UNDERSTANDING EMOJI ATTRIBUTES IN INSTANT MESSAGING APPS

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Abstract: Emoji are pictographs that represent emotion, opinions, ideas, feelings, and reactions concerning a matter or an event. Unlike the traditional text-based system, Emoji possesses anthropomorphic attributes which are widely used in Instant Messaging (IM) apps. In spite of this, the fundamental questions of how the anthropomorphic attributes of Emoji can influence emotion and why users prefer them as a medium of communication are rarely discussed in the design context. Therefore, the objective of this study is twofold: first, to analyze Emoji characters, and secondly, to evaluate the user's response. Eight categories of Emoji characters, *Happy, Angry, Sad, Unwell, Love, Fear, Shy* and *Funny*, were selected as samples. The findings show that the anthropomorphism perception of the users towards the selected samples is unique and distinctive. In regard to the user's response, the results show a higher combined mean in terms of Perceived Anthropomorphism and Perceived Usefulness. The study concluded that basic anthropomorphic attributes and graphic elements of Emoji characters crucially play a significant role in representing the intended expression. Having said that its practicality rests on the aspect of familiarity and usefulness. It is hoped that this study would help enhance knowledge regarding the anthropomorphic attributes and the development of future Emoji characters in IM apps.

Keywords: *Anthropomorphic, Emoji Characters, Instant Messaging Apps,*

1.   Introduction

Considering the internet technology (4G) situation that is happening right now, it seems apparent that human-computer interactions (HCI) are getting more engaging than ever before. Almost all kinds of daily activities that involve business, education, social and many more are done with minimal effort via digital networks. In other words, the internet is a life-changing factor that will greatly affect how we do things today as much as in the future. According to the ICT Use and Access by Individuals and Households Survey Report 2019, the five most popular activities among Internet users in Malaysia are participating in social networks with 97.1 percent, downloading images, movies, videos, music, and playing games with 84.7 percent, searching information about goods or services with 83.5 percent, using Internet call service or voice over Internet protocol (VoIP) with 77.4 percent and downloading applications with 77.1 percent (The Malay Mail, 2020).

In regards to social networks, one particular app that is getting much attention from internet users is the Instant Messaging app (IM), partly because it has the capability of offering a fast and easy way to send messages. Recent studies show that Malaysia has been dubbed as the most active country on IM apps overtaking China by 8 percent and India by 29 percent (Swathi, 2015). Two of the most popular IM apps among users in Malaysia are WhatsApp and Facebook Messenger. These apps are utilised for socialising as well as important tasks like business and education. Despite the benefits of the IM app, there remains an issue of miscommunication. Unlike voice calls or video calls, the text messages sent through the IM apps may get lost in translation. The fact is that text messages cannot accurately convey

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emotion. According to Rosen (2000 p.76 cited in Klein and Herskovits. 2003), because text messages could not supply emotional backgrounds such as facial expression, body language, tone and gesture, they tend to get wretched out of contexts". The outcome of miscommunication of text messages can have a detrimental effect on a relationship whether casual or professional. The choice of ambiguous phrases could lead to confusion, disrespect, stress and even threats. Imagine what could possibly happen if you accidentally sent a text message which addresses your boss by his or her nickname. Therefore, in order to iron out miscommunication issues in text messages, users can opt to integrate punctuation marks. For example, the sentence "I'm happy to see you" could sound more sincere if it had an exclamation mark (!) placed at the end of it. Therefore, to solve this problem, punctuation marks can be integrated so that readers can interpret text messages unambiguously (Jackson, 2005).

2.　Emoji Characters and Anthropomorphism

According to Pardes (2018), users have been utilising Emoji characters since they first appeared on Japanese mobile phones in the late 90s. Generally, Emoji are classified under Unicode which is, an information technology (IT) standard for the consistent encoding, representation, and handling of text expressed in most of the world's writing systems. As of today, there is a repertoire of 143,859 Unicode characters, which consist of 143,696 graphic characters and 163 format characters. From this number, approximately 2700 Emoji characters are readily available on IM apps.

