Austronesian: Journal of Language Science & Literature
P-ISSN: 2963-1548 E-ISSN 2961-9947
Journal Homepage:
https://www.ojs.wahanapublikasi.com/index.php/austronesian



Impoliteness Strategies in Public Reactions to Hailey Bieber's Instagram Post

Ni Komang Gita Risma Diantari[1], Anak Agung Istri Manik Warmadewi[2*], I Gusti Ayu Agung Dian Susanthi[3]

[1-3] Faculty of Letters, Universitas Warmadewa, Denpasar, Bali 80239, Indonesia

ARTICLE INFO

Received:
14 August 2026

Accepted:
04 November 2026

Published:
01 December 2026

Keywords:

Impoliteness Strategies, Sociolinguistics, Function, Hailey Bieber

ABSTRACT

This research explores the phenomenon of impoliteness in public reactions on social media, particularly within the comment section of Hailey Bieber's Instagram account. The aim of the study is to categorize and examine the many forms of rudeness tactics employed by netizens and how they represent social interaction trends in the online world. The data were gathered qualitatively from comments that used offensive or impolite language, and Culpeper (2011) framework of impoliteness tactics was used for analysis. Bald on-record rudeness, positive impoliteness, negative impoliteness, sarcasm or mock politeness, and withhold impoliteness are the five main categories of impoliteness tactics identified by the study. Each tactic works by directly insulting, ridiculing, rejecting, or remaining silent in order to endanger the target's face. According to the publication, Instagram is a medium that allows users to openly express their feelings, opinions, and criticisms often without social restraint. The findings highlight the fact that rudeness on social media is a reflection of social attitudes and cultural norms in online communication as well as a linguistic act. Therefore, raising awareness and fostering more courteous online interactions require an understanding of impoliteness strategies.

Copyright © 2026 The Author(s)
Published by CV Wahana Publikasi.
This article is an open access article under the CC BY-NC-SA 4.0 License

* Corresponding Author: warmadewi@warmadewa.ac.id
DOI: https://doi.org/10.59011/austronesian.5.3.2026.837-847

1. Introduction

In social interaction, people tend to forget what norms are appropriate and inappropriate for interacting or socializing. Especially, in the era of ever-increasing social media, many people use social media from adult, teenagers, even now children use social media. Everyone has a different way of using language when having conversations with other people. Some people tend to forget to choose the language used in communicating, where they usually forget to choose the language that should be used in communicating with certain people. Usually, this act of impoliteness is often found on social media, where social media is used for fun and creating content, and quite a few people abuse their social media to express frustration, anger, and hate speech. The lack of filters or rules on this platform allows people to express their thought without control, people can freely use their language in their comment and they can decide which language that they want to use either polite of impolite (Patimah1 et al., 2022).

Impoliteness is an important point in sociolinguistics which refers to manner in which language is used to convey disrespect, hate speech and rudeness. It is sustained by expectations, desires and/or beliefs about social organization, including, in particular, how one person's or a group's identities are mediated by others in interaction by (Culpeper, 2011). Someone uses language to build relationship with other people. But some people don't understand how to use language properly in communicating with new people or close relatives. In this case, the pattern of strategic impoliteness can be seen on various social media such as Instagram, YouTube, TikTok, Twitter, Facebook, and several other platforms. Strategic impoliteness on social media is very easy to find, especially in sexy comments.

Many previous studies have examined impoliteness strategies that occur in several situations. The research that conducted by (Akinmusuyi, 2023), (Afriana & Mubarak, 2024), (Wahab, 2024), (Santoso & Fauzia, n.d.) strategic incivility using Jonathan Culpeper's theory as a basic framework that focuses on highlighting social impacts but in a different context and conducting analysis with a different number of strategies. However, research (Hartanto et al., 2023), (Meylana et al., 2024), (Salim, 2020) focuses more on how impoliteness strategies are used in the entertainment realm that involves audiences. This research focuses on the deliberate use of impoliteness in a comedic context showing how this impoliteness can be entertaining. On the other hand, several studies has discussed impoliteness on Instagram comment but did not use the same impoliteness strategies that conducted by (Wijayanti & Mubarak, 2020), (Patimah1 et al., 2022), (Nico Wikang Tri Diatma & Agus Wijayanto, 2024), (Siahaan, Romauli., 2023) apart from Instagram comments and shows, impoliteness strategies have been carried out (Fajhira, 2023), (Hulu & Zebua, 2024), (Tahir & Ramadhan, 2024), (Hendar et al., 2022), which can be found in YouTube videos comments and also uses a different impoliteness strategies types.

