Navigating the emoticon landscape: A systematic review of comparative studies on emoticon design

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ABSTRACT

This comprehensive systematic review delves into the nuanced dimensions of emoticon design, exploring cultural, gender, and social media influences. Adhering to Kitchenham's guidelines, the study meticulously progressed through the planning, conducting, and reporting phases. Following stringent inclusion/exclusion criteria, 19 pertinent papers surfaced, revealing eight core research areas. These areas spotlight the pivotal roles of culture, gender, and social media in shaping emoticon creation and usage. The findings underscore the growing significance of emoticons in online communication, with an increasing focus on gender-related and culturally sensitive research. However, notable gaps were identified, including the absence of universal emoticon design principles and limited regional diversity. The study emphasizes context-aware emoticon design and underscores the influential role of social media, providing valuable implications for both academia and practical application. Ultimately, the research advocates for further exploration in diverse cultural contexts and the development of universally comprehensible emoticon design models.

Contribution: This research contributes a comprehensive systematic review of comparative studies on emoticon design, identifying key research areas, trends, and gaps in the literature. It highlights the importance of cultural sensitivity, gender dynamics, and social media platforms in emoticon usage, paving the way for future research and inclusive design practices.

1. INTRODUCTION

Using emoticons to express emotions and intents on various online platforms has evolved beyond simple visual adornment in the age of digital communication (Sadia & Hussain, 2023). Users now have a variety of ways to convey their emotions in text-based chats thanks to these expressive small icons, which range from simple smiling faces to complex emoticons. Designing and using emoticons has become a complex phenomenon with the continued advancement of digital communication, impacted by a variety of elements like culture, gender, and social media (Shah & Tewari, 2021).

Dresner and Herring (2010) defined emoticons (also known as "emoticon icons") as graphic symbols, such as smiley faces, that are often used in computer-mediated communication (CMC). Later scholars offered various explanations for "emoticons." For instance, Cappallo, Svetlichnaya, Garrigues, Mensink, and Snoek (2018) hypothesised that "emoticons" developed from ancient pictographic characters and became a result of contemporary technical progress. This type of pictographic or pictogram is a kind of graphic that conveys concepts or states of

information without relying on letters or language, and possesses ease of understanding (Yuta, Yuji, Andrew, & Ryusuke, 2019). From a semiotic standpoint, "emoticons" are signals that represent people's ideas and activities and maintain information through visuals, according to Danesi (2017) and Vatian et al. (2018). Gu and Hu (2017) argued that "emoticons" are particular symbols or carriers used to express emotions or sensations and promote nonverbal communication. Although "emoticons" are defined differently from various theoretical vantage points, their functional descriptions are consistent. Simply described, "emoticons" are online symbols that are used in social media platforms to represent emotions using a combination of symbols, facial expressions, and body language. "Emoticons" is a general term for any type of symbol or image used to communicate emotions or convey information in online discussions, including kaomoji messages, emojis, and stickers (Iqbal, Safi, & Ullah, 2020). Emoticons are widely used in modern communication because they offer a quick and clear means to convey feelings, tone, and context in text-based dialogues, making up for the absence of natural nonverbal indicators in face-to-face interactions. Although the design of these emoticons appears straightforward, there are numerous subtle variations that develop as their usage increases. Emoticons are becoming more prevalent in digital discourse, which has prompted a critical examination of their creation, interpretation, and influence on communication dynamics. Understanding the creation, perception, and use of emoticons is essential for scholars and practitioners because it has significant consequences for gender dynamics, cross-cultural communication, and changing social media trends.

A complicated and culturally diverse topic, emoticon design has grown to influence gender relations, social media platforms, and cross-cultural communication. However, there is still a lack of consensus regarding the comparative elements of emoticon design, making thorough investigation necessary. The relevance of integrating emoticons into social media contexts has been emphasised in existing literature, along with cultural sensitivity in emoticon use, gender disparities in emoticon preferences, and others (Svoboda, 2022). However, the research diversity within this field is limited, and there lacks clear guidelines or models specifically addressing universal understanding towards emoticon designs.

