter
Communication frequency (in most cases)	Several times a day to occasional	Varied	Frequently within a time period
Presence awareness	Composite text symbols only, e.g., :-)	Composite text symbols only, e.g., :-)	Graphical emoticons

discarded. In recent years, IM has adapted to business needs with the ability to keep track of the information exchanged. For example, the US securities exchange industry has implemented special IM applications to meet Securities Exchange Commission (SEC) requirements. Table 1 summarizes IM characteristics.

3. Research objectives

As computer-mediated communication (CMC) replaces some face-to-face interaction, the nature of communication has changed. With it, however, communication of emotion is often lost. Consequently, finding ways to enrich the medium is important.

The creation and use of emoticons is one attempt to do so. Originally, they were symbols composed of letters and special characters, with an implied direction from right to left or *vice versa*. For examples, frequently used text-based emoticons include smile, sad, cry, etc. as shown in Table 2. Recently, graphical emoticons have been introduced in IM and e-mail (see Table 3). Vendors and users create and improve the available pool, resulting in a new language for expressing human emotions.

Preliminary research has suggested a positive impact when communicating with emoticons. Both sexes are likely to use emoticons equally and they have exhibited increased frequency of use. In addition, females were found primarily to use emoticons to express humor, while males tended to use them to express teasing and sarcasm [21].

Table 2
Text-based emoticon examples

Emoticon	Emotion
:-)	Happy
:-(	Sad
;~(	Cry
:-D	Laughing
:-|	Uncertain
;-)	Winking

Table 3
Graphical emoticon examples (used in Yahoo! Messenger®, see Appendix A for more)

	Happy
	Sad
	Wink
	confused
	Shock
	Angry
	Smug
	Cool
	worried
	devilish
	crying
	laughing

The goal of our study was to examine the potential effects of emoticons, specifically, on the relationships between emoticon use and factors related to the use of IM:

1. *Information richness when using IM*, and its relationship to the use of emoticons.
2. The *perceived usefulness of IM*—especially when interacting with friends and others on social networks.
3. The *perceived level of personal interaction*. The degree with which IM provides more personal interaction and a feeling of closeness.
4. The *level of user enjoyment while using IM*.

4. Literature review

Few studies on IM were found in our literature review [19,12,17]. To establish a foundation, we therefore drew on material in related fields.

4.1. Information richness

Media richness theory (MRT) assumes that richness of the communication medium affects its ability to carry information and thus change a user's perception. "Rich" media enhance a recipient's understanding more rapidly. Studies suggested that a medium with feedback was richer than one with only unidirectional communication and that one that carried more cues (expressions, gestures, tones, etc.) was richer [9,15,5,10].

4.2. Personal interaction

IM messages are less formal and individuality is enhanced by a large variety of emoticons that allow users to express emotions easily. Possibly, IM is more personal than face-to-face conversation. For instance, greeting a person in the hallway may not be as personal as sending an IM message with a happy-face emoticon attached. Recipients of a graphical greeting message might feel that they had special treatment or attention and thus a friendship develops.

A study by Leung [11] attempted to define relationships between the level of IM usage, the user's loneliness, and the user's level of self-disclosure ("what individuals verbally reveal about themselves to others, including thoughts, feelings, and experiences."). However, no significant correlation was found between loneliness and disclosure: loneliness did not change with IM usage

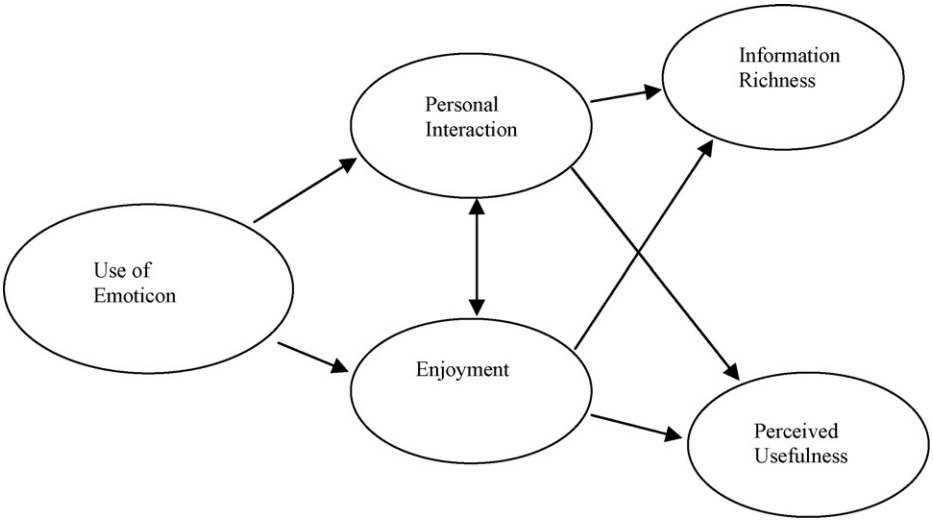

Fig. 1. Theoretical model.