This research is different from previous researches because this research specifically focuses on researching Hailey Bieber's Instagram comments column. Although previous researches also discussed impoliteness strategies, there were some that only used some of these strategies. Posts on Instagram provide space for anyone to comment, whether bad comments of good comments. This research will examine how this impolite behaviour occurs on social media, especially Instagram, in order to understand that impolite behaviour is very inappropriate.

In this research, the significance of analyzing impoliteness strategies is in understanding dynamics of communication between public interaction that develop on social media. This analysis not only highlights the cultural implications of impoliteness in the digital era but also

on broader interactions by showing the impact of social media use on individuals, the public, and celebrity culture. By analyzing these five impoliteness strategies, insight can be gained from how norms in digital communication cause someone to dare to express opinions without realizing that these opinions are not accepted in social media or face-toface interactions.

This research highlights the need for deeper understanding of impoliteness strategies on social media and direct interactions. Understanding the dynamics of impoliteness if essential to better appreciate cultural differences and requires greater awareness of norms in communication. In analyzing this strategy of impoliteness, it is clear that social media functions as a complex platform for public discourse. This research highlights a variety of strategies, including derogatory comments, sarcasm, and outright insults that can result in widespread tensions and grievances. Along with the development of technology, including social media, encouraging more respectful communication has become important in reducing the impact of incivility.

2. Literature Review

Impoliteness is a pragmatic phenomenon involving the use of language to express disrespect, hostility, or verbal aggression in social interactions. Culpeper (2011) explains that impoliteness occurs when communicative behavior conflicts with social expectations and threatens an individual's face. Unlike politeness, which aims to maintain harmonious relationships, impoliteness involves linguistic actions that challenge, damage, or disregard the social identity and expectations of others. This phenomenon can occur in various communication settings, including face-to-face interactions and digital communication (Culpeper, 2013). In social media interactions, impoliteness is frequently expressed through insults, ridicule, offensive expressions, and sarcastic comments.

Culpeper (2011) identifies five major impoliteness strategies: bald on-record impoliteness, positive impoliteness, negative impoliteness, sarcasm or mock politeness, and withhold politeness. Bald on-record impoliteness refers to directly expressing offensive intentions without minimizing the face-threatening act. Positive impoliteness involves damaging the recipient's desire to be accepted or appreciated, while negative impoliteness targets the recipient's personal freedom, autonomy, or social standing. Sarcasm or mock politeness occurs when apparently polite expressions are used insincerely to communicate offensive meanings. Meanwhile, withhold politeness refers to the absence of expected polite behavior in situations where politeness is socially required (Culpeper, 2011, 2013). These five strategies provide the theoretical foundation for examining how linguistic expressions communicate hostility, undermine interpersonal relationships, and threaten an individual's face in online interactions.

3. Method

This study employs a qualitative descriptive method, which focuses on identifying, collecting, and analyzing data in detail. The data are taken from comments on Hailey Bieber's Instagram posts, specifically those containing impolite or offensive language. Hailey's account is chosen as the data source because she often receives negative comments, particularly regarding her marriage to Justin Bieber and the photos she uploads that some fans consider inappropriate. Several posts with the highest number of negative comments will be selected as the main data for this research.

The analysis of the collected data follows Culpeper (2011) framework on impoliteness strategies. This approach aims to describe and interpret the types and functions of

impoliteness expressed in the comments. The qualitative descriptive method allows the researcher to present the findings accurately and contextually, focusing on how language is used to convey rudeness or disrespect in social media interactions. A comment on one of Bieber's Instagram posts served as the study's data source. This study uses offensive language from Hailey Bieber's Instagram comment section. Because Hailey Bieber has a lot of enemies due to her marriage to Justin Bieber and because she posted sexual pictures that fans deemed nude, her Instagram account is used to gather statistics.

