A Preliminary Study of the Form and Status of Passionate Affection Emoticons

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The development of communications technology has provided people with more diverse means for instant communication. Because transmitting text-only messages may not sufficiently express the emotions expressible through face-to-face communications, the design and use of emoticons play a crucial role in instant messaging. In this study, emoticons were divided into three forms (abstract/geometric, personified, and concrete) and two statuses (animated and static). A quantitative investigation and a qualitative focus group discussion were conducted to clarify the effects of the two factors on the usability of the emoticons. The results revealed that the forms of the emoticons were substantially associated with the emoticon status preferred by participants. The quantitative investigation revealed that when the form of an emoticon shifted from abstract/geometric to personified and subsequently to concrete, the status of the emoticon deemed suitable by the users also shifted from static to animated. Furthermore, the qualitative focus group discussion unexpectedly contributed the insight that the participants used particular emoticon forms and statuses in accordance with the timing/intimacy and targets of their conversations. Abstract/geometric and static emoticons were the most frequently applied in polite or emotionally calm conversations; personified emoticons were frequently employed in conversations with familiar people; concrete and animated emoticons were most frequently directed toward intimate people who shared resonating values and a sense of companionship with the participants. This indicated a positive correlation between the moods of users and the form and status, and timing/intimacy, of the emoticons used. In summary, when users select emoticons for use, the forms of the emoticons, the statuses of the emoticons, and the degrees of intimacy and resonance among the users of the emoticons are associated with one another.

Keywords **–** Emoticon, Form, Animated, Static, Emoticon Performance Model.

Relevance to Design Practice **–** The findings may offer interface designers who are concerned about user interaction and emotion insights applicable to various situations and target markets. Appropriate interfaces may also enhance comfort and satisfy users.

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Introduction

The evolution of communications technology and the rising popularity of related hardware devices have yielded increasingly diverse personal communication methods. Electronically mediated communication is currently one of the most prevalent means of interpersonal communication (Beebe, Beebe, Redmond, Geerinck, & Salem-Wiseman, 2015). In particular, *instant messaging* (IM) enables people to communicate immediately (Li, 2015) through texts, images, or videos (Amalanathan & Anouncia, 2015), thus strengthening interpersonal relationships.

Internet communication differs drastically from real-world face-to-face communication. Internet communication provides people with more opportunities to communicate with people otherwise inaccessible in real life (Peris et al., 2002). During face-to-face communication, linguistic intonation and nonverbal modes of expression enable people to assess and confirm the connotations of statements; in a digital, nonverbal communication environment in which no such cues can be observed, *emoticons* are used in dialogs to emphasize emotional manifestations and semantics (Amalanathan & Anouncia, 2015; Hudson et al., 2015).

The overall effect of emoticons is positive. In the emoticon availability task experiment conducted by Rivera, Cooke, and Bauhs (1996), an experimental group of participants was provided with emoticons to select for use in an online chat room, while a control group was not. The results revealed that the members of the experimental group were more satisfied than were the control group members; although the numbers of positive and negative emoticons provided for use in the experiment were nearly equal, the emotional effect of the negative emoticons expressed in the chat room was smaller than that of the negative emotions encountered in face-to-face communications. This verified that emoticons are conducive to emotional communication (Rivera et al., 1996). Emoticons play a crucial role not only in chat rooms, but also in digital teaching.

However, the characteristics of emoticons and the appropriateness of their expressions may vary with individuals (Kurlander, Skelly, & Salesin, 1996; Pesson, 2003; Smith, Farnham, & Drucker, 2002). Numerous studies categorize emoticons

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according to the types of emotion expressed (Huffaker & Calvert, 2006; Shaikh, Lalingkar, Barach, & Feldman, 2017); few have investigated the composition of visual elements within emoticons. Moreover, many studies on graphic emoticons calculate totals of positive and negative or even neutral sentiments (Bravo-Márquez, Frank, & Pfahringer, 2015; Collins, Hasan, & Ukkusuri, 2013). Studies have indicated that socially powerful users are associated with positive emoticons (Tchokni, Séaghdha, & Quercia, 2014), and have explored how users might be influenced by negative emoticons (Hudson et al., 2015). However, Zhang et al. (2011) state that "sentiment should not be simply classified as positive, negative, and objective" (p. 129). Form and status may transform the representation of sentiments. McDougall, Reppa, Smith, and Playfoot (2009) indicated that the familiarity, complexity, and concreteness of emoticon interfaces influence the performance of emoticon users; emoticon use is not simple. For example, "That's great!" (enthusiastic) vs. "That's great." (sarcastic) (Dresner & Herring, 2010, p. 264). Although the presentation of emoticons is vital (Kim, K., & Kim, 2003), few studies have explored the visual designs of emoticons (Lim, Park, & Hong, 2012). Various emoticons may exhibit differences in their usability in studies of their form and status factors (Jibril & Abdullah, 2013; Kim, M., Shi, & Kim, 2014). Therefore researchers saw a need to focus on graphic emoticons expressing one specific sentiment, and their expressive form and status.

In fact, the methods of reading and employing emoticons can be affected by various factors such as users' emotions, timing, and imagery (Dresner & Herring, 2010; Lim, Kim, & Watts, 2011). Dresner and Herring maintained that emoticons could serve as an important clue by which to examine relationships between individuals. Most studies on emoticons have focused on relationships between Internet users and their friends, families, and the opposite sex (Fullwood, Orchard, & Floyd, 2013; Nishimura, 2015; Oleszkiewicz et al., 2017). Fullwood et al. also mentioned that the emoticons and default moods used in Internet communication vary with each user. Moreover, investigation of emoticon usage including attitudes or intentions could help develop understanding of human behavior (Chen & Siu, 2017; Kaye, Malone, & Wall, 2017). However, previous emoticon studies have not offered additional insights (Dresner & Herring, 2010) and researchers have called for research related to emoticons, social relationships, and intimacy (Kaye et al., 2017; Lee, Hong, Kim, Oh, & Lee, 2016).

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This preliminary study involves a quantitative and qualitative exploration of the usability of and motives behind existing emoticons according to the forms and statuses of their visual elements. The key topics are the *effectiveness* of, *motivation for usage* of, and *preference* for emoticons, as well as the connections between emoticons' visual elements and users' interpersonal relationships.

Literature Review

The word *emoticon* is a portmanteau of *emotion* and *icon* (Dresner & Herring, 2010; Kasper-Fuehrera & Ashkanasy, 2001). Emoticons were proposed as messages composed of ASCII characters for use on the Internet by Scott Fahlman in 1982 (Tomić, Martinez, & Vrbanec, 2013). In the late 1990s, colorful graphics-based emoticons called *emojis* were created in Japan for the mobile chat environment (Pavalanathan & Eisenstein, 2015) and they are by now used by up to 92% of the online population (Kaye et al., 2017). As technology and social media have become more mature and popular, the use of online chat environments with graphic emoticons, such as WeChat, Facebook, and LINE has undeniably become overwhelming (Belair-Gagnon, Agur, & Frisch, 2016; Tang & Hew, 2017; Zhang et al., 2011).

Emoticons and Form

Bays (2010) observed that the use of emoticons is a type of synthetic language construct profoundly influenced by visual representations. Beardon (1994) noted that numerous studies on icons have focused on the *abstract/geometric* and specific forms of icons. Yuasa, Saito, and Mukawa (2006) categorized the iconic forms of smiley faces based on two extreme points, namely abstract/geometric and *photorealistic*. Because abstract/geometric images are typically composed of simple geometric elements, some studies have generalized abstract and geometric characteristics as being one category (Liu & Sun, 2007; McDougall et al., 2009). However, emoticons also contain plentiful *personified* forms (Innocent, 2001; Kim, M. et al., 2014). Personified forms involve expressing human nature and are intermediate between abstract/geometric forms and photorealistic forms (Blom & Monk, 2001). Specifically, the emoticons in this study were divided into three forms of external expression, namely *abstract and geometric*, *personified*, and *photorealistic*. Abstract/geometric forms involve simple iconic forms such as circles and squares. Photorealistic forms resemble specific appearances commonly observed in daily living. Personified forms, which are intermediate between abstract/geometric forms and photorealistic forms, involve the use of the forms of organic beings, such as animals and plants, given emotional indicators.