and while frequency and length of IM use were significantly correlated to depth of self-disclosure, lonely IM users tended to be more negative, less honest, and less revealing of their feelings, while, chronically lonely ones were significantly less self-disclosed, less honest in their self-disclosure, and less accurate.

4.3. Perceived usefulness

Many studies of perceived usefulness (PU) have, of course, confirmed that it has a direct impact on individuals' intention to use IT [18]. Some recent studies have also tested it on newer technology such as the Web and mobile devices [4,13]. Our study tested PU on the use of IM.

4.4. Enjoyment

Playfulness or enjoyment experienced by users also significantly affects the adoption of a technology [20]; it may even be the dominant factor.

5. Research model and hypotheses

A research model was proposed as the foundation of our study (see Fig. 1). It incorporated two theories: MRT and TAM. Five constructs were included: the use of emoticons, perceived information richness, PU, personal interaction, and enjoyment.

We believed that IM was a richer medium than others, like e-mail, because it was more interactive and possessed more media choice [16]. Its interaction in real time helped clarify confusing matters, while multiple media choices (text, voice, and graphics), further enhanced media richness. Therefore, we hypothesized a correlation between emoticon use, level of personal interaction, and information richness.

Emoticons apparently enhance the PU of IM in certain tasks. For example, it is faster to use emoticons than words to convey certain expressions. Therefore, emoticon use should improve the PU of IM.

The enjoyment construct is included because IM is often used in leisure activities. Prior studies suggest that users who enjoy a process tend to be more involved, with positive mood, and satisfaction. Therefore, the model included enjoyment as a factor.

The personal interaction construct was also included, based on the fact that IM is used for socializing and networking purposes. It was assumed to be an intermediate construct. Our primary research question was: what is the strength of the internal relationships between the use of emoticons in IM and information richness, personal interaction, PU, and enjoyment? This resulted in the following hypotheses:

$H1_0$. The use of emoticons does not affect perceived information richness.

$H2_0$. The use of emoticons does not affect the PU of IM.

$H3_0$. The use of emoticons does not affect the level of personal interaction.

$H4_0$. The use of emoticons does not affect the level of enjoyment.

6. Methodology

Without a large user base in the workplace, it is hard to conduct empirical research using professionals as subjects in the field. Currently, the largest pool of IM users is students. As a result, we decided to use students as our study population. Data were therefore collected from college students who use IM. A survey instrument was custom-designed for this study.

6.1. Subjects

Two hundred and sixteen usable responses were collected from a large university in the Midwestern United States. Participants were mostly juniors enrolled in business courses. Participation was voluntary. No monetary incentives or bonus credits were provided as inducements to participate. The survey was conducted within a 1-week period. Survey administrators received detailed instructions about the data collection procedure and, before the survey was conducted, a standardized announcement was made to the subjects and written instructions were handed to each participant.

6.2. Measures

The survey questions contained five sections on the participant's use of emoticons, their feelings about information richness, personal interaction, PU, and level of enjoyment. Each of these was measured by multiple items in the questionnaire.

6.2.1. Use of emoticon

In our study, we included three items to measure the use of emoticons by the respondent, those who communicated with the

respondent, and the awareness of the respondent of non-textual cues. The questionnaire statements were.

- When I use instant messaging to communicate, I use a great deal of symbols to represent my feelings or emotions.
- My friends who send me instant messages often use symbols to represent their feelings or emotions.
- Instant messaging conveys more than just text; other information cues are also conveyed.