In this study, we intend to know what are the factors that make Emoji characters so charming and desirable? According to Stark and Crawford (2015), Emoji characters are much more versatile and efficient. They can elicit humour, personality and emotion compared to the monotonous text-based systems. Another contributing factor is that Emoji characters possess a human-like face which many scholars refer to as Anthropomorphism. Derived from the Greek language, Anthropomorphism is a combination of two words, Anthro, which means human and Morph, whic*h* means form. Scholars state that humans have the tendency to identify and recognize faces on non-human or inanimate subjects (Slice, 2008). It is also believed that this phenomenon is related to perceptual theories called *Familiarity Thesis* and *Comfort Thesis*. According to Guthrie (1993) *Familiarity, Thesis* and *Comfort Thesis* explain how anthropomorphism can influence our perception and reaction to certain phenomena. *Familiarity Thesis* postulates that the human self is a reflection of the outside world. The knowledge of oneself is genuine and easiest to be comprehended. *Comfort Thesis* postulates that humans feel comfortable seeing other humans, especially when they are in an unfamiliar setting.

Figure 1: Guthrie's Familiarity & Comfort Thesis
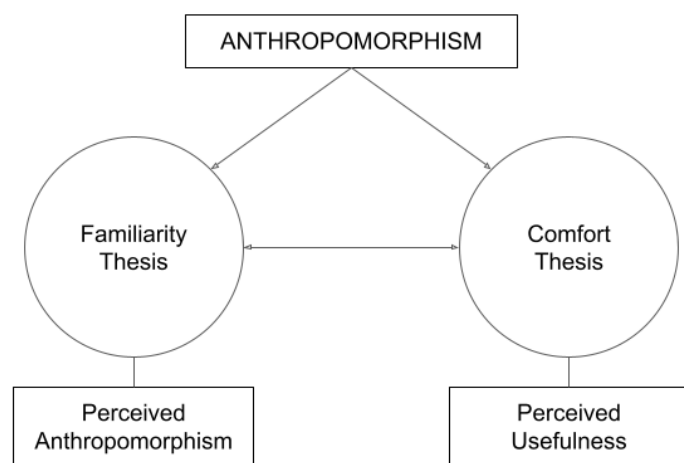
Therefore, in order to make sense of everything, we often attribute non-human and inanimate subjects to familiar human form. For example, in the automotive industry, designers always emphasize the "face" on the front end of a car. In this sense, the headlamps are marked as eyes, the grill or emblem as the nose, and the mouth's additional air intake slots. According to a previous study, facial stimuli

featured in a car may enhance personality and help user interaction (Aggarwal and McGill, 2007). In the experiment, forty-two participants viewed a picture of the front of a car that was modified using digital imaging software to mimic the human facial expression of a smile and a frown. They were asked to rate the two samples based on a two-item measure on the extent to which the car was seen as human (had come alive, like a person). The result shows that the participants tend to give a high rating to the car with a smiling feature, whereas the other car with a frowning feature receives a lower rating.

Masahiro Mori (1970), a Japanese professor, claims that human emotional response towards robots varies according to facial stimuli. He states that if a robot face appears more human-like, it is likely that the observer's emotional response to the robot will become positive and empathic. Unless the robot's appearance reaches a point that is virtually indistinguishable from the human, thus the answer quickly changes from positive to that of strong revulsion such as petrification or eerie. However, as the robot's appearance continues to become less distinguishable (familiar) from that of a human being, the emotional response becomes positive once again and approaches human-to-human empathy levels.

3.   Problem Statements

The use of Emoji characters in social media has increased familiarity and usefulness to IM apps users. In this case, certain downsides of IM, such as miscommunication and vagueness, could be minimized. For instance, a single smiling Emoji transmits the feeling of joy and happiness. An exploratory study conducted by Markus and Martin (2018) discovered that Emoji have the potential to be utilized as alternatives to text-based passwords. Generally, passwords are text code combinations made of letters and numbers) are essential for security purposes. Unfortunately, the combination of letters and numbers are sometimes a bit confusing and hard to remember. On the other hand, passwords using Emoji characters are easy to remember, and most importantly is how, they could provide a positive interaction (Markus & Martin, 2018). Despite the abundance of literature on social media issues, studies on Emoji characters in the context of design and usage in Malaysia are rarely discussed.

3.1   Research Questions

RQ1: What are the signs and meanings of Emoji characters?
RQ2: Why do Instant Messaging apps users prefer Emoji characters?
RQ2: How do anthropomorphic features in Emoji characters affect Instant Messaging apps users?

