A Systematic Review on Emoticon Usage Pattern for Collective Interaction in CMC

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Abstract: The usage of emoticons has become an important part in interaction and communication in Computer-Mediated Communication (CMC). These emoticons are used to express the user's feelings, actions and conditions without having face-to-face meeting. This study analyzed the existing research on the emoticons usage patterns. By doing, so, the areas of research that has been studied the most can be known, followed by the less studied areas. The objectives of this study are to investigate what are the area of studies regarding the usage of emoticons in CMC based from the existing research and whether there are studies about the emoticons that represent the cultures of a certain region or nation by using the Systematic-Literature Review (SLR). This study was started based from the 709 papers gathered from the online library such as IEEE, ACM, Science Direct and Web of Science by using a search strategy that has been constructed in research method. After filtering process was done by using the inclusion and exclusion criteria, only 30 relevant papers are chosen as the body of knowledge of this study.

Key words: Emoticons, computer-mediated, communication, culture-based, emoticons, process

INTRODUCTION

Computer-Mediated Communication (CMC) is the current leading communication type as it can connects peoples all around the world anytime and anywhere as long as there are internet access available. Email, instant messaging, blogs and social networking sites are the examples of CMC. With recent technology, all of these communication can be done via. mobile phone. While the messaging capability is one of the main function of mobile phone, the usage of emoticons play a big role in CMC. The usage of emoticons have become more important than texting alone because of its ability to express emotional, feelings and thoughts more effective compare to texting.

According to Cao and Ye (2009), the representation of emoticons as pictures or videos are what that make the message easier to understand by the receiver. Compare to texting, the emoticons are more appropriate to express any messages that relate to emotional. Smith (2015) stated that adding the emoticons alongside the text improved the emotional sense of the message where text alone lack the emotional context of face-to-face interaction. While Urabe *et al.* (2013) also stated that due to lack of nonverbal cues in texting, CMC often fail to express the sender's feeling and mood without using the emoticons.

The other advantage of using emoticons compare to texting are the saving of time and energy spent during sending the messages, obtaining the messages and interpreting the messages. During the urgent or importance time, using emoticons are the best way to communicate as it reduce the time taken for the user to type or read the message (Cao and Ye, 2009).

In recent years, there are many mobile applications that support the CMC have been developed. The usage of emoticons in the applications has become a crucial part in communications. As emoticons have become vital in CMC it could be more beneficial if it can be use in more meaningful way. Beside expressing the emotional, feeling and thought, emoticons also can be used to express something that represent the belief, race, faith, religion and cultures of certain region or nation. This can be one initiative to introduce and promote the country's cultures throughout the world and enhance the user's knowledge about the culture of certain nations.

This study conduct the review of existing research regarding the usage of emoticon in CMC through the Systematic Literature Review (SLR) with the aims to investigate what are the areas of studies for emoticons usage that has been done and whether there are study about the emoticons that represent the cultures of certain region or nation.

Usage of emoticon: The term of emoticon are based from the combination of word "Emotion" and "Icon" that represent the facial expression produced by using the

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ASCII symbols (Skovholt *et al.*, 2014). These emoticons are being used in CMC or text-based environment. The emoticons are constructed based from the combination of punctuation, numeral, keyboard character and special character to form a face-look text, basically with the eye, mouth and nose as the main component (Ruan, 2011). It can be read either sideway or normal way, depend on the way the user construct the emoticons. Usually, westerners construct the emotions horizontally such as while easterners construct vertically like.

According to Ruan (2011), the usage of emoticons first started by Scott E. Fahlman in 1982 at Carnegie Mellon University. His intention of using emoticons at that time was just as a jokes. Since, the communication via CMC or text-based environment lacks the expression of feelings and emotions it may easily lead the communication to be seen as abrupt or rude whenever the user try to express their feeling through the texting alone. So, by using the emoticons could ease the strain and strengthen the emotional content of the text communication as well as other intention such as to express sarcasm or irony.

The usage of emoticons are more to socio-emotional context rather than task-oriented context where the motive of using emoticon depend on the relationship of the people they are communicating in the CMC (Derks *et al.*, 2008). People tend to use more emoticons when the communication happen with their friends or somebody close to them compare to the communication that happen with the stranger.

A study by Park shows that the usage of emoticon not focus only on conveying the emotional state of the user but also to the socio-cultural norm where the emoticons used by the user are differ by their geography and culture. This may happen because of the different languages used in CMC. Thus, by taking into consideration the usage of emoticons across the variety of cultural study, the use of "Cultural-based emoticon" is very appropriate to convey the social-cultural norms which depict on race, religion and culture of certain region or nation.