Multiple studies have proven that systematic reviews can comprehensively review and evaluate research on a selected topic, gain a deeper and broader understanding of the topic studied, and provide some insights into the latest thinking and developments on the topic (Abdul Salam, Mohd, Masrom, Johari, & Saraf, 2022; Ramely, Talib, Radha, & Mokhtar, 2022). In light of the fact that emoticons continue to influence interpersonal interactions in our increasingly interconnected world, it is crucial to critically assess the study frameworks that are now in place and to pinpoint important themes, patterns, and research gaps. This systematic review aims to meet this need by examining existing literature, to identify key areas, trends, and gaps, and gain deeper insights into the future of emoticon design as well as its role in facilitating effective cross-cultural communication during the digital age. As a result, this systematic review aims to investigate key study themes within comparative studies on emoticon designs, trends, gaps in the literature, and particular cultural research examples globally. The purpose of this study is to provide a thorough assessment of the present body of knowledge about emoticon design and to provide suggestions for further study as well as practical applications.

Planning, conducting, and reporting the review are the three main phases of this study. The investigation is guided by precisely constructed research questions, and rigorous inclusion and exclusion criteria are used to guarantee the selection of pertinent literature. The final objective is to present a thorough assessment of the areas of research that have already been done, identify the important research topics, trends, and gaps that affect emoticon design and usage.

2. METHODS

In this study, the researchers separated the literature review procedure into three phases in accordance with the guideline of Kitchenham (2004) and the styles of pertinent research reviews. These phases are the reviewing of planning, conducting, and reporting (Figure 1). Choosing the research questions for a systematic literature review

is done through the planning review process. The next step is conducting the review, which entails looking up articles in online journals and libraries and debating how to do it. In this stage, inclusion and exclusion criteria are also included, along with information on how to screen papers and journals that have been searched. The reporting review clarifies the findings of the comprehensive literature research.

Figure 1. Three phases of this review.

2.1. Planning Review

Several research questions have been developed in order to meet the goals of this study. To build a knowledge base for this study, additional research can be done using the publications found using created search terms. The following are the research questions (RQ) for the systematic literature review (SLR):

1. What are some research areas related to comparative studies on emoticon design?
2. What trends and gaps exist in existing literature on emoticon design?
3. Are there any culture-specific studies on emoticon design from around world?

2.2. Conducting Review

This study drew from the PRISMA Guidelines for Systematic Reviews in order to better conduct a systematic review (Nightingale, 2009). The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) can help authors to improve the reporting of systematic reviews and meta-analyses. Researchers constructed search keywords "emoji," "emoticons," "emoticon design," and "comparative" based on their research questions, using different combinations of these keywords they performed searches in four paper databases - Scopus, Emerald Insight Web of Science, and CNKI (China National Knowledge Infrastructure, a China's largest academic journal full-text database) as shown in Table 1.

Table 1. Number of articles searched per database.

Digital libraries	Keywords	Results
Scopus	Emoticons and comparative	37
	Emoji and comparative	35
	Emoticon design and comparative	3
Emerald insight	Emoticons and comparative	214
	Emoji and comparative	178
	Emoticon design and comparative	211
Web of science	Emoticons and comparative	4
	Emoji and comparative	12
	Emoticon design and comparative	2
CNKI	Emoticons and comparative	577
	Emoji and comparative	59
	Emoticon design and comparative	15
Total articles		1347

2.3. Inclusion and Exclusion Criteria

During the conducting review process, the retrieval of all four digital libraries was based on research up to September 2023. Over 1000 publications were discovered by researchers in the digital libraries of Scopus, Emerald Insight, Web of Science, and CNKI. There was a sizable amount and a wide range of information, including a sizable number of publications irrelevant to the research topic. All papers underwent stringent revision and review,

with those irrelevant to the research being discarded, to make sure that only pertinent publications were chosen. For example, among the searched papers, some were related to emoticons while others focused solely on facial expressions or emotional expression. There were also some studies that examined emotion symbol comprehension through eye-tracking experiments comparing young and elderly individuals' moment by moment; these studies were not relevant to the main purpose of this research. Therefore, it was necessary to exclude studies unrelated to emoticons. The relevance and quality of all selected papers were critically evaluated and all data correctly recorded.