3.2   Research Objectives

RO1: To analyze the anthropomorphic features of Emoji characters.
RO2: To study Instant Messaging app users' preference of Emoji characters.
RO2: To describe how anthropomorphic qualities of Emoji characters are being perceived by users?

4.   Methodology

This study involved two phases, Phase 1: Semiotic Analysis and Phase 2: Descriptive Analysis. In Phase 1: Semiotic Analysis, Emoji characters were sampled and analyzed to describe how their formal (visual) elements give meaning and facilitate user interaction. The study adopted a concept called Pierce's Triadic Model (Figure 2) to carry out this task, which consists of three components, *Object*, *Representamen* and *Interpretant* (Kilstrup, 2015). The model suggests a notion that an *object* is an entity that a word or phrase denotes, which can be regarded as a *Representamen*. However, this does not mean that the *Object* has to be tangible. In conjunction, an *Interpretant* suggests any meanings conveyed by the *Representamen* about the *Object* which was previously unknown (Chandler, 2002). As shown in Figure 1, the *Object* is an icon of a leaf represented by a word leaf (text or sound). The text is then interpreted (orally or visually) as the leaf. Hence, if the icon were found on the packaging, consumers would be able to interpret and associate it with nature, environment or sustainability. According to Lester (2014), the ability to interpret meanings is based on two processes, sensory and perceptual. Sensory occurs when we identify or recognize an image. Perceptual, on the other hand, is a

process of generating meaning. The semiotic analysis of this study uses table format, which is divided into four columns. Column 1, Emoji characters code; Column 2, Object; Column 3, Representamen; and column 4, Interpretant.

Figure 2: Peirce's Triadic Model
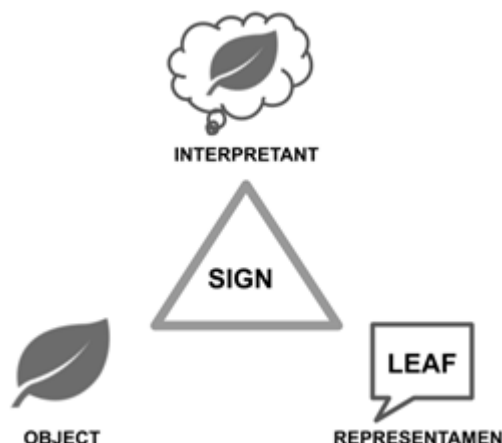
In Phase 2: Descriptive analysis, a purposive sampling approach was used. According to Creswell (2007), purposive sampling involves criteria that would be useful for quality assurance. In this case, students in higher learning institutions were selected mainly because of their frequent usage of Instant Messaging apps.

To generate an ideal sample size from a larger population of students in Malaysia, an online survey tool, Raosoft's calculator, was used. As recommended, three hundred and fifty (n=377) students have been identified to participate in the survey. They were asked to observe all eight categories of Emoji characters and then answer a questionnaire based on a five-point Likert scale *Extremely Disagree (ED) =1; Disagree (D) =2; Unsure (U) =3; Agree (A)=4; Extremely Agree (EA) =5*. The questionnaire contains section A, Demography (Age, Gender, Higher learning Institutions); Section B, Instant Messaging App; Section C. Perception of Anthropomorphism; Section D, Perception of Usefulness. 10 questions are divided into two Expectation Groups, A. Perceived Anthropomorphism (4 sets of questions) and B. Perceived Usefulness (6 sets of questions altogether). Perceived Anthropomorphism is a condition where users are familiar with the design and appearance of Emoji characters. Perceived Usefulness is a condition where users feel comfortable using the Emoji characters. Table 1 contains the questions.

Regarding the internal consistency of the questions (items), Cronbach's Alpha was employed. Technically, internal consistency refers to how all items on a scale measure the different aspects of the same attribute. In this case, Cronbach's alpha value ranges from 0 to 1, with 0.7 or greater is considered sufficiently reliable and acceptable. During the execution of this research, a pilot study was conducted to examine the reliability and validity of the survey instrument. The results of the pilot study indicated the questions (items) are reliable. The overall alpha score was 0.949 for Perceived Anthropomorphism and 0.963 for Perceived Usefulness.