Relation of emoticons and Computer-Mediated Communication (CMC): Computer-Mediated Communication (CMC) can be defined as any communication between humans that happen via. two or more electronic devices (Ho, 2009). The likes of email, instant messaging, chatting, video conferencing are the examples of CMC. Ho (2009) stated that initially the purpose of CMC was for deaf education at Gallaudet University in the mid, 1980's. Due to its successful utilization, CMC now has become the global

communication where distance is not the limit anymore for communication. People do not have to meet face to face to have a communication. They can communicate anytime and anywhere using the CMC as long as there are Internet connection.

The previous study by He and Huang (2014) mentioned that the usage of CMC been argued by earlier work because it limits the traditional and usual communication patterns since it lack the social presence and cues of the user. Hence, the usage of emoticons in CMC are essential that act as non-verbal communication cues, so that, the true intention and meaning of the communication can be understandable by the receiver. Emoticons somehow solve the problem of lacking the social presence and cues of the user. Emoticon also has become the paralanguage in CMC (Hogenboom *et al.*, 2013).

With the current technologies, the CMC can happen not only in one-to-one communication but also in many-to-many communication that enables the video conferencing and online group discussion to be held. Due to its borderless communication geographically and culturally, the usage of emoticons can be utilized into the cultural perspective that can be beneficial in introducing and promoting the culture of certain nation throughout the world.

MATERIALS AND METHODS

The research method section discuss about the steps involved during the process of SLR. In this study, the researcher used the Kitchenham's guidelines (Kitchenham, 2004) as the process to conduct the SLR. Kitchenham (2004) stated three stages of activities to conduct the SLR which are planning the review, conducting the review and reporting the review.

Planning the review is the process where the SLR research questions were identified, followed by conducting the review that discussed on how the researcher conduct the search for papers and journals in online library. The inclusion and exclusion criterias are also included in this stage where it discussed about the filtering process for the searched papers and journals. Finally, reporting the result explained the result of the SLR research.

Planning the review: In order to achieve the aims of this study, several questions have been constructed. Based from the papers obtained by using the search string constructed, a further investigation can be done, hence, build the body of knowledge of this research. The SLR research questions are as follows:

- RQ1: what are the area of study regarding the usage of emoticons?
- RQ2: are there any research regarding emoticon that represents or relates with certain cultures around the world?
- RQ3: what are the appropriate methods to validate the new emoticon design?

Conducting the review: To conduct the review, the researcher constructed the search string to be used as the search strategy to search for the relevant paper based from the research questions.

Search strategy: The searching process is based on the search string below, followed by the result of the searching that are presented in Table 1 ("Emoticon" or "Cultural emoticon" or "Cultural based emoticon") and ("Computer Mediated Communication" OR "CMC").

Inclusion and exclusion criteria: During conducting the review step, a total of 709 papers has been found from the IEEE, ACM, Science Direct and Web of Science digital library. To ensure that only relevant paper are selected, all the papers have been revised and reviewed based on their title, abstract, literature, methodology and conclusion. The papers that are not related were excluded from this research. For example, most of the digital libraries also show the results that contained the "Emotional" term rather than "Emoticon" term in the paper's searched which some are related and some are not related with emoticons. Hence, the study that are not related with emoticons need to be excluded. All the selected papers were documented and all of the data were recorded properly. The data that were recorded are ID, name of the database, publication, author, year, topic area, title and number of primary studies.

The inclusion criteria are used to determine which literature that comprise from journals, papers, technical reports that were found from the search string will be used in the research. The papers that are related to the emoticons, computer mediated communication and written in English only are being considered by the researcher. The other criterias are listed below:

- Studies that are relevant to the research questions
- Studies that describe the functions of the emoticons in computer-mediated communication
- Studies that describe the usage of the emoticons in computer-mediated communication across countries and cultures
- Studies that describe the relation of emotional and emoticons usage in computer-mediated communication
- Studies in the range of 2008-2015

Table 1: Number of articles searched per database

Digital libraries	Address	Mapping date	Results
IEEE	http://ieexplore.ieee.org	April-Jun 2015	228
ACM	http://dl.acm.org	April-Jun 2015	167
Science Direct	http://www.science direct.com	April-Jun 2015	261
Web of Science	http://apps.webofkno wledge.com	April-Jun 2015	53
Total articles			709

The exclusion criteria are contrary from inclusion criteria where the exclusion criteria will be used to determine which literature review will be excluded from the research. The criterias are listed below:

- Studies that are not relevant to the research questions
- Studies that do not describe emoticons
- Studies that do not describe the computer-mediated communication
- Studies other than emoticons and computer mediated communication

RESULTS AND DISUCSSION

RQ1: Based from the searched results, the papers that been considered by the researcher are based from the discussions of the abstract, overview, challenges, analysis, dimension and perspective regarding the usage of emoticons. Table 2 displays the area of previous study and number of study that studied about it. The area of studies are related to the factors that influenced the usage of emoticons.