The inclusion criteria, which are used to select which journal articles, papers, and technical reports found from the search string will be used for this study, are determined as the first stage in the literature screening process. Only papers pertaining to emoticons, emoticon design, and comparative studies of emoticons will be taken into consideration for inclusion based on the study's goals and the researchers' prior experiences. Following are the specific standards:

1. Research relevant to the research question.
2. Must be published peer-reviewed articles, conference papers or academic papers.
3. Comparative studies evaluating different aspects of emoticon design.
4. Studies describing the use of emoticons in cross-national and cross-cultural computer-mediated communication.
5. The research must be in English or Chinese.
6. Studies conducted between 2016 and 2023.

To further narrow the scope of the study, exclusion criteria were established after certain papers were chosen based on the inclusion criteria and duplicates were eliminated. In contrast to the inclusion criteria, the exclusion criteria are used to choose which literature reviews will not be included in the study. Following is a list of these standards:

1. Research not related to emoticons or emoticon design.
2. Studies focusing on communication in computer-mediated communication or cultural studies but not investigating emoticons or emoji.
3. The main focus of a given paper is on emoticons or emoji but does not involve comparative studies (e.g., comparisons between different cultures, countries, ages or genders).

Based on the title, keywords and inclusion criteria of the paper, the searched articles were initially screened to 203, including 10 duplicates.
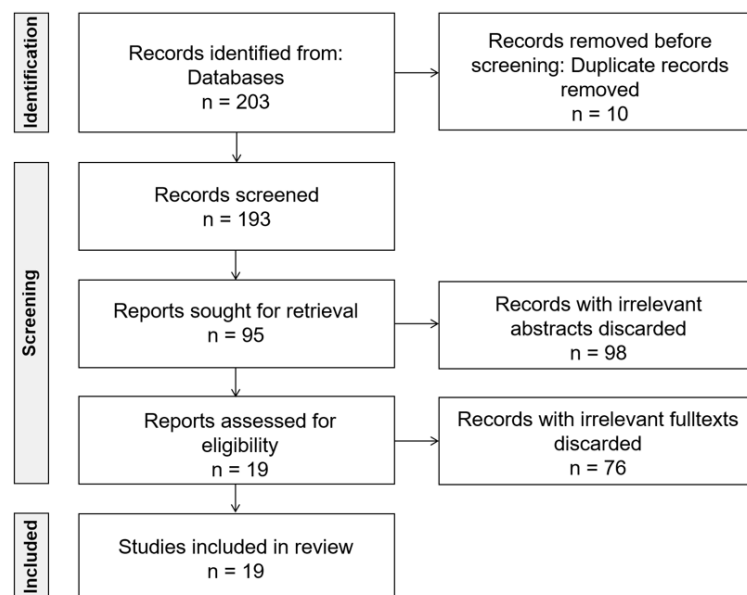

Figure 2. Flowchart of this systematic review.

By reading the abstracts of these 193 articles, 98 were excluded as they did not mention emoji or reference emoji design (exclusion criterion 1). Subsequently, a preliminary full-text review was conducted on the remaining 95 articles. Based on exclusion criteria 2 and 3, 76 articles were deleted, leaving a final selection of 19 literature for systematic review. The procedure is presented in Figure 2.

3. RESULTS

The results of a systematic review on comparative studies of emoticon design are primarily presented in this part. Researchers examined 19 chosen papers using stringent inclusion and exclusion criteria, then arranged the findings in accordance with the study questions created during the design review step. The following are the results for the research questions.

For RQ 1, the chosen articles identify 8 key research areas connected to the comparison of emoticon design.