Meanwhile, a combined Mean score (or weighted mean) is used to represent the expectations of the study. This is simply done using two steps. Step 1 adds the means of each set and Step 2 divides the sum from Step 1 by the sum total of all individuals (or data points).

Table 1: Questions

A. Perceived Anthropomorphism	B. Perceived Usefulness
Q1. I am familiar with this EC	Q5. I use this EC to give quick response
Q2. I use this EC to express my true feeling	Q6. I use this EC on casual occasion
Q3. I think the facial expression of this EC is convincing.	Q7. I use this EC all the time
Q4. I use this emoji character with my personal contacts	Q8. I think this EC makes the message more clearly
	Q9. I use this EC in Instant Message Apps
	Q10. I think this EC give many benefits to user

5.   Results and Discussions

In general, Emoji characters are a representation of human attributes such as eyes, mouth, tongue, hands and tears. Although these attributes are graphical representations, yet they possess the ability to show familiar expressions and emotion. This expression can be achieved by manipulating graphic elements, namely line, colour and shape. As shown in Figure 2, the image (EC) on the left is an abstraction of a human face. A striking resemblance is noticed in both images (Emoji and Human) in terms of the shape of the eyes (A) and mouth (B). Another aspect of Emoji characters is its cuteness perception. Generally, all Emoji characters are cute and innocent looking even though the intended expression is negative, like angry, sad, afraid, disgusted and annoyed. According to Konrad Lorenz (1943, cited in Glocker et al., 2009), this effect is called *Kinder schema*, which refers to a set of facial features commonly found in infants such as a large head, a round face, a high and protruding forehead, large eyes, and a small nose and mouth. As in the case of Emoji characters, the *Kinder schema* effects are deliberately exploited and conveyed through a round-shaped face with less details.

Figure 3: Happy Emoji

This study also found that the design and appearance of Emoji characters under study are fairly straightforward. According to Danesi (2019. p.66), Emoji are metaphorical pictures that involve "conceptual processes that blend domains of meaning to produce a new form of meaning that consolidate the various referential domains into one image". As shown in Figure 4, a happy expression is represented with a yellow face, whereas a red face depicts negative expressions. Hence when these design elements are blended together with text, it would not only transform the abstract concept into meaning but also impart emotion as well.

Figure 4: Happy and Angry

In addition, several familiar symbols representing other concepts are also used. As shown in Figure 5, a thermometer and a frowning mouth line are intentionally incorporated into the design to give an impression of indisposition. In this sense, the sender might be seeking sympathy or seeking an excuse for a certain commitment or duty. At the same time, the double heart-shaped eyes signify the feeling of love and excitement over something or event which relates to the users.

Figure 5: Unwell and Love
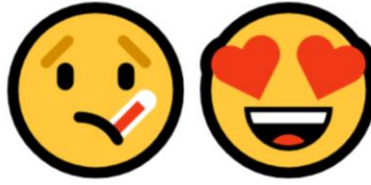
Hand gestures and tears are also found to be useful for expressing emotion. In Figure 6, two hands covering left and right ears with big opened mouths and white eyes represent the feeling of fear. A single hand partially covering a smiling mouth with pink blush on both sides of the cheeks and arch-shaped eyes signify the feeling of shyness or embarrassment. Tears rolling down cheeks with frowning eyebrows and opened mouths suggest crying or feeling sad. However, tears coming out from a happy face are more likely to offer funny expressions. Overall, all of the graphical elements and additional symbols found in Emoji characters are not only regarded as "accessories" but functional as well to enhance emotion and suggest meaning more accurately. Table 2 contains the summary result of semiotic analysis of Emoji characters based on Pierce's Triadic Model.