As indicated in cognitive studies, understanding abstract/geometric icons typically requires learning and accumulated experience; consequently, greater abilities of concentration, recollection, and organization are required than for understanding concrete icons. Learned abstract/geometric icons potentially require less cognitive load than do photorealistic icons (Kolb & Fry, 1975; Wiemer-Hastings & Xu, 2005). However, because new emoticons are being continually created and demanded (Ruan,

2011), a considerably high percentage of abstract/geometric icons are still unfamiliar icons for users. Conversely, photorealistic icons are recognized through their external manifestations of real objects experienced in daily living. Therefore, of all the listed types of icons, photorealistic icons are the easiest to recognize upon exposure (McDougall et al., 2009). Moreover, photorealistic facial expressions increase the senses of pleasure and familiarity in users when displayed on computer screens (Yamashita, Eibo, Ichimura, & Mera, 2011). Numerous studies (McDougall et al., 2009; Patel, Pilato, & Roy, 2004; Schröder & Ziefle, 2008) have indicated that photorealistic icons exhibit greater usability than do abstract/geometric icons, and simple and photorealistic icons are the easiest to recognize (Forsythe, 2009). McDougall et al. (2009) further maintained that the aforementioned results may be related to the memory and cognitive performance of users.

Typically, although photorealistic and simple icons theoretically exhibit the most satisfactory usability, the applicability of emoticons is affected by the context of interactions; therefore, the preferences, usage motivation, and practices of users, as well as the relationships and conversations between speakers, must be further examined. Although abstract thinking may increase cognitive load (Paas & van Merriënboer, 1994), it is widely popular among Internet users because it occasionally enables imagination (Kolb & Fry, 1975; Moreno, Ozogul, & Reisslein, 2011). Mirenda (2003) suggested that icons should be designed in accordance with iconicity to maximize their usability. However, emoticon selection and usage may not only be affected by cognitive load. According to the model theory of the factors influencing icon interpretation, as proposed by McDougall and Curry (2007), users' preferences and icon purchases are associated with the cognitive characteristics of icons for users. Isherwood (2009) reported that the interpretations of emoticon interfaces by designers and users may differ from each other because of the difference in their roles. Emoticon users consider not only the usability of emoticons, but also the concurrent attitudes and motivations of the users themselves (Dresner & Herring, 2010). For example, winking emoticons are more frequently used by chatters without profile photos than by those with them because these emoticons are fancier and more attractive (Fullwood et al., 2013). Wolf (2000) reported that women's groups tend to use numerous emoticons in discussing humorous topics and to mock men with satirical images. Socially powerful users are associated with positive emoticons (Tchokni et al., 2014). Emoticon usage reveals the evaluative disclosure of individuals and their linguistic styles in social interactions (Fullwood et al., 2013; Hu, Wood, Smith, & Westbrook, 2006). In summary, emoticon selection and usage reflect the modes of users' behaviors and interpersonal relationships (Fullwood et al., 2013). This is one of the greatest differences between emoticons and other functional interface icons.

Emoticons and Status

Technological interfaces can be explored through the characteristics of their animated or static status (Van den Bergh & Coninx, 2005). Veszelszki (2005) and Xu, Yi, and Xu (2007) have also categorized emoticons on the basis of their animated or static status in their discussions. Furthermore, Jibril and Abdullah (2013) observed that emoticons exhibit not only static facial expressions, but also animated and other visual changes. Therefore, in addition to the three types of visual forms of emoticons, the prevalent animated and static statuses are also discussed in the present study.

In studying the animated status of emoticons, Wang, Prendinger, and Igarashi (2004) explored the emotional effects of emoticons attained by adding text compositions to their animated elements. The experiment revealed that the animated status enabled more immediate expression of emotions and triggering of user feedback. Xu et al. (2007) indicated that animated statuses are more vivid and closer to real-life interactions than are static statuses. Harmon et al. (2014) and Fujisawa, Inoue, Yamana, and Hayashi, (2011) have maintained that animated expressions strengthen the connotations of emoticon status. Schlosser et al. (2012) reported that animated expressions outperformed static expressions in verb icon evaluation. Additionally, animated expressions provide more information than static expressions, such as temporal elements (Lee, Jun, Forlizzi, & Hudson, 2006); occasionally, such diverse expressions reduce the requirement for explanation (Kennedy, 1974). In addition to usage performance, animated status may enhance the likeability of emoticons for users (van der Meer et al., 2012). Lo and Leung (2009) reported that users may use various levels of emoticon status to express their detailed emotions and thereby achieve more enjoyment through Internet communication.

Animated statuses are not absolutely superior; static statuses also have advantages (Cook, 2006; Harmon et al., 2014). Static statuses require less perception time and currently cost less than animated statuses (Dindar, Kabakçı Yurdakul, & Dönmez, 2014). Additionally, animated, highly informative activities may sometimes cause more mental workload for users than static status may (Hasler, Kersten, & Sweller, 2007) and distract their readers (Xu et al., 2007). The usability of emoticons with animated, static, and various other statuses needs to be investigated (Xu et al., 2007) and involves not only their efficiency, efficacy, and preferability, but also their mutual relationships with the mental workload of their users (Lund & Light, 2006).

Research Design

This was a preliminary study on the forms and statuses of emoticons. To clarify the usability of the emoticons and the motives for their usage, a statistical survey was conducted to acquire quantified feedback, and a qualitative study was performed to further explore the motivations and preferences of users in selecting emoticons and to further understand the realistic details of the emoticons, in the hope of generating more thorough research findings. According to Fullwood et al. (2013), qualitatively investigating the motivations of emoticon users enables one to truly understand the reasons for their emoticon usage. Hu et al. (2006) maintained that content analysis must be conducted to further understand the true characteristics of intimacy in instant messaging. A *focus group* discussion is a method organized with semi-structured interview questions with a group of 6–12 participants (Robert Wood Johnson Foundation, n.d.; Tobacco Technical Assistance Consortium, n.d.; Wong, 2008). It offers

the following advantages: (a) the discussion enables interaction and sharing among participants, thereby enabling researchers to gather realistic data; (b) the flexibility of the discussion enables researchers to repeatedly inquire into and understand the details and claims of the participants; and (c) the researchers can immediately formulate conclusions and verify them with the participants. These advantages fitted the purpose of this study: to clarify the experience of emoticon users. Therefore, the qualitative research was conducted through a focus group discussion and a subsequent generalization of the content it yielded.

Previous studies have indicated that university students are the largest cohort (Baron, 2004; Jia & Chen, 2016) who contribute considerably to IM research; these students are familiar with the use of Internet devices to deliver messages to various groups and establish interpersonal relationships (Hu et al., 2006; Pettijohn, LaPiene, Pettijohn, & Horting, 2012). Numerous participants in emoticon studies have been aged close to the average university student age. For example, the participants gathered by Leung (2004) were aged 16–24 years; the participants gathered by Whitty and Gavin (2001) had an average age of 23 years; and the participants gathered by Hu et al. (2006) had an average age of 21.50 years. Accordingly, the participants in this study were university students. Forty-two subjects (age 18–22, 22 male, 20 female) were recruited from a university in northern Taiwan. These students had no teacher–student relationships or interests with the researchers; thus the realism and accuracy of the research results were enhanced. In addition, panelists who had actively shared their opinions on emoticon usage with other people were invited into the focus group discussion.

Phase I: *Experiment*

Studies have indicated that emoticons can be categorized according to the types of emotion they convey. Different emoticons may exhibit differences in their usability in studies of their form and status factors (Jibril & Abdullah, 2013; Kim, M. et al., 2014). Moreover, interpersonal relationships can be examined through emoticon usage (Hu et al., 2006). In particular, *love* is a communication variable that can be used to detect interpersonal relationships (Kolodny, 2003), and therefore emoticons expressing *love* may be useful objects to focus on (Roberts, Roach, Johnson, Guthrie, & Harabagiu, 2012; Smith, Masthoff, & Tintarev, 2016). Therefore, a within-subject preliminary emoticon usability study was conducted on *love* emoticons involving three forms (abstract/geometric, personified, and concrete) and two statuses (animated and static).

A *heuristic evaluation* was conducted in the pretest. Heuristic evaluation is a usability method that is used before experiments and can help two or more specialists determine interface problems and related issues (Kumar & Hussein, 2014; Lambeck, Müller, Fohrholz, & Leyh, 2014; Neto & Campos, 2014; Reynaga, Chiasson, & Oorschot, 2015). Three experts with a minimum of five years of experience (Dimitrova, Sharp, & Kingdom, 2001; Gkouskos & Chen, 2012) in studying human–computer interactions categorized *love* emoticons in a simulated chat room into three types of forms, namely abstract/geometric, personified, and concrete. From each form, six *love* emoticon animations were selected. Subsequently, the most representative emoticon of each form was selected by the pretest participants as the three forms of animated emoticons to be used in the experiment. To control style and content manifestation, the most representative grids of the animated icons were employed as the basis of the static icons, as shown in Figure 1. The forms from left to middle to right are respectively abstract/geometric, personified, and concrete. Research has stated that color is a variable that can affect interface performance (Douglas & Kirkpatrick, 1999; Zhou, Xue, & Liu, 2016). Therefore, all the emoticons were presented in black and white to eliminate any potential distraction by the color variables at this stage.