After collecting data, the next step that must be taken is analyzing the data. This step is carried out based on the discussion section of discussion sequence in the impoliteness strategies. Then the data was analyzed using qualitative descriptive methods with the theory used. In this research, applying the theory from Culpeper (2011) regarding impoliteness strategies.

4. Result

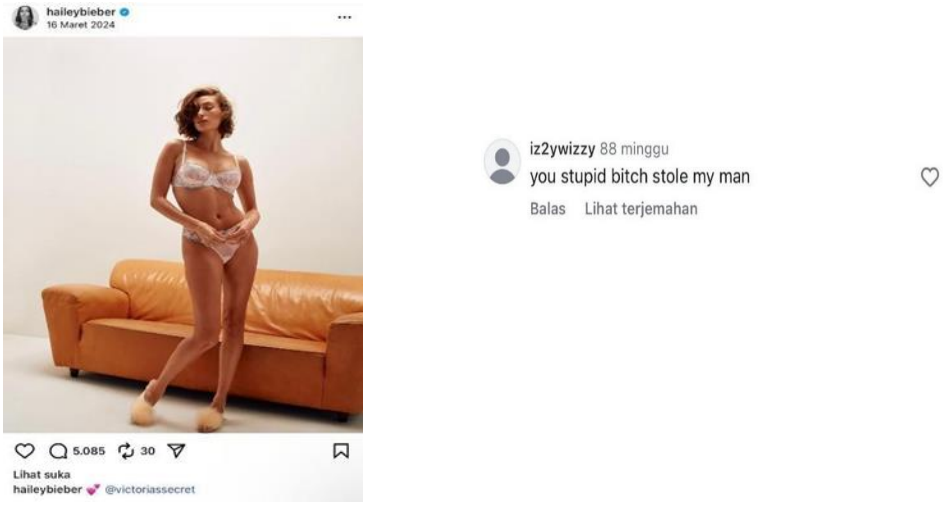
Impoliteness is an important point in sociolinguistics which refers to manner in which language is used to convey disrespect, hate speech and rudeness. It is sustained by expectations, desires and/or beliefs about social organization, including, in particular, how one person's or a group's identities are mediated by others in interaction by Culpeper (2011). The communication phenomena of impoliteness is widespread and can be found in many forms of discourse, including private and public/mass media, informal and institutional, face-to-face and electronic, spoken and written, and fiction and real life. (Culpeper, 2013) states that impoliteness is behaviour in an environment that can be considered negative and rude when it contradicts someone's assumptions.

One of the pragmatic theories in linguistics that is fascinating to comprehend but is rarely considered a social issue is the concept of impoliteness (Reswara Sani Reg, 2020). The study of impoliteness is essential for comprehending social communication and dispute resolution, regardless of the public's unfavorable opinion of it. Impoliteness studies can assist people and organizations in managing their emotions to prevent conflict and uphold polite interactions by gaining an awareness of social norms.

The previously stated claim leads one to the conclusion that rude speech acts and social norm violations constitute impoliteness. One way to question or annoy opponents is to be impolite. Furthermore, rudeness can harm relationships and induce emotional stress. Thus, it is crucial to research rudeness in order to help society regulate its members conduct and communication with others, both in real life and on social media. There are 5 (five) strategies for impoliteness: Bald on Record Impoliteness, Positive Impoliteness, Negative Impoliteness, Sarcasm Impoliteness, and Withhold Impoliteness.

a. Bald on Record Impoliteness

Bald on Record Impoliteness is a strategy where the speaker directly and clearly expresses impoliteness intentions toward someone, explicitly and without ambiguity. Bald on Record Impoliteness occurs when a face threatening act (FTA) is performed directly. There are no corrective procedures or steps to lessen the violation included in this plan. Additionally, this infraction was done promptly and with clarity.