Figure 6: Fear. Shy, Sad and Funny

Table 2. Semiotic Analysis of Emoji characters

| Object	Representamen	Interpretant
😁	Round face, yellow face, opened mouth showing teeth and tongue, arch-shaped eyes	Positive response (happy, exuberant, joy)
😠	Round face, red face, frowning eyebrows line with black bead eyes, frowning mouth line	Negative response (angry, furious, annoyed)
😭	Round face, yellow face, frowning eyebrow, arch-shaped eyes, opened mouth with teeth, tears streaming down	Negative response (sad, disappointed)
🤒	Round face, yellow face, frowning eyebrow with black bead eyes closed mouth line with a thermometer	Negative response (unwell, sick, ailing)
😍	Round face, yellow face, pair of heart-shaped eyes, open mouth	Positive response (extremely excited, wonderful)
😱	Round face, yellow and blue face, white eye, open mouth	Negative response (fearful, shocked, tension)
😊	Round face, yellow face, closed eye, smiling, hand covering a mouth	Positive response (shy, embarrassed, cheeky)
😂	Round face, yellow face, closed eye, smiling, tear of joy	Positive response (extremely happy, extremely funny)

This section (Figure 7) comprises three parts, A. Demographic, B. Perceived Anthropomorphism and C. Perceived Usefulness. In part A. Demographic, a total of 350 respondents (*n*=350) participated in the survey, of which 43.0% are males, and 57.0% are females. Regarding the sample respondents (*n*=377), 72.8% are from universities with 72%; Polytechnics 22.8% and Community College 4.2%. In the context of IM apps users, the graph shows that *WhatsApp* is the most popular one with 65%, followed by *Skype* 12.0%, *FB Messenger* 8.0%, *Line* 8.0%, and *We Chat* 7.0%. In the context of the type of use, 80.0% of the respondents say they use IM for social matters and only 20.0% for official use. In general, the result shows that Emoji are well accepted by younger generations. This is due to the availability and convenient use of Emoji characters in most IM apps.

Figure 7: Part A (Demographic Data)
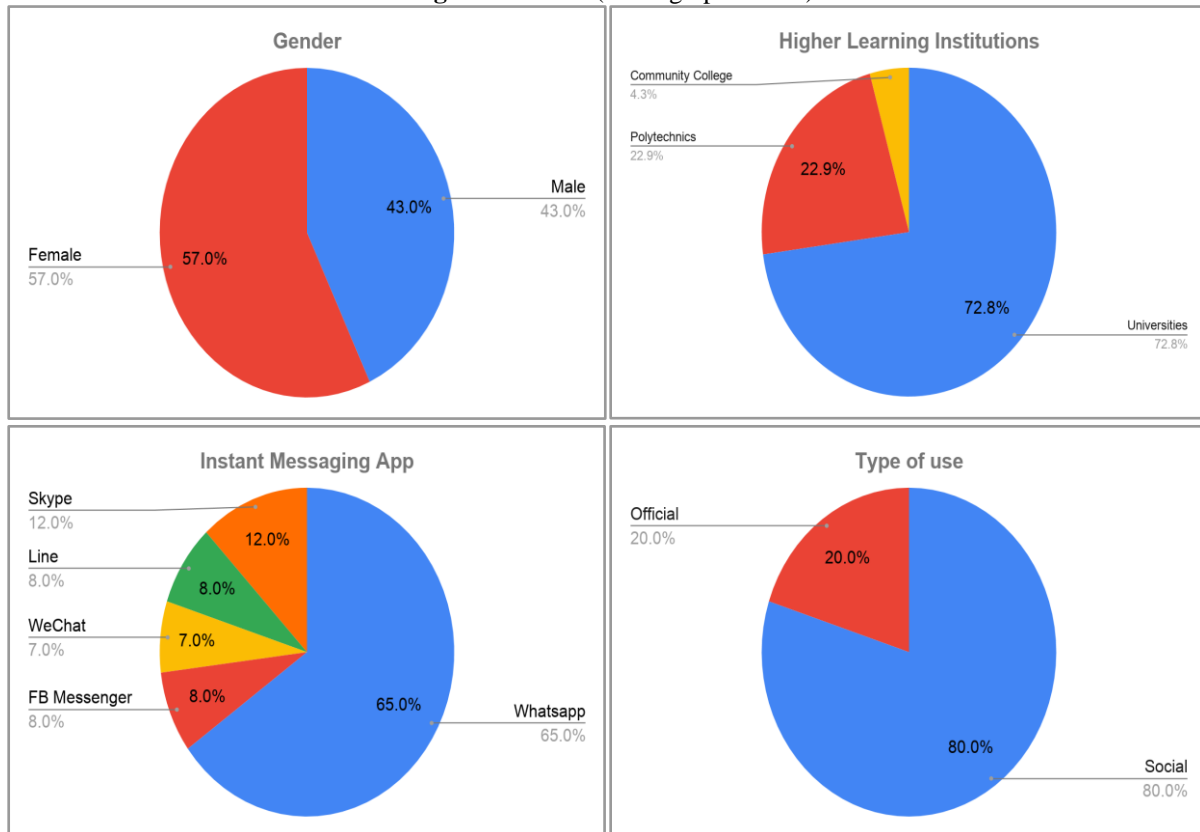
In Part B (Perceived Anthropomorphism), higher Mean value is approximately observed in all Emoji Characters understudy as shown in Figure 8. 😄 *Happy*, (M=4.13, SD=0.61); 😡*Angry* (M=3.80, SD=0.85), 😭 *Sad* (M=4.32 SD=0.48); 🤢 *Unwell* (M=3.63, SD=0.97); 😍 *Love* (M=4.25, SD=0.53); 😱 *Fear* (M=3.96, SD=0.73); 😊 *Shy* (M=4.42, SD=0.41); 😂 *Funny* (M=3.97, SD=0.73). Four categories, *Happy, Sad, Love, and Shy,* are rated greater than ($\geqslant$) 4.00. Whereas *Angry, Unwell, Fear and Funny are* rated lesser than ($\leqslant$) 3.00 possibly due to ambiguity reason. According to scholars, specific or standalone Emoji can be ambiguous which will likely increase the risk of miscommunication or misinterpretation (Miller et al., 2017). In this sense, a message containing ambiguous Emoji characters might be taken out of context and offend the receiver. Overall, this finding suggests that the perceived anthropomorphism in the selected Emoji characters has a significant relationship in the context of IM apps users.