The six stimuli were presented to the 42 experiment participants on a computer screen. To improve the realism of the context, the background environment of the emoticon browsing window was represented as a chat room window. To reduce environmental interference, the usability of the emoticons was examined through written assessments.

All the participants were requested to browse the six representative *love* emoticons involving three forms and two status levels. The participants performed a written assessment on each of the emoticons that they browsed. The assessment concerned three dimensions of usability, namely the effectiveness of, motivation for usage of, and preference for the emoticons. The essential function of an emoticon is to convey messages effectively (Boia, Faltings, Musat, & Pu, 2013; Wang, 2015). Secondly, the emoticon should motivate its usage (Cao & Ye, 2009; McDougald, Carpenter, & Mayhorn, 2011). Users are satisfied not only with successful communication, but also with joyful conversation (Huang, Yen, & Zhang, 2008). Accordingly, investigation into preferences is required (Dunlap et al., 2014; Hsiao & Hsieh, 2014).

These three dimensions with three forms by two statuses were evaluated using 18 questions and a 7-point Likert scale. (The 7-point Likert scale was shown to participants with disagree to agree as -3 to 3 and was calculated with 1 to 7 points. 7 = most strongly agree; 1 = most strongly disagree. The questionnaire is summarized in the appendix.) The participants could voice any question or opinion during the experimental phase.

Effectiveness: The extent to which this emoticon enhances the participant's emotional imagery.

Usage motivation: The extent of the participant's intention to use this emoticon.

Preference: The extent of the participant's preference for this emoticon.

In addition to the aforementioned three usability dimensions, the experience and practices of the participants regarding using the emoticons were further examined. The participants were requested to evaluate the following six questions regarding the six representative emoticons, and emoticons in general, through a 7-point Likert scale: "Do you like to use the emoticon?" "Do you like to see this emoticon?" "Are you adept at using this emoticon?" "Does this emoticon enhance emotional expression?" "Do you save new

emoticons?" and "Do you frequently switch among the emoticons that you use?" In this way, consistency among the participants' active usage intention, execution, passive reception, perceived effectiveness, and preference regarding the emoticons was clarified. Through the dimension of preference, it was confirmed whether the use and cognition of the emoticons by the participants were for long-term learning and usage or short-term purposes.

Abstract/Geometric Personified Concrete

Figure 1. Stimulus emoticons with three representational forms.

Phase II: *Focus Group Discussion*

The focus group discussion was conducted with eight students (age 22–24, four male, four female) recruited from a university in northern Taiwan. All the students had IM experience. Phase I participants were excluded from recruitment. The discussion employed semi-structured questions in a set environment (comfortable, circle setting, tape recorded; Krueger, 2002). First, the researchers presented the participants with papers containing a description of the research and the purpose of the experiment, along with the semi-structured questions, and provided pens. Next, the researchers explained the objectives of the research and started to put the questions. To obtain more open feedback and suggestions, the 5W1H (who, what, where, when, why, how) questioning formula was employed to elicit the details of the participants' experience of and feelings about using the emoticons. Moreover, all participants were encouraged to discuss and exchange thoughts with each other until the discussion generated conclusions.

The researchers had to ensure that the discussion adhered to the scope of the study, and enable the participants to review the discussion content and verify the completeness of their contributions to the research when brainstorming. To gather a broad scope of data and verify the results of the first phase, the core of the semi-structured questions did not focus on the emoticons for any particular emotion.

The semi-structured questions put in the focus group were as follows:

(a) Experience: What were your satisfactory and unsatisfactory experiences of using the emoticons in the chat room?
(b) Form: Why do you like or dislike the emoticon and its form?
(c) Status: How did you feel about using the animated and static emoticons in texts?
(d) Suggestions: Please provide any suggestions and supplementary opinions you have.

During the discussion process, certain participants might offer opinions actively and the researchers would continuously question the others to confirm agreement on each point. Where there was divergence, the researchers would dig into the reasons behind it by repeating 5W1H questions and lead the participants to clarify their statements and consensus. On the other hand, there would be no consensus if there was no common ground or the opinions were opposite. The discussion data included the notes made by the participants and audio records; a content and axial inductive analysis was conducted on these data.

Analysis

Phase I: *Statistical Analysis*

A total of 42 participants returned valid responses to the questionnaire survey. IBM SPSS Statistics was employed for 2-way analysis of variance to analyze the six incorporated emoticons involving three forms (abstract/geometric, personified, and concrete) and two statuses (static and animated). The analyses on the effectiveness of, motivation for usage of, and preferences for the *love* emoticons as well as the relationships among the aforementioned six dimensions are presented as follows:

Effectiveness

Tables 1 and 2 list the analyses of the effectiveness of the six emoticons involving three forms and two statuses. While the differences in effectiveness between the statuses and forms were statistically insignificant, the interaction between the statuses and the forms was significant ($F = 5.139$, $p = .008 < .05$).

The interaction is displayed in Table 2 and Figure 2. The participants indicated that the animated and personified emoticon enhanced emotional expression the most significantly; conversely, the static and concrete emoticon enhanced emotional expression the least significantly.

Generally, regarding the personified emoticons, both the animated and static emoticons were considered capable of effectively conveying emotions. Regarding the abstract/geometric emoticons, the static emoticon was considered as conveying emotions more effectively than the animated one. For the concrete emoticons, the animated one conveyed emotions more effectively than the static one.

Usage Motivation

Regarding the usage motivation for the *love* emoticons involving three forms and two statuses, according to the post-hoc least significant differences as listed in Tables 3, 4, and 5, the primary effects of the forms were significant ($F = 7.046$, $p = .002 < .05$). Overall, the usage intention for the personified emoticons was the highest; those for the abstract/geometric and concrete emoticons were not significantly different.

A significant interaction was observed between the statuses and the forms regarding usage intention ($F = 3.980$, $p = .022 < .05$). As indicated in the interaction chart shown in Figure 3, the participants displayed the highest intention to use the abstract/geometric and static emoticons; conversely, the participants showed the lowest intention to use the concrete and static emoticons. Overall, both the animated and the static personified emoticons were associated with high usage motivation in the participants.

Table 1. Descriptive statistics: Effectiveness.

Variables	Form	*Mean*	*SD*	*N*
Animated	Abstract and Geometric	3.952	1.873	42
	Personified	4.667	1.618	42
	Concrete	4.214	1.539	42
	Total	4.278		
Static	Abstract and Geometric	4.476	1.401	42
	Personified	4.357	1.650	42
	Concrete	3.643	1.462	42
	Total	4.159		
Sum	Abstract and Geometric	4.214		
	Personified	4.512		
	Concrete	3.929		

Table 2. Two-way ANOVA results for effectiveness.

Source of Variation	*SS*	*df*	*MS*	*F*	*Sig.*
Between					
Status	.893	1	.893	.388	.537
Form	14.294	2	7.147	2.486	.089
Status*Form	13.738	2	6.869	5.139	.008*
Within					
Error	188.496	41	4.597		
Error (Status)	94.274	41	2.299		
Error (Form)	235.706	82	2.874		
Error (Status*Form)	109.595	82	1.337		
Total	634.258	250			

* $p < 0.05$

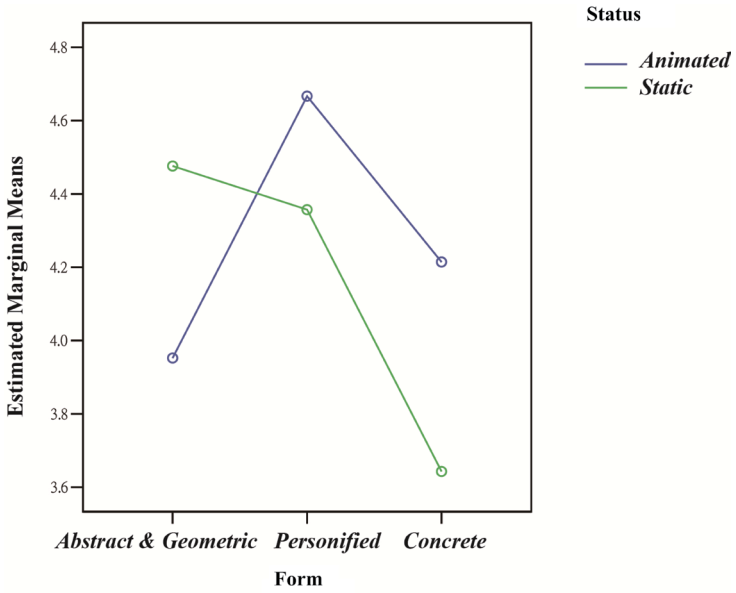

Figure 2. Interaction chart on effectiveness.

Table 3. Descriptive statistics: Usage motivation.