6.2.2. Information richness

We used three items to measure the ability to: clarify ambiguous issues, explain confusing matters, and help resolve disagreement. In other words, the purpose was to measure the value of IM in avoiding misunderstanding. Our questions used e-mail as a baseline for comparison, because it is the most common form of communication today. In addition, previous studies have suggested that e-mail is not an ideal channel for delivering rich contents. The statements in the questionnaire were:

- Instant messaging is better than e-mail for clarifying ambiguous (hard to understand) issues.
- Instant messaging is better than e-mail for explaining confusing matters.
- Instant messaging is better than e-mail for resolving disagreements.

6.2.3. Perceived usefulness

PU has been confirmed as an important determinant of intention to use and actual usage of a technology. In our study, PU was considered to be a dependent variable. The objective was to find out whether or not the use of emoticon affected PU. Two statements were used to gauge usefulness for social activities and interacting with friends:

- Instant messaging is useful for social networking.
- Instant messaging is more useful than e-mail for interacting with friends.

6.2.4. Personal interaction

Personal interaction measured closeness with friends while using IM to interact. This was a subjective measure. Respondents were asked to rate their agreement with the three statements in the questionnaire:

- Instant messaging allows friendships to develop more quickly.
- Instant messaging makes me feel closer to my friends or team members.
- Instant messaging is more personal than e-mail.

6.2.5. Enjoyment

In our study, we felt that ease of use of IM was no longer an important factor: IM applications are very simple to learn for most Internet users, especially college students. We viewed the level of enjoyment as a more meaningful construct [1]. Previous studies have used a variety of ways to measure it [7]. In our study, two items were used to measure levels of enjoyment when using IM.

- My friends and I often have a good time when we use instant messaging to communicate.
- I enjoy the process of using instant messaging.

Table 4
Scale reliability estimates

Factors	Cronbach's Alpha
Use of emoticons	0.69
Enjoyment/playfulness	0.80
Information richness	0.82
PU	0.67
Personal interaction	0.76

7. Data analysis and results

Basic statistical analysis revealed that the majority of respondents used emoticons and enjoyed using them. Fifty-six percent of respondents either agreed or strongly agreed with the statement: "when I use instant messaging to communicate, I use a great deal of symbols to represent my feelings or emotions." Seventy-four percent indicated that their friends "often use symbols to represent their feelings or emotions." Approximately 80% of respondents said they had fun or enjoyed the process of using IM.

The data were further analyzed using scale reliability analysis and SEM techniques.

7.1. Reliability analysis

Because the questionnaire was new, Cronbach's Alpha testing was used to estimate the internal consistency of the material. The results are shown in Table 4, where internal consistency estimates were acceptable, being either higher than or close to 0.7.

7.2. Structural equation modeling

The primary technique used to analyze the data was structural equation modeling (SEM), which is most suitable for confirming relationships predicted by existing theories. The SEM process started with a simple three-construct model: emoticon use, PU, and perceived information richness. After several revisions, the model shown in Fig. 2 was achieved. The standardized regression weight and critical values are shown in Tables 5 and 6. In the three-construct model, all three relationships were significant at a 5%

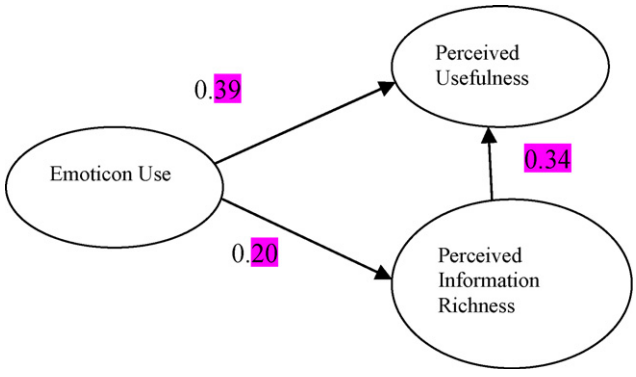

Fig. 2. Three-construct structural equation model.

Table 5
Regression weights of the three-construct model

	Estimate	*P*-Value
Richness ← emoticon use	0.20	0.051
Usefulness ← richness	0.34	***
Usefulness ← emoticon use	0.39	0.002

***P-value < 0.001.

Table 6
Model fit indexes for the three-construct model

Index name	Index value of the model	Rule-of-thumb for model acceptance
TLI (NNFI)	0.97	Acceptable if $0.9 < TLI < 0.95$; good if $TLI > 0.95$
CFI	0.99	Acceptable if $0.9 < CFI < 0.95$; good if $CFI > 0.95$
Chi-square/degree-of-freedom ratio	22.2/17 = 1.31	Acceptable if less than 3 (for IS research)
RMSEA	0.04	Acceptable if $RMSEA < 0.1$; good if $RMSEA < 0.05$