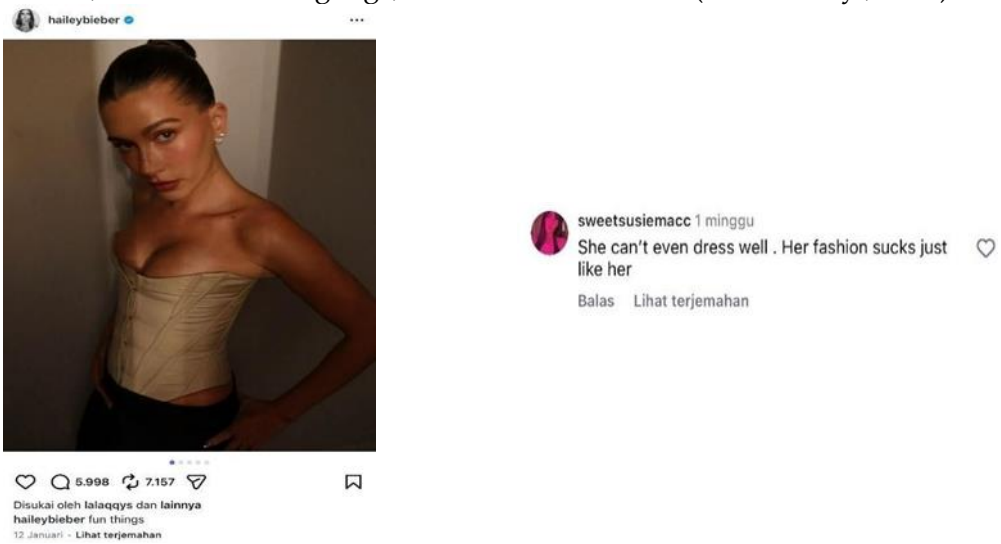


Data 1. (Post dated March 16)
"You stupid bitch stole my man"

Hailey Bieber posted a photo marketing a piece of underwear. The photo, uploaded on March 16, 2024, is captioned "(pink love emoji) @victoriassecret." Hailey is seen wearing underwear while standing, revealing some of. This verbal exchange took place directly on Hailey Bieber's Instagram account. The Instagram user expressed her frustration and aroused emotions. The language used showed rudeness because it included the rude term "stupid bitch." The statement "you stupid bitch stole my man" showed deep annoyance and hatred.

b. Positive Impoliteness

Positive impoliteness is the use of strategies to damage someone's desire to be liked and appreciated. These strategies entail a strategy to keep someone out of the public eye and ignore them. Impoliteness strategies are more than just behaviors that undermine someone's need for approval. but when someone uses harsh words, mocks someone's name or calls them by another name, uses unclear language, and acts uninterested (Akinmusuyi, 2023).



Data 2. (Post dated January 12)
"She can't even dress well. Her fashion sucks just like her"

The statement occurred verbally on Hailey Bieber's personal Instagram account. In the post, Hailey Bieber shared a picture wearing a tight corset-style top that accentuates her

curves. Her hair is neatly styled, giving her an elegant look. The speaker expressed their opinion about Hailey Bieber's post. In the comment, the speaker attacked her face by mocking it, stating that in their opinion, Hailey Bieber is unattractive. The speaker's particular remarks looked to be offensive. That sentence so qualifies as positive impoliteness. Examining the aforementioned instances also shows that rudeness isn't always expressed with harsh language. It occasionally uses polite language in an impolite manner. Although there was no offensive language, the statement clearly attacked her face with degrading comments, intentionally meant to belittle.

c. Negative Impoliteness

Negative Impoliteness is an act that targets the recipient's negative face. This tactic entails frightening, making fun of, disparaging, and instilling a sense of obligation. With the strength of the opponent, thru this strategy, the speaker's tendency is to try to silence the opponent or increase the speaker's emotional tension so that they do not attack well (Hartanto et al., 2023).



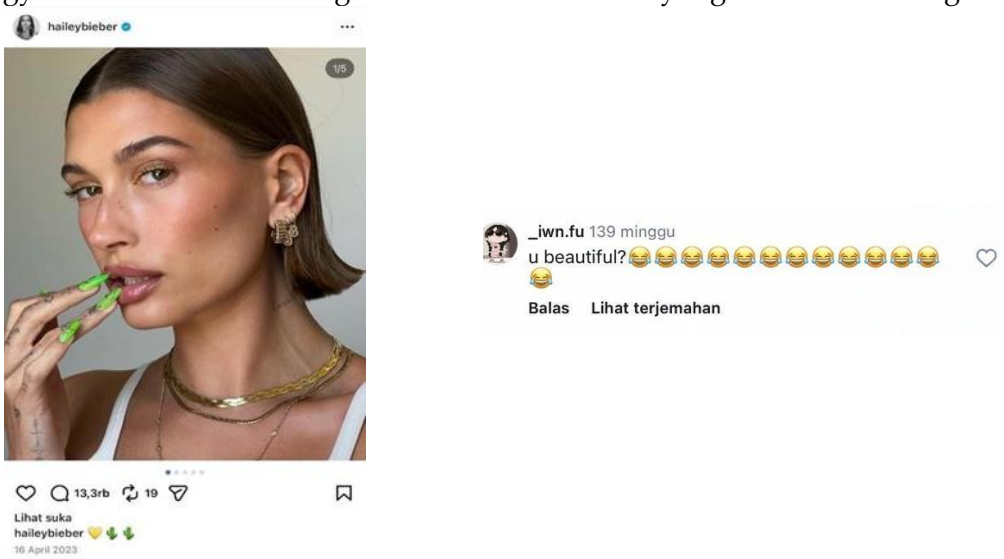
Data 3. (Post dated July 9)
"Stop showing your ass it's boring"