3.1. Cultural Differences in Emoticon Usage

Multiple studies Bai, Han, and Lou (2021); Guntuku, Li, Tay, and Ungar (2019); Jiang (2021); Kimura-Thollander and Kumar (2019); Lin, Cheng, Qiao, Pang, and Li (2020); Xu (2019); Yang, Labato, Davis, and Qin (2023) and Zhu (2021) have explored the differences in emoticon usage across different cultures and emphasised that emojis are not universally understood and may be interpreted differently among different cultures. In particular, Lin et al. (2020) highlighted cultural disparities in face expression descriptions and interpretation by contrasting emoticon systems across Eastern and Western cultures. Similar to this, Guntuku et al. (2019) examined how emojis are used in Eastern and Western nations and highlighted how linguistic differences affect emoji usage. The research by Kimura-Thollander and Kumar (2019) used a variety of techniques to examine and analyse how people from 45 different nations with varying cultural backgrounds interpret and understand emoticons. The research on the emoticon preferences, emotional attitudes, and cross-cultural decoding skills of Chinese university students as contrasted to foreign students studying in China was examined in the study from Bai et al. (2021). Additionally, Yang et al. (2023) used an interactive communication technology adoption model to look into and clarify the variations in how Chinese and American university students use adorable stickers on mobile communication apps. These studies highlight cultural background-based variations in interpreting and using emoticons.

3.2. Gender Differences in Emoticon Usage

According to a study by Chen et al. (2018) there are noticeable disparities between emoticon usage by male and female users. The use of emoticons in electronic media communication (EMC) was researched by Prada et al. (2018) and the findings revealed that females used them more frequently than males and felt more favourably about doing so. Gender disparities were also underlined by Yang et al. (2023) who noted that males are more likely than females to use adorable stickers across cultures. This area of research helps us understand how different gender groups use emoticons in different ways.

3.3. Integration of Emoticons in Cross-cultural Communication

In their studies of the use of emoticons in cross-cultural communication, Shang, Su, and Han (2019); Jiang (2021) and Zhu (2021) explored how people from various cultural backgrounds use emoticons to close communication gaps and emphasised the significance of emoticons in overcoming cultural differences and fostering cross-cultural understanding.

3.4. Emoticon Perception and Emotion Recognition

In-depth studies on emoji perception and emotion recognition have been undertaken by Takahashi, Oishi, and Shimada (2017) and Dong and Na (2019) which focused on the interpretation and perception of emoticons by people from various cultural backgrounds. Takahashi et al. focused on the impact of exposure to emoticons on emotion recognition, while Dong and Na's study highlighted some consistency in cross-cultural emotional recognition.

3.5. Use of Social Media Platforms for Emoticon Usage

The use of emoticons in text communications across many languages and cultural backgrounds was examined by Park and El Mimouni (2020) and Togans, Holtgraves, Kwon, and Zelaya (2021) who also discussed their universality. Among them, Park and El Mimouni (2020) emphasised the function of emoticons in boosting communication within various online communities by focusing on how Twitter users from various language backgrounds use them to make up for the absence of nonverbal cues in online communication.

3.6. Popularity of Emoticons

Ljubešić and Fišer (2016) and Togans et al. (2021) examined emoticons' popularity and variations globally, indicating regional variances in adoption patterns with higher rates seen in Southeast Asia and South America.

3.7. Cultural Models for Emoticon Design

In an effort to address the demand for emoticons that are inclusive of all cultures, Mohd Zukhi, Hussain, and Husni (2020) launched an effort and try to create culture-based models for emoticon design by including recognised cultural frameworks.

3.8. Comparison between Emoticons and Real Human Expressions

Emoticons were compared with actual human postures, actions, and facial expressions in a number of research, which was a fascinating undertaking. Pohl, Domin, and Rohs (2017) and McCulloch and Gawne (2018) examined the intricacies of emoticons to show the degree to which these straightforward characters reflect the complexity of human emotions and nonverbal communication.

About RQ 2, Several trends and gaps in the existing knowledge have been discovered by a systematic literature review.

3.9. Trends in the Existing Literature Include

1. Cross-cultural focus and cultural sensitivity: An important development is the comparison of emoticon designs that considers cultural variations. These studies highlight the importance of comprehending how culture affects the interpretation and application of emoticons. Researchers are becoming more aware of how culture influences how emoticons are used. These studies also emphasise the importance of designing emoticons with cultural sensitivity. Numerous studies have shown that cultural differences affect how emoticons are interpreted and that not everyone can understand them. This emphasises how critical it is to create more varied and inclusive emoji sets to accommodate various user groups.