Table 7
Model fit indexes for the five-construct model

Index name	Index value of the model	Rule-of-thumb for model acceptance
TLI (NNFI)	0.96	Acceptable if $0.9 < TLI < 0.95$; good if $TLI > 0.95$
CFI	0.97	Acceptable if $0.9 < CFI < 0.95$; good if $CFI > 0.95$
Chi-square/degree-of-freedom ratio	83.7/60 = 1.4	Acceptable if less than 3 (for IS research)
RMSEA	0.04	Acceptable if $RMSEA < 0.1$; good if $RMSEA < 0.05$

significance level. Emoticon use was significantly correlated to perceived richness of information exchange and PU. At the same time, perceived information richness was also correlated with PU.

There are many ways to judge the fit of an SEM. The most common is chi-square goodness of fit; if the value is small, indicating a small difference between predicted and actual values, the model is deemed acceptable. However, the chi-square test is only valid when the sample size is small. The chi-square/degree-of-freedom ratio is deemed more appropriate when the number of cases exceeds 200 and a rule-of-thumb is to accept a model with a chi-square/degree-of-freedom ratio of 3 or smaller. Our study therefore used this ratio. The chi-square value of the three-construct model was 22.2 and the number if degrees of freedom was 17, resulting in a ratio of 1.31, which indicated that the model was acceptable and the relationships between emoticon uses, PU, and perceived information richness was confirmed. The *P*-value of the chi-square test was 0.176, which fails to reject the null hypothesis assuming no difference in the expected value predicted by the model and actual observations. Thus the model is acceptable based on the chi-square test, despite its large sample size.

The Tucker–Lewis index (TLI) or non-normed fit index (NNFI) was 0.97, which indicated a relatively good model. The comparative fit index (CFI), another popular measure of model fit, was 0.99. It also suggested that the three-construct model was a good model. The root mean square error of approximation (RMESA) was 0.038; also indicating a good model. Table 6 shows fit indices of the three-construct model.

7.3. Five-construct model

We also examined the roles of enjoyment and perceived level of personal interaction when using IM. The second phase of SEM analysis added these constructs. After several trials, the resulting five-construct model had a chi-square value of 84, with 69 degrees of freedom. The derived ratio was 1.4 (smaller than that for the three-construct model), indicating that the model was acceptable. TLI or NNFI was 0.96, which indicated an acceptable model. The CFI was 0.97. It also suggested the three-construct model was acceptable. The RMESA was 0.04; also indicating the model was acceptable (see Tables 7 and 8).

In the five-construct model, emoticon use was significantly correlated with perceived richness and enjoyment. Enjoyment was significantly correlated with PU and personal interaction. Personal interaction was correlated with PU.

Table 8
Standardized regression weights for the five-construct model

	Estimate	*P*-Value
Enjoyment ← emoticon use	0.51	***
Richness ← personal interaction	0.52	***
Personal interaction ← enjoyment	0.65	***
Usefulness ← enjoyment	0.56	***
Usefulness ← personal interaction	0.34	0.004

***P-value < 0.001.

8. Discussion

Combining the results of SEM and the regression weights, a path diagram was constructed (see Fig. 3). Like most other analysis of correlations, the SEM does not indicate causal relationships. The path shows only significant correlations and probable effects between any two constructs.

8.1. Emoticon use and enjoyment

The standardized regression weight between emoticon use and enjoyment is 0.514, with a *P*-value less than 1%. This correlation makes intuitive sense; an emoticon speeds up communication and eliminates some difficulty in expressing feeling using words; the process is easier, more interactive, and more fun. Also many emoticons are aesthetically pleasant and look amusing and many users apply emoticons sarcastically.

8.2. Enjoyment and personal interaction

The path diagram shows a positive correlation between enjoyment and personal interaction. The standardized regression weight of 0.65 is statistically significant. When IM users enjoy the communication process, they tend to use it more and respond faster, increasing interaction with friends. Also, friendship develops more quickly when the communication process is enjoyable.

8.3. Emoticon and information richness

In the tree-construct model, the standardized regression weight between emoticon use and information richness was 0.20, with a *P*-value of 0.051. In the five-construct model, there was no significant direct link between emoticon use and information richness, but there was an indirect link bridged by two intermediate constructs: enjoyment and personal interaction.