Variables	Form	*Mean*	*SD*	*N*
Animated	Abstract and Geometric	3.714	1.672	42
	Personified	4.548	1.670	42
	Concrete	3.738	1.609	42
	Total	4.000		
Static	Abstract and Geometric	4.310	1.554	42
	Personified	4.643	1.543	42
	Concrete	3.476	1.435	42
	Total	4.143		
Sum	Abstract and Geometric	4.012		
	Personified	4.595		
	Concrete	3.607		

Table 4. Two-way ANOVA results on the usage motivation of the participants.

Source of Variation	*SS*	*df*	*MS*	*F*	*Sig.*	*Post Hoc (LSD)*
Between						
Status	1.286	1	1.286	.5810	.450	
Form	41.452	2	20.726	7.046	.002*	(Personified, Abstract/Geometric) > Concrete
Status*Form	7.786	2	3.893	3.980	.022*	
Within						
Error	204.048	41	4.977			
Error (Status)	90.714	41	2.213			
Error (Form)	241.214	82	2.942			
Error (Status*Form)	80.214	82	.978			
Total	666.714	250				

* $p < 0.05$

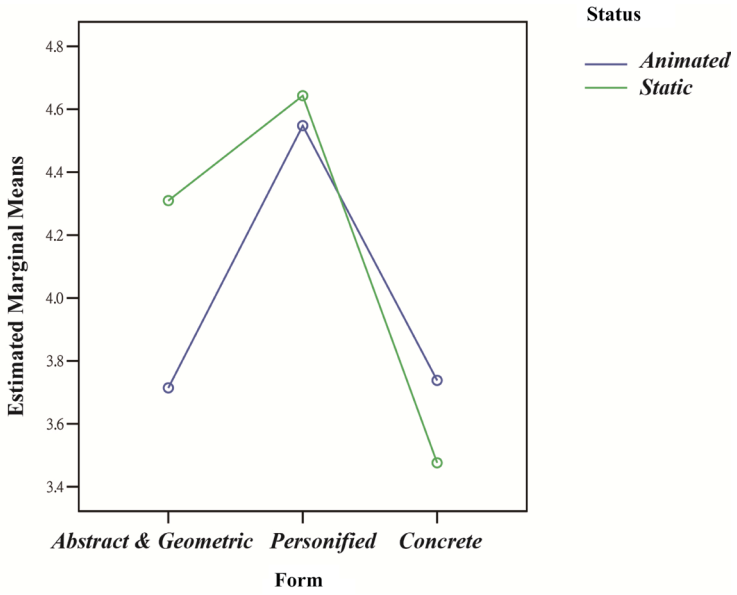

Figure 3. Interaction chart on usage motivation.

Preference

Regarding the preferences of the participants for the different *love* emoticons, the post-hoc least significant differences as listed in Tables 5, 6, and 7 reveal that the main effects of the three forms were significant ($F = 9.851$, $p = < .05$). Overall, the personified emoticons were the most preferred by the participants; the abstract/geometric emoticons were considerably less preferred; and the concrete emoticons were the least preferred.

A significant interaction was observed between the two statuses and the three forms regarding preference ($F = 15.141$, $p < .05$). As indicated in the interaction chart in Figure 4, both the animated and static personified emoticons were considerably and equally preferred by the participants. Regarding the abstract/geometric emoticons, the static one was more preferred than the animated one. Conversely, regarding the concrete emoticons, the animated one was more preferred than the static one.

Correlation of Effectiveness, Usage Motivation, and Preference

The aforementioned analysis on the effectiveness of, motivation for usage of, and preference for the emoticons showed that the primary effects of the activities were not significant; that of the personified form was the optimal and least significant among the three forms. However, a consistent correlation was observed among these three dimensions. A Pearson analysis was conducted to identify the correlation, as shown in Table 7. The results indicate that the effectiveness of, motivation for usage of, and preference for the emoticons as indicated by the participants were positively associated with one another.

Phase II: *Focus Group Discussion Analysis*

The focus group discussion involved a total of eight participants experienced in using emoticons. All the participants actively brainstormed on and shared with each other their motivations, feelings, and suggestions for using the emoticons. Moreover, the eight participants themselves reached a consensus after discussion. The recorded data were repeatedly verified by the participants for an accurate, agreed conclusion. For example, when the researchers asked all the participants, "Why do you think abstract or geometric emoticons are in common use?" Participant 1 responded, "Abstract or geometric emoticons can be found in most chat rooms." Participant 4 supported this opinion, saying, "I agree. It's the normal and basic emoticon." Participant 5 also confirmed the experience, saying, "I think everyone has used the abstract or geometric ones." When other participants expressed agreement with nods, the researchers checked and confirmed the agreement and recorded the conclusion of this section as "abstract/geometric emoticon is the basic form." All the consensuses are shown in Table 8.

Analyzing the discussion revealed the interaction between the participants' levels of usage of the three emoticon forms and of the two emoticon statuses. Unexpectedly, the participants' motivations for using the emoticons were found to vary in accordance with their situations and senses of intimacy. The analysis is summarized in Table 8 and as follows:

(a) Use of the abstract/geometric emoticons: the static icons were preferred; typically used for polite greetings and non-intimate relationships.

(b) Use of the personified emoticons: the animated and static icons were equally preferred; typically used for lively greetings and intimate relationships.

(c) Use of the concrete emoticons: the animated icons were more preferred; typically used for familiar, frequent intimate interactions, and specific groups or individuals with whom the participants had strong senses of companionship.

Discussion

The quantitative investigation in Phase I revealed that the three dimensions of effectiveness, usage motivation, and preference were positively correlated with one another, and all the degrees of interaction between the statuses and forms were equal. The determined concepts of the interactions are described as follows: (a) The abstract/geometric emoticons were ideally expressed in static forms. Both abstract/geometric and animated emoticons caused higher mental workload for their readers than did static ones (Kolb & Fry, 1975; Wiemer-Hastings & Xu, 2005). Combining the two types of emoticons increased the difficulty and mental workload for users in reading the emoticons. Therefore, the participants indicated that employing this combination did not enable effectively expressing emotions, and the usage motivation and preference for the combination were low. (b) The concrete emoticons were ideally expressed in animated forms. The participants were able to recognize the concrete icons easily (McDougall et al., 2009; Patel, Pilato, & Roy, 2004; Schröder & Ziefle, 2008), and expressing these emoticons in static forms was considered uninteresting. When expressed in animated forms, the emotional manifestation of these concrete emoticons was enhanced. (c) Overall, the personified emoticons were the most popular emoticons among the participants; both the animated and static forms were strongly positively evaluated by the participants. This *may be* because emoticons are used to express human emotions, and this purpose corresponds with personified emoticons, which are primarily designed to express human nature (Blom & Monk, 2001). Accordingly, with the personified emoticons as the standard reference point, the emoticons with more abstract/geometric forms were better presented in static forms, and those with more concrete forms were better presented in animated forms. Specifically, the concrete emoticons were ideal for use as animated emoticons in addition to the personified ones, and the abstract/geometric emoticons were ideal for use as static emoticons in addition to the personified ones. Thus, the mental workload of the participants regarding the forms and statuses of the emoticons could be balanced.

The focus group discussion analysis performed in Phase II revealed that the general experience and opinions of the participants regarding the use of the emoticons involving the

Table 5. Emoticons: Descriptive statistics: Satisfaction.

Variables	Form	*Mean*	*SD*	*N*
Animated	Abstract and Geometric	3.8095	1.486	42
	Personified	4.8095	1.642	42
	Concrete	4.0476	1.497	42
	Total	4.2220		
Static	Abstract and Geometric	4.6429	1.303	42
	Personified	4.8095	1.566	42
	Concrete	3.3571	1.411	42
	Total	4.2700		
Sum	Abstract and Geometric	4.2260		
	Personified	4.8100		
	Concrete	3.7020		

Table 6. Emoticons: Two-way ANOVA results for subjective satisfaction.