Figure 8: Perceived Anthropomorphism
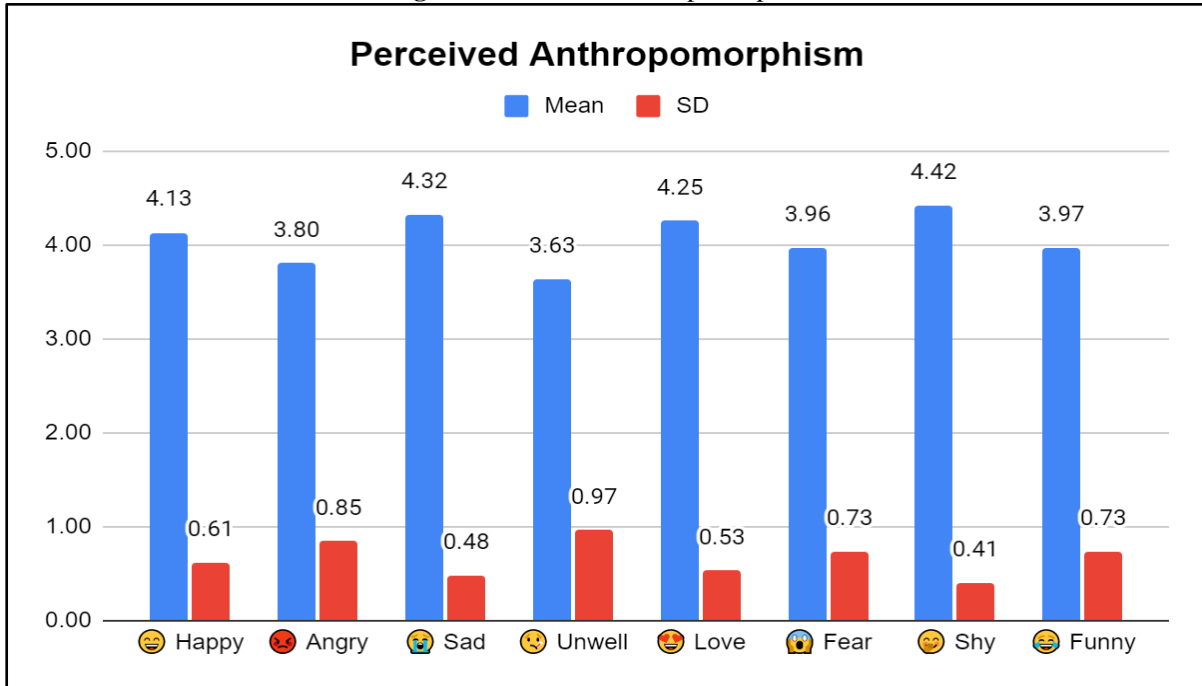
In Part C (Perceived Usefulness), a moderate Mean value is observed in all Emoji Characters understudy as shown in Figure 9. 😄 *Happy*, (M=3.73, SD=0.121); 😡*Angry* (M=3.52, SD=0.16), 😭 *Sad* (M=4.07 SD=0.66); 🥴 *Unwell* (M=3.59, SD=1.00); 😍 *Love* (M=4.06, SD=0.66);😱 *Fear* (M=3.82, SD=0.84); 😊 *Shy* (M=4.29, SD=0.50); 😆 *Funny* (M=3.81, SD=0.84). In this regard, only three Emoji characters (😭 *Sad,* 😍 *Love* and 😊 *Shy*) have been rated greater than (⩾) 4.00. This result suggests that these Emojis are perceived to be efficient in conveying meaning. Part of the reason is that the *Sad*, *Love* and *Shy* Emojis possess symbols or gestural indicators, which enhance its character appeal as well as meaning. Overall, this finding demonstrates that Emoji characters have the capacity to improve the usefulness of communication and users' interaction.