People who use more emoticons perceived IM as richer. Also emoticons are not only fun to use but may be beneficial because an increase in information richness is equivalent to an improvement in communication efficiency and effectiveness. Thus emoticons may allow users to convey more in less time.

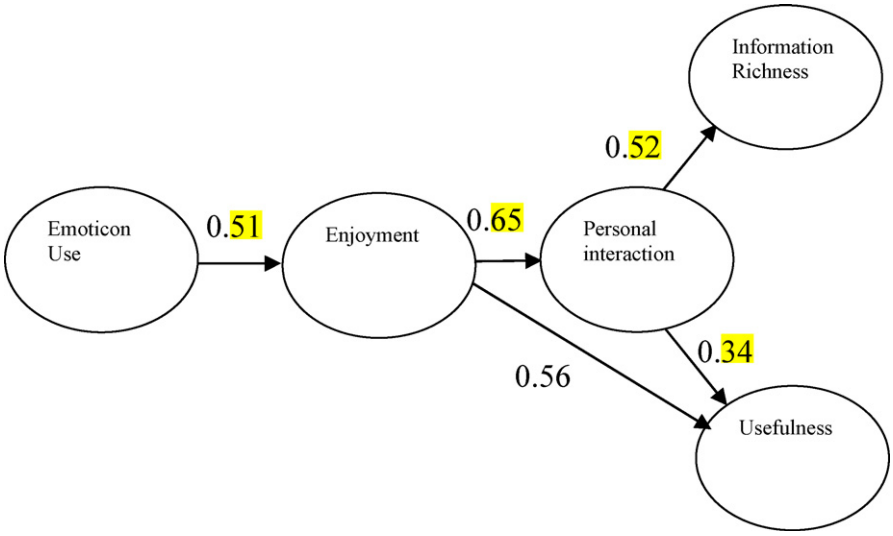

Fig. 3. Path diagram and standardized regression weights in the five-construct model.

9. Limitations

Our study had several limitations. First, due to the lack of prior studies, theories could only be drawn from related fields. Therefore, we had to use caution when interpreting the results; SEM is best used to confirm existing theories. The path diagram thus only represents the authors' best attempt at using the data and analysis tools. Second, we used student subjects and though they are probably the largest IM user group, generalization of the study must be limited: users of different age groups and demographic factors might perceive the use of emoticons differently.

10. Conclusions

IM is likely to drive collaboration inside the enterprise and enable organizations to leverage expertise and facilitate information sharing. We surveyed 216 IM users. Our model was used to explore the relationships among emoticon use, information richness, personal interaction, perceived usefulness, and enjoyment. Results suggested that emoticons directly affected enjoyment, and that this, in turn, affected personal interaction. The indirect but positive correlation between emoticon use and information richness suggested that emoticons could affect communications among coworkers. As indicated in prior research, when employees find pleasure in working, their productivity increases. The positive correlation suggested that using IM with richly enhanced emoticons might foster a caring and cooperative environment. The overall PU of IM was also enhanced by emoticon use.

While our data were collected from student subjects, the results have implications beyond a student population. College students eventually join the labor force. Their communication habits impact the workplace. Consequently, our results are important to business organizations.

Appendix A. Examples of emoticons used by Yahoo! Messenger

	:)	happy		:-c	call me - New!
	:(	sad		:)]	on the phone - New!
	;)	winking		~X(	at wits' end - New!
	:D	big grin		:-h	wave - New!
	;;)	batting eyelashes		:-t	time out - New!
	>:D<	big hug		8->	daydreaming - New!
	:-/	confused		I-|	sleepy
	:x	love struck		8-|	rolling eyes
	:">	blushing		L-)	loser
	:P	tongue		:-&	sick
	:-*	kiss		:-$	don't tell anyone
	=((	broken heart		[-(	not talking
	:-O	surprise		:O)	clown
	X(	angry		8-}	silly
	:>	smug		<:-P	party
	B-)	cool		(:|	yawn
	:-S	worried		=P~	drooling
	#:-S	whew!		:-?	thinking
	>:)	devil		#-o	d'oh
	:((	crying		=D>	applause
	:))	laughing		:-SS	nailbiting
	:|	straight face		@-)	hypnotized
	/:)	raised eyebrow		:^o	liar
	=))	rolling on the floor		:-w	waiting

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