RQ2: Based from the SLR conducted there is no study regarding emoticons that represents or relates with certain cultures around the world. There is only a study by Park that investigated the usage style of emoticons that are vary by geography and culture not the way or how the emoticons represent or relates with the culture. Park compared the usage style of emoticons between westerners and easterners where the westerners employed the horizontal like of emoticons while the easterners employed the vertical like of emoticons. This variance of usage are due to westerners favour to interpret the expression from the mouth while the easterners tend to interpret from the eyes.

RQ3: Based from the SLR conducted, there are two steps to validate a new emoticon design. The first step is the verification of the new emoticons design and the second step is the evaluation of the usage of the new emoticons design. The purpose of the verification of new emoticons step is to investigate whether user could properly

Table 2: Area of study and number of study

Area of study	No. of study
Sentiment of document/sentence	8
Classification of emoticons	5
Social interaction relationship	4
Markers of attitudes	3
Non-verbal communication cues	2
Type of feedback	2
Teenage phenomenon	1
Alert reader	1
Attention saving	1
Design of emoticons	1
Gender classification	1
Cultural usage style	1
Total	30

recognizes the emotional states, behavior and culture of the new emoticons as what they are intended for. Chen *et al.* (2014) used verification method before they implementing their new design of emoticons which they named as empatheticon into the GroupFun, a group music recommender. The verification method can be done by recruiting a number of participant consist of expert user and novice user to verify the emoticons. The researcher will provide a list of new emoticons and a sets of option containing the meaning of the emoticons. The participants need to match the emoticons with the set of option given. After finished the verification process, the results will be analyzed and the feedback from the participants will be considered in terms of the design and expression of the emoticons.

The purpose of the evaluation of the usage of new emoticon step is to measure the impact of the new emoticons in terms of how user may use, perceives and reacts towards the emoticons when they are using it. This method can be executed when the new emoticons have been employed in the CMC. A number of participant will be recruited to test the new emoticons employed in the CMC, considerably other people than the participants during the verification method and consist of multiple races and cultures.

The place will be in laboratory or some place that has stable internet connection and less disturbance from the public, so that, the user will stay focus during the evaluation process. All the participants will be broke down into a number of groups, so that, the researcher can monitor easily during the process. The groups will consist participants from multiple races. Then an internet chats will be done by the participants among their group members accordingly in the context of socio-emotional by using the CMC where the new emoticons were employed. Their records of conversations in the CMC will be taken and the usage of the new emoticons will be analyzed in terms of how they use, perceive and react when it been used.

The participants also will be encouraged to think aloud during the chatting. After that, a post-questionnaire will be distributed to the participants to assess their experience and measuring their satisfaction upon using the new emoticons. Chen *et al.* (2014) in their study used ResQue (Recommender system's Quality of user experience) model of questionnaire to assess the quality of user experience of their empatheticon usage in the music recommender system. The questionnaire will be in the form of 5-point Likert scale.

Based from the Table 2, it shows that the areas regarding the study of emoticons usage are more to the sentiment of document or sentence, classification of emoticons and social interaction relationship where there are eight, five and four studies. Researcher make a conclusion that these three areas play big roles in determining the usage of emoticons in CMC.

Previous study by Derks *et al.* (2008) shows that the user use more emoticons in social-emotional context rather than task-oriented context. In other words, users tend to use more emoticons with their friends in a relaxed conversation rather than conversation with strangers in a tense conversation. This shows that the user used more emoticons with the person that they are close to. The user will not easily express their feelings and emotions to strangers and somebody they did not really know. In the middle of sentiment of sentence and social interaction relationship, there are classification of emoticons.

By Toratani and Hirayama (2011) study, they stated that the classification of emoticons are important so that the user acknowledge they are using the right emoticons to express their emotion. This is because there are many similar emoticons created by developers that make user confuse. To avoid misunderstanding, user need to understand the classification of emoticons that reflect the correct emotion. While Ptaszynski *et al.* (2010) developed emoticon analysis and decoding system (CAO) to extract and classify the usage of emoticons from sentences precisely for research purpose.