Figure 9: Perceived Usefulness
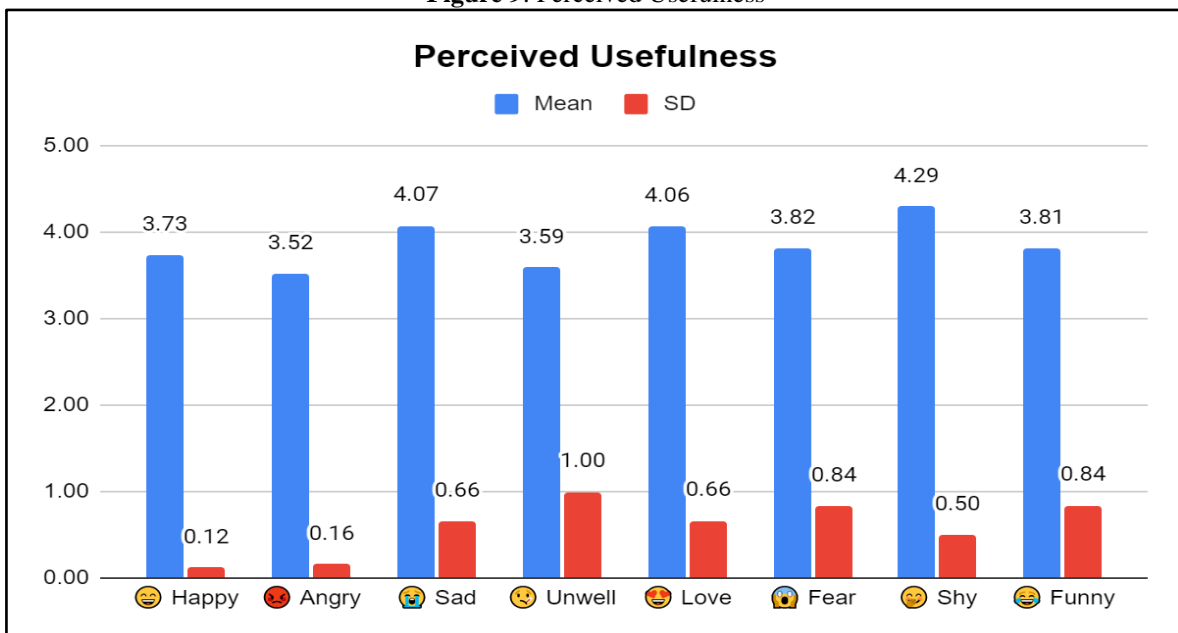
6.   Conclusion

In this study, we discovered that users of IM apps have the tendency to perceive Emoji characters' appearance appealing due to its anthropomorphic attributes such as head, yellow face, eyes, mouth, tongue, hands. In conjunction, there are also additional symbols or gestural indicators such as hand covering a mouth, heart-shaped eyes and thermometer are used to accentuate the expression. Regarding the user's response to Emoji characters, a higher combined Mean value ($\geqslant 4.00$) is observed for Perceived Anthropomorphism, and a moderate Mean value ($\geqslant 3.00$) is observed for Perceived Usefulness. Hence the finding suggests that users are already accustomed to Emoji characters and prefer to utilize them regularly. This study concludes that the eight Emoji characters (*Happy, Angry, Sad, Unwell, Love, Fear, Shy* and *Funny)* are useful for enhancing nonverbal communication and users' interaction. They also play a significant role as a mediator in IM apps that enable users to perceive emotional expression and better understand the content's meaning.