In this data, a photo posted by Hailey Bieber on July 9 with the caption "summer club lemontini girli." In the photo, Hailey is seen wearing a white and yellow patterned one-piece, carrying a basket filled with lemons in her right hand and holding a glass in her left hand. This shows that inappropriate words can occur in any situation. The language used by the speaker is impolite. Indirectly, the speaker mocks Hailey Bieber's lip shape by stating that her lips look big and strange. The speaker openly mocks Hailey Bieber, which can be concluded as an act of Negative Impoliteness. The preceding example demonstrates how the speaker is attempting to directly attack the listener while also intimidating and pressuring them. Because the listener perceives this conduct as frightening, it is regarded as negative impoliteness.

d. Sarcasm or Mock Politeness

Sarcasm or Mock Politeness are the FTA is performed with the use of politeness strategies that are obviously insincere, and thus remain surface relations (Culpeper, 2011). Sarcasm is

typically used to convey the meaning of what is truly intended to be uttered or its opposite. This strategy also includes delivering sarcasm since it is subtly regarded as insulting.



Data 4. (Post dated April 16)
"u beautiful? (laugh emoji)"

The statement includes sarcasm or mock politeness. Although the grammar appears polite, it actually conveys a negative meaning toward Hailey Bieber. The speaker uses a neutral tone to disguise their contempt for Hailey. The speaker implies that the individual seeks public attention or maintains popularity by exposing their body rather than through real talent or achievements. In Hailey Bieber's post published on April 16 with the caption "(yellow heart emoji) (cactus emoji)." there were many negative comments attacking Hailey Bieber's Instagram account.

e. Withhold Impoliteness

Withhold politeness is the absence of politeness work where it would be expected. For example, failing to thank somebody for a present may be taken as deliberate impoliteness (Culpeper, 2013). Being impolite to someone you are speaking to is disrespectful. For instance, it is considered rude to leave someone while speaking face-to-face or to avoid making eye contact with the speaker. This is not only true for face-to-face communication, but also for communicating thru gadgets; hanging up while the other person is still speaking is considered impolite.

5. Discussion

The findings of this study reinforce the relevance of Culpeper's (2011) impoliteness framework in examining hostile and offensive language in digital communication. The identified strategies demonstrate that impoliteness is not restricted to explicit verbal aggression but can also be conveyed through negative evaluations, intrusive expressions, and sarcastic language. This is consistent with Culpeper's (2013) view that impoliteness is context-dependent and may occur across different forms of communication, including electronic and public discourse. In the context of Instagram, the interpretation of impoliteness therefore requires consideration of both linguistic expressions and the communicative context in which they appear.

The findings are also comparable to Akinmusuyi's (2023) study of impoliteness strategies in cyberbullying commentary targeting Harry Maguire. Both studies examine negative expressions directed at public figures in online environments, demonstrating the relevance of impoliteness analysis to celebrity- and public figure-related interactions. However, the present study extends this discussion to reactions toward personal Instagram posts, where comments may involve evaluations of appearance, fashion, and personal relationships. This contextual distinction illustrates how the targets and subjects of online criticism can vary depending on the content being discussed. The findings also correspond with Diatma and Wijayanto's (2024) investigation of impoliteness in Instagram comments directed at FIFA, suggesting that Instagram comment sections provide a relevant setting for examining linguistic expressions that challenge an individual's or public entity's social image.