2. Gender-based research: Studies have revealed distinct preferences and behaviours between male and female emoticon users, drawing attention to gender disparities in emoticon usage.

3. Social media environment: As evidence of the importance of these symbols in online communication, research increasingly sees social media platforms as venues for the usage of emoticons.

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3.10. Gaps in the Literature Include

1. Limited geographical diversity: The majority of current research focuses exclusively on East Asian and Western cultures, leaving a significant knowledge vacuum about emoticon usage in other cultures. To fully comprehend the usage of emoticons around the world, additional research is required, including studies of broader cultural backgrounds.

2. Emoticon design models or guidelines: Despite recognising cultural differences and a few studies mentioning culturally based emoticon design characteristics, formal models or standards for creating emoticons that are both globally understood and culturally inclusive are still lacking.

For RQ 3, Numerous research have examined the complex field of emoticon design in the context of various cultural backgrounds. For instance, studies carried out in China by Yang et al. (2023); Jiang (2021) and Zhu (2021) have provided useful insights into the subtleties of emoticon usage and design within the Chinese cultural context. In the United States, Guntuku et al. (2019) have investigated the subtleties of emoticons, illuminating how they are created and interpreted in the American environment. Similar to this, Takahashi et al. (2017) have explored the uniqueness of emoticon usage in Japan, revealing the distinct design concerns in Japanese culture. Moreover, studies that compare cultures, such as those by Kimura-Thollander and Kumar (2019); Bai et al. (2021) and Mohd Zukhi et al. (2020) have shed light on the difficulties and differences that are present in emoticon design, usage, and interpretation across various international contexts. These culturally specific studies highlight how crucial it is to understand and accommodate the small variations in emoticon communication across many cultural contexts, providing helpful advice for efficient cross-cultural communication in the digital era.

In summary, the reviews based on the literature indicate a number of study areas, trends, and gaps in the design of emoticons. The identification of culture, gender, and the impact of the social media environment as key determinants affecting the use of emoticons in contemporary communication is one area of this field that is getting more and more attention. Researchers have examined particular cultural studies from many parts of the world, giving insight on the complex intricacies of emoticon design and its significant impact on communication dynamics. This growing corpus of research highlights the value of cultural sensitivity in emoticon usage, encouraging a more comprehensive understanding of its function in contemporary discourse. However, there are still unknown places in the landscape of emoticon research, and future investigation into these uncharted regions has the potential to deepen our understanding of the complex world of emoticon usage and design.

4. DISCUSSION

Eight key study areas connected to comparative studies on emoticon design are identified in this review, highlighting the variety of emoticon design. It emphasises how crucial it is to comprehend the different aspects that influence how emoticons are used and interpreted in modern communication, going beyond simple visual cues and include cultural, social, and psychological elements. The main conclusions and importance of this review will be discussed in depth, bringing up issues like gender dynamics, the use of emoticons on social media, and the wider effects of cross-cultural communication.

The first is on the cultural sensitivity of emoticon design. The significance of cultural sensitivity in emoticon design emerges as a prominent theme from this thorough review. The chosen articles continually stress that emoticons are not universally understood and may be viewed differently in various cultural contexts. The effect of these cultural disparities on the use of emoticons has been examined from several angles, including East-West cultural disparities, linguistic quirks, and the impact of cultural origins on emoticon comprehension. Understanding cultural variety when using emoticons is important for modern communication, especially when people from many cultural backgrounds contact often in a globalised society. The findings of this review demonstrate the need for the creation of more inclusive and culturally aware sets of emoticons in order to close communication gaps between users from various cultural backgrounds. To guarantee that emoticons successfully communicate feelings and

intents, designers and developers should take cultural considerations into account while producing new emoticons. Mohd Zukhi et al. (2020) further demonstrated that research on culture models for emoticon design offers intriguing directions for future investigation. Creating explicit standards or rules for creating emoticons that are cross-culturally inclusive and universally understood could make significant contributions to this field and improve cross-cultural communication in the digital era.