7.   Acknowledgement

8.   References

Aggarwal, P. & McGill, A.L. (2007). Is That Car Smiling at Me? Schema Congruity as a Basis for Evaluating Anthropomorphized Products. J*ournal of Consumer Research*, *34 (4)*, 468-479

Chandler, D. (2002). Semiotics: The basics. London: Routledge.

Creswell, J. W. (2007). Research design: Qualitative, quantitative, and mixed methods Approaches (2nd ed.). Thousand Oaks, CA: Sage.

Danesi, M. (2019). The Semiotics of Emoji: The Rise of Visual Language in the Age of the Internet. London: Bloomsbury Publishing

Guthrie, E. S. (1993). Faces in the cloud: A new theory of religion. New York: Oxford University Press

Glocker, M. L., Langleben, D. D., Ruparel, K., Loughead, J. W., Gur, R. C. & Sachser, N. (2009). Baby Schema in Infant Faces Induces Cuteness Perception and Motivation for Caretaking in Adults. *Ethology: formerly Zeitschrift fur Tierpsychologie*, *115*(3), 257–263. https://doi.org/10.1111/j.1439-0310.2008.01603.M

Jackson, H. (2005). Good grammar for Students. London, UK: Sage Publications Ltd

Kilstrup, M. (2015). Naturalizing semiotics: The triadic sign of Charles Sanders Peirce as a systems property in *Progress in Biophysics and Molecular Biology* Volume 119, Issue 3, December 2015, Pages 563-575 https://doi.org/10.1016/j.pbiomolbio.2015.08.013

Klein, E. E. & Herskovitz P. J. (2003). Text-based group system: A Simmelian perspective on E collaboration in *Information Technology and Organizations: Trends, Issues*, *Challenges & Solution*. Volume 1 edited by Mehdi Khosrowpour. London: Idea Group Publishing

Lester, P.M. (2014). Visual communication: Images and messages. Boston, MA: Wadsworth/Cengage Learning

Markus, R. & Martin, K. (2018). Evaluating the Security and Usability of Emoji-Based Authentication. NTNU. Retrieved June 24, 2020, from http://hdl.handle.net/11250/2562795

Miller, H., Kluver, D., Thebault-Spieker, J., Terveen, L. & Hecht, B. (2017). Understanding Emoji Ambiguity in Context: The Role of Text in Emoji-Related Miscommunication. *Proceedings of the International AAAI Conference on Web and Social Media*, *11*(1), 152-161. Retrieved from https://ojs.aaai.org/index.php/ICWSM/article/view/14901

Mori, M. (1970). The Uncanny Valley. *Energy, 7*(4). 33-35

Pardes, A. (2018). The WIRED Guide to Emoji: More than just cute pictures, these digital icons are a lingua franca for the digital age. Retrieved June 24, 2020, from https://www.wired.com/story/guide-emoji/#:~:teMt=Emoji%20have%20been%20popular%20since,press%20releases%20and%20corporate%20emails.

Slice, D. (2008). Life is a highway: Study confirms cars have personality. Retrieved June 24 from https://www.fsu.edu/news/2009/07/06/car.personality/

Stark, L. & Crawford, K. (2015). The Conservatism of Emoji: Work, Affect, and Communication First Published

October 8, 2015, Research Article https://doi.org/10.1177/2056305115604853

Swathi, R. M. (2015). Internet Users in Malaysia Are More Active on WhatsApp and Facebook Than Those in US, UK, And China. Retrieved June 24 from https://dazeinfo.com/2015/10/09/facebook-whatsapp-wechat-usage-malaysia-us-uk-china-instant-messaging-report/

The Malay Mail (2020). Survey: Participating in social networks is the most popular activity among internet users in Malaysia. Retrieved June 24 from https://www.malaymail.com/news/malaysia/2020/04/10/survey-participating-in-social-networks-most-popular-activity-among-interne/1855471