Source of Variation	*SS*	*df*	*MS*	*F*	*Sig.*	*Post Hoc (LSD)*
Between						
Status	.143	1	.143	.094	.760	
Form	51.532	2	25.766	9.851	.000*	Personified > Abstract/Geometric > Concrete
Status*Form	24.452	2	12.226	15.141	.000*	
Within						
Error	201.746	41	4.921			
Error (Status)	62.190	41	1.517			
Error (Form)	214.468	82	2.615			
Error (Status*Form)	80.214	82	.978			
Total	666.714	250				

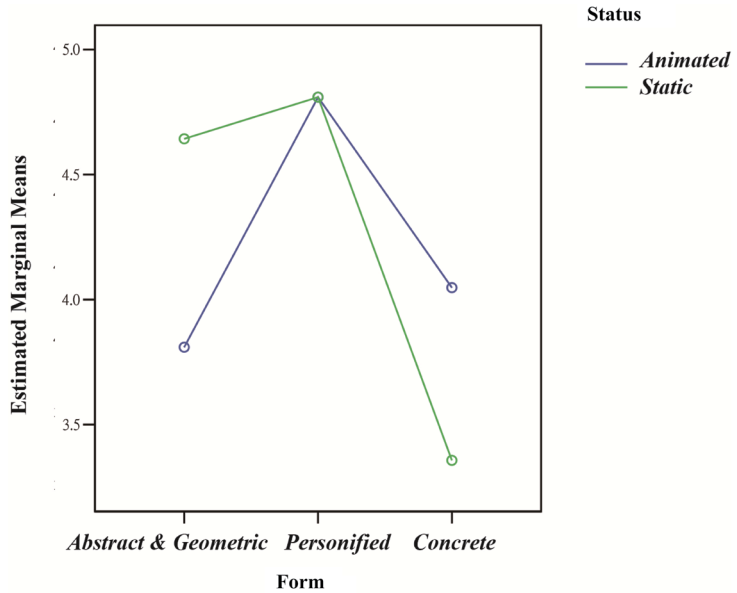

Figure 4. Interaction chart on preference.

Table 7. Pearson correlation matrix: Preference, usage motivation, and effectiveness.

Variables	Preferred Form	*Effectiveness*	*Usage Motivation*
Animated	Abstract and Geometric	.689* (Sig. .000)	.901* (Sig. .000)
	Personified	.747* (Sig. .000)	.884* (Sig. .000)
	Concrete	.779* (Sig. .000)	.866* (Sig. .000)
	Total	.737* (Sig. .000)	.827* (Sig. .000)
Static	Abstract and Geometric	.726* (Sig. .000)	.860* (Sig. .000)
	Personified	.714* (Sig. .000)	.913* (Sig. .000)
	Concrete	.689* (Sig. .000)	.901* (Sig. .000)
	Total	.747* (Sig. .000)	.884* (Sig. .000)

* $p < 0.01$

Table 8. Focus group discussion: Summary of participants' experience of using the emoticons, regarding the three forms, two statuses, and timing/intimacy.

Form	Summary
Abstract/geometric	1-1 basic; 1-2 simple to use; 1-3 frequently used in conversations with unfamiliar people; 1-4 frequently used for greetings or introductions; 1-5 static emoticon preferred, and animation not required to understand the emoticons; 1-6 animated emoticon slightly complicated; 1-7 static emoticon preferred for communications with unfamiliar people, and the animated emoticon considered as too enthusiastic
Personified	2-1 interesting; 2-2 collection intended; 2-3 frequently used for enthusiastic conversations; 2-4 plenty of emoticons with personified animals, and both animated and static emoticons frequently used; 2-5 numerous static emoticons considered as adorable and frequently used; 2-6 animated emoticons considered as lively
Concrete	3-1 static emoticon considered as similar to a photo; 3-2 most emoticons considered as uninteresting; 3-3 small animations or films required to be interesting; 3-4 relatively effective only when used in conversations with familiar people or groups discussing certain topics

three forms and two statuses were consistent with those regarding the use of the *love* emoticons as the stimuli in Phase I. This further confirmed the analysis results of Phase I. Moreover, the participants indicated that they selected the forms and statuses of the emoticons to use according to the context and the people they conversed with. The abstract/geometric emoticons were typically used in static forms and in conversations with unfamiliar people for politeness and decorum, consistent with the relatively calm moods of the participants. In studying the animated and static statuses of emoticons, Visch and Goudbeek (2009) indicated that emoticons for sadness are typically expressed in static forms, thus indirectly reflecting the relationship between the status of emoticons and the melancholic moods of their users. In this study, the personified emoticons were typically used in lively conversations and for expressing earnest feelings. Regardless of their status, these emoticons were used if their visual manifestations were interesting; thus, their use was consistent with the energetic mood of their users. The concrete emoticons were typically chosen in the forms of small movies or photo series. These emoticons were used to express specific themes from real life. Accordingly, these concrete emoticons were commonly used in conversations with familiar individuals or discussion groups. These animated expressions were consistent with the familiarity between their users and the targets of their conversations. This also corresponds with the argument by Maynard, Bontcheva, and Rout (2012), whereby the motions of animated emoticons correspond with the social characteristics and intended semantics of individuals. The group discussion analysis confirmed the compositions of the visual elements of the emoticons and the axes of timing/intimacy relationships. Hu et al. (2006) reported that the intimacy hidden within interpersonal relationships can only be understood by analyzing transmitted IMs.

We found that the emoticons in this study exhibited an index that had the personified forms as the standard and extended toward the abstract/geometric and concrete forms, which corresponded with the static and animated statuses, respectively. As verified in the focus group discussion, the relationship between the targets of emoticon transmission and intimacy in conversations corresponded with these two axes as shown in the emoticon performance model in Figure 5. The more polite, distant, and non-intimate a conversation was, the more abstract/geometric and static the emoticons involved became. Conversely, in conversations with greater resonances among participants toward specific topics, and in groups with greater senses of companionship, and thus higher intimacy, more concrete and animated emoticons would be employed. In addition to the relationship between the visual elements of emoticons and the mental workload of users, the consistency of the relationship with

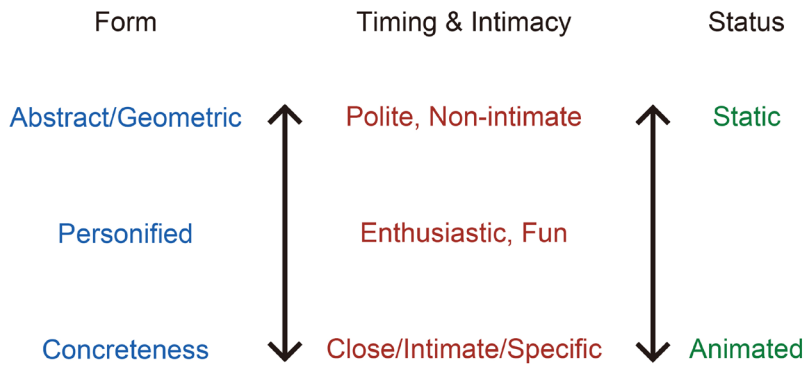

Figure 5. Emoticon performance model. The relationship between form, status and timing/intimacy.

the intimacy and moods of users in conversations was verified. This corresponds with the suggestion by Hu et al. (2006) that the social intimacy level in IMs must be further examined.

Regarding the analysis of the emoticon usage experiences and practices of the participants, the participants' low preference toward old emoticons and high expectations toward new ones correspond with the argument by Ruan (2011) that because new emoticons are continually created and demanded, the research and application of emoticons still primarily involves short-term cognition. This is different from other interface applications for which long-term cognitive learning is required.

Conclusion

With the prevalence and development of IM software, graphic emoticons are frequently applied in chat rooms. Although emoticons cannot be simply categorized as having abstract/geometric, personified, or concrete forms (some emoticons are intermediate between abstract/geometric and personified or between personified and concrete), this study provided a trend indicator on the correspondence between the visual forms of emoticons and their statuses. In addition, the relationship with the interpersonal intimacy axes in this model was identified by the focus group results. The more polite, distant, and non-intimate an interpersonal conversation was, the more abstract/geometric and static the emoticons used became. The main concern with fun and enthusiasm is associated with personified forms. Conversely, in conversations with greater resonances among participants toward specific topics, and in groups with greater senses of companionship, and thus higher intimacy, more concrete and animated emoticons would be employed. The results of this study provide a reference to emoticon designers for the animated and static statuses corresponding to the forms in emoticon designs. Thus, designers can focus on developing emoticons that exhibit positive usability and facilitate users' ideal usage practices in accordance with the attributes of IM users.

Limitations and Future Research

This study focused on emoticon usage in instant messaging and may differ from the text-assisted communications in emails and other means of Internet communication. This study explored the use of *love* emoticons for expressing positive emotions in Phase I and qualitatively examined the use of emoticons through interviews and verifications. However, additional studies should be conducted on other emoticons that manifest positive emotions to confirm the applicability of the form–status model. In addition, there is a need to investigate the use of negative emoticons in future studies. Colors are one of the visual elements in emoticons; now that the applicability of the aforementioned emotion categories used in the model has been confirmed, the real color variable should be included in future studies. Examining the cultural backgrounds of emoticon users can also contribute to a more comprehensive study on the visual elements of emoticons.