Then, the fourth most studied areas are the marker of attitudes where there are three studies about this area. A study by Skovholt *et al.* (2014) stated that emoticons are used as three communicative functions which are marker of positive attitude, marker of joke or irony and marker of strengthener. The marker of positive attitude is where the emoticons are been used after the signature word. When it been used after signature word, the emoticon represent the sender's mood and facial expressions. The marker of joke or irony is where the users used the emoticons in the humorous sentence or to ease a tense conversation to be more relax. The marker of strengthener means that the emoticons are used to boost expressive speech acts such as greetings, thanks, compliments and appraisals.

The area of studies are then followed by the non-verbal communication cues and type of feedback where each of the areas have two studies. Lo (2008) stated that the CMC are lacking the non-verbal communication cues without the usage of emoticons. Without emoticons, most people cannot interpret the correct attitude, attention and emotion of the sender. When the emoticons are added, the perception of the receivers regarding the messages sent started to change significantly. This shows that the usage of emoticons allow receiver to interpret and understand the correct attitude, attention and emotion of the sender as the emoticons act as the non-verbal communication cues. According to Ganster et al. (2012) hypothesis, the non-verbal cues commonly influence the message interpretation and perception. Regarding the type of feedback area, there are two types of feedback which are positive and negative feedback. Both research from Derks et al. (2008), Vogel and Sanchez (2012) stated that most people use more emoticons in positive feedback than in negative feedback. The emotions used in the positive feedback intend to praise the receiver.

The other areas of research regarding the usage of emoticons are teenage phenomenon, alert reader, attention saving, design of emoticons, gender classification and cultural usage style where each areas have one study. The usage of emoticons been regarded as typical teenage phenomenon and young people chat style in CMC (Skovholt et al., 2014). That's why during the early usage of emoticons, users were advised to limit the use of emoticons especially in workplace to avoid lack of control of one's emotions among workers.

For the alert reader area, it relates with the psychological aspect. Based from the psychological test conducted, messages with the emoticons are perceived positively by the receiver compare to messages without emoticons (Skovholt et al., 2014). The usage of emoticons also can alert receiver that the content of the messages could be less serious since emoticons add the humorous or irony aspect in the messages.

Besides from humorous and irony aspect, emoticons usage also result to the attention saving of the users (Cao and Ye, 2009). The usage of emoticons requires less user's effort and time compare to texting where user only need to select emoticons that they want to use with a single click while texting require user to type alphabets to form a word or sentence. The time taken to interpret the meaning of emoticons also less than the time taken to interpret the meaning of texting as texting requires reading. Hence, the usage of emoticons in CMC provides maximum benefits with the minimum time and energy. In design of emoticons area (Nayeem et al., 2012) stated that

the design of emoticons are importance, so that, it can be used universally because under several circumstances, texting is difficult. Gender classification area discussed about the frequency of emoticons usage between males ada females (Tossell et al., 2012) and cultural usage style discuss on the different usage style between easterners and westerners.

CONCLUSION

The researcher performed the SLR to study about the variability of emoticons usage pattern in CMC through 30 selected existing researches. Based from the searched results, most of the existing studies are related to the user's sentiment, feeling, classification of emoticons and social interaction. The study regarding the usage of emoticons that represent or relate with the cultures of a certain regions or nations are still lacking. The only study regarding the cultural reason of the usage of emoticons is only the different style of usage between westerners and easterners where the westerners tend to use the horizontal like emoticons while the easterners prefer the vertical like emoticons. This kind of usage style did not represent the culture of certain nations.

What the researcher are looking for is the study regarding emoticons that are use to represent the culture of any nation, so that, whenever the user use the emoticons, they know that the emoticons are the cultures from which nations. By this way of emoticons practice, it can lead to a new dimension of emoticons usage where the emoticons can be used not only to promote the cultures of the nations throughout the world but also increase the knowledge of user whenever they are using it.

From the literature and searched results, it is known that the usage of emoticons in CMC are powerful in term of representing and expressing emotions, feelings and expression. If the emoticons are used as the tool to represent matters related to social-cultural norms, it could be beneficial to our society around the world. Since, the usage of emoticon becomes a trending now a days, a study to classify and design the appropriate emoticons for specific cultural view that contribute to the effectiveness of text-based conversation should be done.

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