Examining gender variations in emoticon usage is the second crucial finding of the systematic review. In studies like Chen et al. (2018) and Yang et al. (2023) it was discovered that there were substantial variations between male and female users' emoticon usage. This gender-based study offers insightful information on the varied tastes and emoticon-using behaviours among various gender groups. It can be useful to know how men and women utilise emoticons in different circumstances, such as marketing, interpersonal communication, and user interface design. It highlights how crucial it is to take individual gender preferences into account when creating collections or emoticon-based marketing initiatives.

The third point raised by this analysis is the growing significance of emoticons in online social media settings. A number of studies, like Park and El Mimouni (2020) and Togans et al. (2021) examine how people from various language and cultural backgrounds use emoticons on websites like Twitter and text messaging. These results emphasise the function of emoticons in making up for nonverbal cues and improving communication in a variety of online groups. Emoticons play an increasingly significant role in facilitating online interactions as social media platforms continue to develop and change how people communicate. Beyond private messaging, emoticons are used in digital conversations to affect tone and emotional context.

In addition, this assessment of the literature on emoticon design identifies trends and knowledge gaps. Cross-cultural study and an emphasis on cultural sensitivity are undoubtedly expanding trends in emoticon design. Researchers are aware that culture has a big influence on how people understand and use emoticons, and this tendency highlights the need for more research in this area. The body of literature does, however, have some obvious gaps. The research is primarily focused on East Asian and Western civilizations, which limits regional variety. Future research should examine a broader range of cultural backgrounds to provide a more complete knowledge of worldwide emoticon usage patterns. Second, even though it is acknowledged that culture has an impact, there isn't a defined model or set of rules for creating emoticons that are inclusive of all cultures and are generally understood.

Lastly, this systematic review identifies trends and gaps in the literature regarding emoticon design. Clearly, cross-cultural research and a focus on cultural sensitivity are growing trends in emoticon design. Researchers recognize that culture plays a crucial role in interpreting and using emoticons, and this trend underscores the need for further studies in this field. However, there are noticeable gaps in the literature. Firstly, geographic diversity is limited in research, with a primary focus on East Asian and Western cultures. For a more comprehensive understanding of global emoticon usage patterns, future research should include a wider range of cultural backgrounds. Secondly, despite acknowledging the influence of culture, a clear model or guideline for designing universally understood and cross-culturally inclusive emoticons is lacking. This gap offers an avenue for future study of developing valuable frameworks for emoticon designs that take cultural variation into consideration.

5. IMPLICATIONS

The results of this review have a variety of effects on both research and practise. First, in order to develop more inclusive and useful emoticons, the research findings suggest that academics in the field of emotion design should keep investigating cultural and gender inequalities. These results highlight the significance of designing emoticons with context in mind, taking into account the diverse backgrounds and tastes of users. Second, the use of emoticons in social media environments makes it clear that future study should concentrate on how emoticons function in various online communities and adjust to changing communication norms. Thirdly, there are potential for more

research and development based on the reported regional diversity gap and the absence of clear design principles. Technology businesses and emoticon designers should think about broadening their design considerations to include a wider range of cultural contexts and engaging in research to produce precise design rules for emoticons that are universally understood.

6. LIMITATIONS

It is important to acknowledge the limitations of this systematic review. Firstly, the inclusion and exclusion criteria, while rigorous, may have excluded some relevant studies. Secondly, the review is limited to research conducted up to September 2023, and the field of emoticon design is continuously evolving. Therefore, more recent developments may not be fully represented in this review.

7. CONCLUSION

In conclusion, this systematic review offers a thorough examination of comparative research on emoticon design, highlighting important areas for future study, current trends, and gaps in the body of knowledge. Existing research underscores the significance of cultural sensitivity, gender dynamics, and the function of social media platforms in affecting emoticon usage and shows that emoticons have evolved from their status as merely visual symbols to become an essential aspect of cross-cultural communication. The importance of emoticons as a universal language for expressing emotion and meaning cannot be understated as communication evolves in the digital era. Globally more effective and inclusive communication practises will be made possible by embracing cultural diversity and gender dynamics in emoticon design. The evaluation emphasises the need for additional study to fill up regional gaps and create thorough design models or recommendations. This study lays the groundwork for future research into the dynamic function of emoticons in modern discourse as emoticons continue to develop as a form of digital communication.

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