References

1. Amalanathan, A., & Anouncia, S. M. (2015). Social network user's content personalization based on emoticons. *Indian Journal of Science and Technology,* 8(23). doi:10.17485/ijst/2015/v8i23/72773
2. Baron, N. (2004). See you online: Gender issues in college students' use of instant messaging. *Journal of Language and Social Psychology, 23*(4), 397-423.
3. Bays, H. (2010). Visual iconic patterns of instant messaging: Steps towards understanding visual conversations. In J. Hunsinger, L. Klastrup, & M. Allen (Eds.), *International handbook of Internet research* (pp. 41-64). Dordrecht, Netherlands: Springer. doi:10.1007/978-1-4020-9789-8
4. Beardon, C. (1994). Iconic communication. *Intelligent Tutoring Media, 5*(2), 58-62. doi:10.1080/14626269409408343
5. Beebe, S. A., Beebe, S. J., Redmond, M. V., Geerinck, T. M., & Salem-Wiseman, L. (2015). *Interpersonal communication: Relating to others* (6th ed.). Toronto, Canada: Pearson.
6. Belair-Gagnon, V., Agur, C., & Frisch, N. (2016). *New frontiers in newsgathering: A case study of foreign correspondents using chat apps to cover political unrest.* New York, NY: Tow Center for Digital Journalism, Columbia University.
7. Blom, J., & Monk, A. (2001). One-to-one e-commerce: Who's the one? In *CHI '01 Extended Abstracts on Human Factors in Computing Systems* (pp. 341-342). New York, NY: ACM. doi:10.1145/634067.634269

8. Boia, M., Faltings, B., Musat, C.-C., & Pu, P. (2013). A :) is worth a thousand words: How people attach sentiment to emoticons and words in Tweets. In *2013 International Conference on Social Computing* (pp. 345-350). Piscataway, NJ: IEEE. doi:10.1109/SocialCom.2013.54
9. Bravo-Márquez, F., Frank, E., & Pfahringer, B. (2015). Positive, negative, or neutral: Learning an expanded opinion lexicon from emoticon-annotated Tweets. In Q. Yang & M. Wooldridge (Eds.), *Proceedings of the 24th International Joint Conference on Artificial Intelligence* (pp. 1229-1235). Buenos Aires, Argentina: AAAI Press.
10. Cao, Z., & Ye, J. (2009). Attention savings and emoticons usage in BBS. In *Proceedings of the 4th International Conference on Computer Sciences and Convergence Information Technology* (pp. 416-419). Piscataway, NJ: IEEE. doi:10.1109/ICCIT.2009.112
11. Chen, X., & Siu, K. W. M. (2017). Exploring user behaviour of emoticon use among Chinese youth. *Behaviour & Information Technology, 36*(6), 637-649.
12. Collins, C., Hasan, S., & Ukkusuri, S. V. (2013). A novel transit rider satisfaction metric: Rider sentiments measured from online social media data. *Journal of Public Transportation, 16*(2), 21-45.
13. Cook, M. P. (2006). Visual representation in science education: The influence of prior knowledge and cognitive load theory on instructional design principles. *Science Education, 90*(6), 1073-1091.
14. Dimitrova, M., Sharp, H., & Kingdom, S. (2001). Why do experts predict false alarms? An empirical investigation into the validity of expert evaluations of instruction multimedia software. In M. J. Smith, G. Salvendy, D. Harris, & R. J. Koubek (Eds.), *Usability evaluation and interface design: Cognitive engineering, intelligent agents and virtual reality* (pp. 1247-1251). Mahwah, NJ: Lawrence Erlbaum Associates.
15. Dindar, M., Kabakçı Yurdakul, I., & Dönmez, F. I. (2014). Measuring cognitive load in test items: Static graphics versus animated graphics. *Journal of Computer Assisted Learning, 31*(2), 148-161. doi:10.1111/jcal.12086
16. Douglas, S., & Kirkpatrick, A. E. (1999). Model and representation: The effect of visual feedback on human performance in a color picker interface. *Transactions on Graphics, 18*(2), 96-127.
17. Dresner, E., & Herring, S. C. (2010). Functions of the nonverbal in CMC: Emoticons and illocutionary force. *Communication Theory, 20*(3), 249-268. doi:10.1111/j.1468-2885.2010.01362.x
18. Dunlap, J. C., Bose, D., Lowenthal, P. R., York, C. S., Atkinson, M., & Murtagh, J. (2014). What sunshine is to flowers: A literature review on the use of emoticons to support online learning. In S. Y. Tettegah & M. Gartmeier (Eds.), *Emotions, technology, design and learning* (pp. 163-182). San Diego, CA: Elsevier.
19. Forsythe, A. (2009). Visual complexity: Is that all there is? In D. Harris (Ed.), *Engineering psychology and cognitive ergonomics* (pp. 158-166). Berlin, Germany: Springer. doi:10.1007/978-3-642-02728-4_17
20. Fujisawa, K., Inoue, T., Yamana, Y., & Hayashi, H. (2011). The effect of animation on learning action symbols by individuals with intellectual disabilities. *Augmentative and Alternative Communication, 27*(1), 53-60. doi:10.3109/07434618.2011.553245
21. Fullwood, C., Orchard, L. J., & Floyd, S. A. (2013). Emoticon convergence in Internet chat rooms. *Social Semiotics, 23*(5), 648-662. doi:10.1080/10350330.2012.739000
22. Gkouskos, D., & Chen, F. (2012). The use of affective interaction design in car user interfaces. *Work, 41*(1), 5057-5061.
23. Hasler, B. S., Kersten, B., & Sweller, J. (2007). Learner control, cognitive load and instructional animation. *Applied Cognitive Psychology, 21*(6), 713-729.
24. Harmon, A. C., Schlosser, R. W., Gygi, B., Shane, H. C., Kong, Y. Y., Book, L., … Hearn, E. (2014). Effects of environmental sounds on the guessability of animated graphic symbols. *Augmentative and Alternative Communication, 30*(4), 298-313. doi:10.3109/07434618.2014.966206
25. Hu, M. (2009). Will online chat help alleviate mood loneliness? *CyberPsychology & Behavior, 12*(2), 219-223. doi:10.1089/cpb.2008.0134
26. Hsiao, K.-A., & Hsieh, P.-L. (2014). Age difference in recognition of emoticons. In S. Yamamoto (Ed.), *Human interface and the management of information. Information and knowledge in applications and services* (pp. 394-403). Cham, Switzerland: Springer. doi:10.1007/978-3-319-07863-2
27. Hu, Y., Wood, J. F., Smith, V., & Westbrook, N. (2006). Friendships through IM: Examining the relationship between instant messaging and intimacy. *Journal of Computer-Mediated Communication, 10*(1). doi:10.1111/j.1083-6101.2004.tb00231.x
28. Huang, A. H., Yen, D. C., & Zhang, X. (2008). Exploring the potential effects of emoticons. *Information & Management, 45*(7), 466-473.
29. Hudson, M. B., Nicolas, S. C., Howser, M. E., Lipsett, K. E., Robinson, I. W., Pope, L. J., … Friedman, D. R. (2015). Examining how gender and emoticons influence Facebook jealousy. *Cyberpsychology, Behavior, and Social Networking, 18*(2), 87-92. doi:10.1089/cyber.2014.0129
30. Huffaker, D. A., & Calvert, S. L. (2006). Gender, identity, and language use in teenage blogs. *Journal of Computer-Mediated Communication, 10*(2). doi:10.1111/j.1083-6101.2005.tb00238.x
31. Innocent, T. (2001). The language of Iconica. *Leonardo, 34*(3), 255-259. doi:10.1162/002409401750287038
32. Isherwood, S. (2009). Graphics and semantics: The relationship between what is seen and what is meant in icon design. In D. Harris (Ed.), *Engineering psychology and cognitive ergonomics* (pp. 197-205). Berlin, Germany: Springer.
33. Jia, J., & Chen, Z. (2016). Blending smart phones into regular classroom learning. In S. Cheung, L. Kwok, J. Shang, A. Wang, & R. Kwan (Eds.), *Blended learning: Aligning theory with practices* (pp. 337-347). Cham, Switzerland: Springer. doi:10.1007/978-3-319-41165-1_30

34. Jibril, T. A., & Abdullah, M. H. (2013). Relevance of emoticons in computer-mediated communication contexts: An overview. *Asian Social Science, 9*(4), 201-207.
35. Kasper-Fuehrera, E. C., & Ashkanasy, N. M. (2001). Communicating trustworthiness and building trust in interorganizational virtual organizations. *Journal of Management, 27*(3), 235-254. doi:10.1177/014920630102700302
36. Kaye, L. K., Malone, S. A., & Wall, H. J. (2017). Emojis: Insights, affordances, and possibilities for psychological science. *Trends in Cognitive Sciences, 21*(2), 66-68.
37. Kennedy, J. M. (1974). *A psychology of picture perception.* London, UK: Jossey-Bass.
38. Kim, K., & Kim, D. (2003). Design of emotional bulletin board to support learning motivation of CoP in web-based learning environment: Based on emoticon & color. *Journal of the Korea Society of Computer and Information, 6*(2), 165-173.
39. Kim, M., Shi, C., & Kim, J. (2014). Reinterpret 3G emoticons from a persona theory. *Lecture Notes in Computer Science, 8531*, 462-473. doi:10.1007/978-3-319-07632-4_44
40. Kolb, D. A., & Fry, R. (1975). Toward an applied theory of experiential learning. In C. Cooper (Ed.), *Theories of group process* (pp. 33-58). Hoboken, NJ: Wiley.
41. Kolodny, N. (2003). Love as valuing a relationship. *The Philosophical Review, 112*(2), 135-189. doi:10.1215/00318108-112-2-135
42. Krueger, A. R. (2002). *Designing and conducting focus group interviews.* Retrieved from http://www.alnap.org/resource/19266
43. Kumar, B. A., & Hussein, S. (2014). Heuristic based user interface evaluation of mobile money application: A case study. *International Journal of Handheld Computing Research, 5*(2), 75-86.
44. Kurlander, D., Skelly, T., & Salesin, D. (1996). Comic chat. In *Proceedings of the 23rd Annual Conference on Computer Graphics and Interactive Techniques* (pp. 225-236). New York, NY: ACM.
45. Lambeck, C., Müller, R., Fohrholz, C., & Leyh, C. (2014). (Re-)Evaluating user interface aspects in ERP systems – An empirical user study. In *2014 47th Hawaii International Conference on System Sciences* (pp. 396-405). Piscataway, NJ: IEEE. doi:10.1109/HICSS.2014.57
46. Lee, J., Hong, N., Kim, S., Oh, J., & Lee, J. (2016). Smiley face: Why we use emoticon stickers in mobile messaging. In *Proceedings of the 18th International Conference on Human-Computer Interaction with Mobile Devices and Services Adjunct* (pp. 760-766). New York, NY: ACM. doi:10.1145/2957265.2961858
47. Lee, J., Jun, S., Forlizzi, J., & Hudson, S. E. (2006). Using kinetic typography to convey emotion in text-based interpersonal communication. In *Proceedings of the 6th Conference on Designing Interactive Systems* (pp. 41-49). New York, NY: ACM. doi:10.1145/1142405.1142414
48. Lee, S. (2015). The effects of personality traits and motivations on utilization of graphical emoticon in mobile messenger: Focusing on KakaoTalk. *The Journal of the Korea Contents Association, 15(*12), 129-140.
49. Leung, L. (2004). Net-generation attributes and seductive properties of the Internet as predictors of online activities and Internet addiction. *CyberPsychology & Behavior, 7*(3), 333-348. doi:10.1089/1094931041291303
50. Li, X (2015). Research on the impact of IM technology on college students' intimacy. In *Proceedings of the International Conference on Information Technology and Applications* (pp.107-112). London, UK: CRC Press.
51. Lim, C., Park, T., & Hong, W. (2012). Developing emoticon support tool based on emotional affordance to facilitate peer feedback in online collaborative learning. In *Proceedings of E-Learn 2012—World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education* (pp. 1106-1111). Chesapeake, VA: Association for the Advancement of Computing in Education (AACE).
52. Lim, S. H., Kim, D., & Watts, S. (2011). An empirical study of the usage performance of mobile emoticons. *Journal of Information Technology Applications & Management, 18*(4), 21-40.
53. Liu, I. T., & Sun, C. S. (2007). Association between emotional reaction and visual icons. In *Proceedings of the 3rd WSEAS/IASME International Conference on Educational Technologies* (pp. 336-341). Stevens Point, WI: WSEAS.
54. Lo, O. W.-Y., & Leung, L. (2009). Effects of gratification-opportunities and gratifications-obtained on preferences of instant messaging and e-mail among college students. *Telematics and Informatics, 26*(2), 156-166. doi:10.1016/j.tele.2008.06.001
55. Lund, S. K., & Light, J. (2006). Long-term outcomes for individuals who use augmentative and alternative communication: Part I – What is a "good" outcome? *Augmentative and Alternative Communication, 22*(4), 284-299. doi:10.1080/07434610600718693
56. Maynard, D., Bontcheva, K., & Rout, D. (2012). Challenges in developing opinion mining tools for social media. In *Proceedings of the 8th Conference on Language Resources and Evaluation* (pp. 15-22). Paris, France: ELRA.
57. McDougald, B. R., Carpenter, E. D., & Mayhorn, C. B. (2011). Emoticons. What does this one mean? In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 55*(1), 1948-1951. doi:10.1177/1071181311551406
58. McDougall, S., & Curry, M. (2007). More than just a picture: Icon interpretation in context. In *Proceedings of the 1st International Workshop on Coping with Complexity* (pp. 73-80). Bath, UK: University of Bath Press.
59. McDougall, S., Reppa, I., Smith, G., & Playfoot, D. (2009). Beyond emoticons: Combining affect and cognition in icon design. *Lecture Notes in Computer Science, 5639*, 71-80. doi:10.1007/978-3-642-02728-4_8
60. Meeks, B. S., Hendrick, S. S., & Hendrick, C. (1988). Communication, love and relationship satisfaction. *Journal of Social and Personal Relationships, 15*(6), 755-773.
61. Mirenda, P. (2003). Toward functional augmentative and alternative communication for students with autism: Manual signs, graphic symbols, and voice output communication aids. *Language, Speech, and Hearing Services in Schools, 34,* 203-216.

62. Moreno, R., Ozogul, G., & Reisslein, M. (2011). Teaching with concrete and abstract visual representations: Effects on students' problem solving, problem representations, and learning perceptions. *Journal of Educational Psychology, 103*(1), 32-47.
63. Neto, E. V., & Campos, F. F. C. (2014). Evaluating the usability on multimodal interfaces: A case study on tablets applications. In A. Marcus (Ed.), *Design, user experience, and usability. Theories, methods, and tools for designing the user experience* (pp. 484-495). Cham, Switzerland: Springer. doi:10.1007/978-3-319-07668-3_47
64. Nishimura, Y. (2015). A sociolinguistic analysis of emoticon usage in Japanese blogs: Variation by age, gender, and topic. *Paper presented at Internet Research 16: The 16th Annual Meeting of the Association of Internet Researchers*. Phoenix, AZ, 21–24 October 2015. Retrieved from https://spir.aoir.org/index.php/spir/article/view/1137
65. Oleszkiewicz, A., Karwowski, M., Pisanski, K., Sorokowski, P., Sobrado, B., & Sorokowska, A. (2017). Who uses emoticons? Data from 86,702 Facebook users. *Personality and Individual Differences, 119*, 289-295.
66. Paas, F., & van Merriënboer, J. (1994). Instructional control of cognitive load in the training of complex cognitive tasks. *Educational Psychology Review, 6*(4), 351-371. doi:10.1007/bf02213420
67. Patel, R., Pilato, S., & Roy, D. (2004). Beyond linear syntax: An image-oriented communication aid. *Assistive Technology Outcomes and Benefits, 1*(1), 57-66.
68. Pavalanathan, U., & Eisenstein, J. (2015). Emoticons vs. emojis on Twitter: A causal inference approach. Retrieved from https://arxiv.org/pdf/1510.08480.pdf
69. Peris, R., Gimeno, M. A., Pinazo, D., Ortet, G., Carrero, V., Sanchiz, M., & Ibáñez, I. (2002). Online chat rooms: Virtual spaces of interaction for socially oriented people. *CyberPsychology & Behavior, 5*(1), 43-51. doi:10.1089/109493102753685872
70. Pesson, P. (2003). ExMS: An animated and avatar-based messaging system for expressive peer communication. In *Proceedings of the International ISIGGROUP Conference on Supporting Group Work* (pp. 31-39). New York, NY: ACM.
71. Pettijohn, T. F. II, LaPiene, K. E., Pettijohn, T. F., and Horting, A. L. (2012). Relationships between Facebook intensity, friendship contingent self-esteem, and personality in U.S. college students. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace, 6*(1), article 2. doi:10.5817/CP2012-1-2
72. Reynaga, G., Chiasson, S., & Oorschot, P. C. (2015). Heuristics for the evaluation of captchas on smartphones. In *Proceedings of the British HCI Conference* (pp. 126-135). New York, NY: ACM.
73. Rivera, K., Cooke, N. J., & Bauhs, J. A. (1996). The effects of emotional icons on remote communication. In *Conference Companion on Human Factors in Computing Systems* (pp. 99-100). New York, NY: ACM. doi:10.1145/257089.257180
74. Robert Wood Johnson Foundation. (n.d.). *Qualitative research guidelines project.* Retrieved from http://www.qualres.org/HomeFocu-3647.html
75. Roberts, K., Roach, M. A., Johnson, J., Guthrie, J., & Harabagiu, S. M. (2012). EmpaTweet: Annotating and detecting emotions on Twitter. In *Proceedings of the 8th International Conference on Language Resources and Evaluation* (pp. 3806-3813). Paris, France: European Language Resources Association.
76. Ruan, L. (2011). Meaningful signs—Emoticons. *Theory and Practice in Language Studies, 1*(1), 91-94. doi:10.4304/tpls.1.1.91-94
77. Schlosser, R. W., Shane, H., Sorce, J., Koul, R., Bloomfield, E., Debrowski, L., ... Neff, A. (2012). Animation of graphic symbols representing verbs and prepositions: Effects on transparency, name agreement, and identification. *Journal of Speech, Language, and Hearing Research, 55*(2), 342-358. doi:10.1044/1092-4388(2011/10-0164)
78. Schröder, S., & Ziefle, M. (2008). Effects of icon concreteness and complexity on semantic transparency: Younger vs. older users. In *Proceedings of the 11th International Conference on Computers Helping People with Special Needs* (pp. 90-97). Berlin, Germany: Springer.
79. Schwalm, N. D. & Shaviv, V. (2000). Can icon animation enhance human performance… Or is it just another gimmick? In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 44* (pp. 323-326). San Diego, CA: International Ergonomics Association. doi:10.1177/154193120004400208
80. Shaikh, S., Lalingkar, P., Barach, E., & Feldman, L. (2017). Cross-cultural reactions to crisis events via language and emoticon use. In *Proceedings of International Conference on Applied Human Factors and Ergonomics. Advances in Intelligent Systems and Computing* (pp. 23-28). Cham, Switzerland: Springer. doi:10.1007/978-3-319-60747-4_3
81. Smith, K. A., Masthoff, J., & Tintarev, N. (2016). Expressing emotions as emoticons for online intelligent agents. In *Proceedings of the 30th International BCS Human Computer Interaction Conference.* doi:10.14236/ewic/HCI2016.44
82. Smith, M., Farnham, S., & Drucker, S. (2002). The social life of small graphical chat spaces. In R. Schroeder (Ed.), *The social life of avatars: Presence and interaction in shared virtual environments* (pp. 205-220). London, UK: Springer. doi:10.1007/978-1-4471-0277-9_12
83. Tang, Y., & Hew, K. F. (2017). Is mobile instant messaging (MIM) useful in education? Examining its technological, pedagogical, and social affordances. *Educational Research Review, 21*, 85-104.
84. Tchokni, S. E., Séaghdha, D. O., & Quercia, D. (2014). Emoticons and phrases: Status symbols in social media. In *Proceedings of the 8th International AAAI Conference on Weblogs and Social Media* (pp. 485-494). Palo Alto, CA: Association for the Advancement of Artificial Intelligence.
85. Tobacco Technical Assistance Consortium (n.d.). *Focus groups.* Retrieved from http://tacenters.emory.edu/resources/products_tools/tobacco/power-of-proof/data_coll/focus_groups/index.html
86. Tomić, M. K., Martinez, M., & Vrbanec, T. (2013). Emoticons. *FIP – Journal of Finance and Law, 1*(1), 35-42.

87. Van den Bergh, J., & Coninx, K. (2005). Towards modeling context-sensitive interactive applications: The context-sensitive user interface profile (CUP). In *Proceedings of the Symposium on Software Visualization* (pp. 87-94). New York, NY: ACM.
88. Van der Meer, L., Didden, R., Sutherland, D., O'Reilly, M. F., Lancioni, G. E., & Sigafoos, J. (2012). Comparing three augmentative and alternative communication modes for children with developmental disabilities. *Journal of Developmental and Physical Disabilities, 24*(5), 451-468.
89. Veszelszki, Á. (2005). Dinamikus emotikonok [Dynamic emoticons]. In G. H. Balázs, Gy. Varga, & Á. Veszelszki (Eds.), *A magyar szemiotika negyedfél évtized után* [Hungarian semiotics after three and a half decades] (pp. 273-286). Budapest, Hungary: Magyar Szemiotikai Társaság.
90. Visch, V. T., & Goudbeek, M. B. (2009). Emotion attribution to basic parametric static and animated stimuli. In *2009 3rd International Conference on Affective Computing and Intelligent Interaction and Workshops*. Piscataway, NJ: IEEE. doi:10.1109/acii.2009.5349548
91. Wang, H., Prendinger, H., & Igarashi, T. (2004). Communicating emotions in online chat using physiological sensors and animated text. In *CHI '04 Extended Abstracts on Human Factors and Computing Systems* (pp. 1171-1174). New York, NY: ACM. doi:10.1145/985921.986016
92. Wang, S. S. (2015). More than words? The effect of line character sticker use on intimacy in the mobile communication environment. *Social Science Computer Review, 34*(4), 456-478.
93. Whitty, M., & Gavin, J. (2001). Age/sex/location: Uncovering the social cues in the development of online relationships. *CyberPsychology & Behavior, 4*(5), 623-630. doi:10.1089/109493101753235223
94. Wiemer-Hastings, K. K., & Xu, X. (2005). Content differences for abstract and concrete concepts. *Cognitive Science, 29*(5), 719-736. doi:10.1207/s15516709cog0000_33
95. Wolf, A. (2000) Emotional expression online: Gender differences in emoticon use. *CyberPsychology and Behavior, 3*(5), 827-833.
96. Wong, L. P. (2008). Focus group discussion: A tool for health and medical research. *Singapore Medical Journal, 49*(3), 256-60.
97. Xu, L., Yi, C., & Xu, Y. (2007). Emotional expression online: The impact of task, relationship and personality perception on emoticon usage in instant messenger. In *PACIS 2007 Proceedings* (79). Retrieved from http://aisel.aisnet.org/pacis2007/79/
98. Yamashita, T., Eibo, A., Ichimura, T., & Mera, K. (2011). Emotion-oriented human–computer interaction. In S. Fukuda (Ed.), *Emotional engineering* (pp. 207-221). London, UK: Springer. doi:10.1007/978-1-84996-423-4_11
99. Yuasa, M., Saito, K., & Mukawa, N. (2006). Emoticons convey emotions without cognition of faces: An fMRI study. In *CHI '06 Extended Abstracts on Human Factors in Computing Systems* (pp. 1565-1570). New York, NY: ACM. doi:10.1145/1125451.1125737
100. Zhang, K., Cheng, Y., Xie, Y., Honbo, D., Agrawal, A., Palsetia, D., ... Choudhary, A. (2011). SES: Sentiment elicitation system for social media data. In *Proceedings of the 11th International Conference on Data Mining Workshops* (pp. 129-136). Piscataway, NJ: IEEE. doi:10.1109/ICDMW.2011.153
101. Zhou, Y., Xue, Q., & Liu, M. (2016). The effect of color on implicit cognition and cognitive control. In *Proceedings of the 22nd International Conference on Industrial Engineering and Engineering Management* (pp. 665-677). Paris, France: Atlantis Press.

Appendix

Summarized questionnaire on effectiveness, usage motivation, and preference dimensions of emoticon usage.

Form	Status	*Effectiveness*	*Usage Motivation*	*Preference*
Abstract/ Geometric	Static 	disagree □ □ □ □ □ □ □ agree -3 -2 -1 0 1 2 3	disagree □ □ □ □ □ □ □ agree -3 -2 -1 0 1 2 3	disagree □ □ □ □ □ □ □ agree -3 -2 -1 0 1 2 3
	Animated 	disagree □ □ □ □ □ □ □ agree -3 -2 -1 0 1 2 3	disagree □ □ □ □ □ □ □ agree -3 -2 -1 0 1 2 3	disagree □ □ □ □ □ □ □ agree -3 -2 -1 0 1 2 3
Personified	Static 	disagree □ □ □ □ □ □ □ agree -3 -2 -1 0 1 2 3	disagree □ □ □ □ □ □ □ agree -3 -2 -1 0 1 2 3	disagree □ □ □ □ □ □ □ agree -3 -2 -1 0 1 2 3
	Animated 	disagree □ □ □ □ □ □ □ agree -3 -2 -1 0 1 2 3	disagree □ □ □ □ □ □ □ agree -3 -2 -1 0 1 2 3	disagree □ □ □ □ □ □ □ agree -3 -2 -1 0 1 2 3
Concrete	Static 	disagree □ □ □ □ □ □ □ agree -3 -2 -1 0 1 2 3	disagree □ □ □ □ □ □ □ agree -3 -2 -1 0 1 2 3	disagree □ □ □ □ □ □ □ agree -3 -2 -1 0 1 2 3
	Animated 	disagree □ □ □ □ □ □ □ agree -3 -2 -1 0 1 2 3	disagree □ □ □ □ □ □ □ agree -3 -2 -1 0 1 2 3	disagree □ □ □ □ □ □ □ agree -3 -2 -1 0 1 2 3

*The 7-point Likert scale shown to participants ranged from disagree to agree as -3 to 3 and was calculated with 1 to 7 points.

**Animated form samples were shown in dynamic gif format.