Similarities can also be identified with Wijayanti and Mubarak (2020), who examined impolite utterances in comments on Instagram posts. Both studies highlight the importance of examining language beyond its literal meaning when identifying impoliteness. This is particularly relevant to sarcastic expressions, in which apparently positive or neutral linguistic forms may communicate negative evaluations depending on their contextual use. Such observations support Culpeper's (2011) explanation that mock politeness involves the use of insincere politeness strategies to convey an impolite intention. Consequently, the analysis of online impoliteness should consider contextual meaning rather than relying exclusively on the presence of offensive vocabulary.

The findings further relate to Hendar et al. (2022), who investigated impoliteness strategies in online comments on the Kompas TV YouTube channel. Although the platforms and communicative contexts differ, both studies demonstrate the relevance of pragmatic approaches to understanding impolite language in public comment sections. Tahir and Ramadhan (2024) also examined hostile expressions in YouTube comments, particularly hate comments directed at presidential talk shows. Their research provides a related perspective on how digital communication accommodates negative and offensive language. Nevertheless, the present study focuses on comments directed at an individual celebrity rather than discussions surrounding political content. This distinction is important because the subject of online interaction may influence the content and form of negative expressions.

Furthermore, Hartanto et al. (2023) examined impoliteness strategies and responses to swearing utterances in Javanese slapstick performances. Although their research concerns entertainment discourse rather than social media comments, it provides additional evidence of the importance of examining impoliteness in relation to its communicative context. Impolite expressions may serve different interactional purposes depending on the setting in which they occur. Unlike entertainment performances, where impoliteness may be incorporated into humorous interactions, the comments examined in the present study occur as public reactions to a celebrity's Instagram posts. Therefore, the interpretation of offensive language needs to account for the specific interactional environment rather than assuming that similar linguistic forms always serve identical functions.

Overall, the comparison with previous studies indicates that impoliteness remains a relevant phenomenon across different digital platforms and public communication settings. The present study contributes to this area by examining how impoliteness strategies are represented in public reactions to Hailey Bieber's Instagram posts. Its contribution lies in the application of Culpeper's (2011) framework to a specific celebrity-related context, particularly in examining expressions associated with personal appearance, fashion, and interpersonal relationships. However, the findings should be understood within the boundaries of the

selected comments and the qualitative scope of the study. They do not establish that all Instagram users employ similar strategies or that the identified expressions represent public reactions to celebrities in general.

6. Conclusion

Impoliteness has emerged as a common and significant term in social media communication. This study, particularly in relation to public reactions to celebrity Hailey Bieber's posts, shows that social media users often utilize social media platforms to convey their thoughts, feelings, and emotions in ways that violate social norms. Five main categories of impoliteness strategies were analyzed using Culpeper (2011) framework: Bad on Record Impoliteness, Positive Impoliteness, Negative Impoliteness, Sarcasm or Mock Impoliteness, and Withhold Impoliteness. These strategies utilize direct verbal abuse that can damage a person's self-esteem and display contempt, each of which can threaten a person's face in a negative way.

Public Reaction to Hailey Bieber's Instagram Post: An Analysis of Impoliteness Strategies Because it seeks to investigate the meaning of impoliteness techniques and conduct a thorough analysis of the impoliteness phenomena, this study employs a qualitative methodology. This topic is examined through the use of words using the qualitative method. Because the majority of the data utilized in this study are words rather than statistics, the qualitative method is appropriate for exploring theories like Jonathan Culpeper's impoliteness theory. Since Jonathan Culpeper's theory is among the most thorough theoretical frameworks for examining rudeness, it is used in this study. This hypothesis was created by Culpeper as a phenomenon with functions related to social interaction that result in certain outcomes.

This study emphasizes the need for an increased awareness of impoliteness strategies in both face-to-face and social media interactions. A deeper appreciation of cultural differences necessitates a broader awareness of communication standards and an understanding of the mechanics of impoliteness. It is evident from examining this strategy of impoliteness that social media serves as a sophisticated forum for public conversation. This study identifies a number of strategies that can lead to generalized tensions and complaints, such as disparaging remarks, sarcasm, and outright insults. As social media and other technologies have advanced, it is now crucial to promote more polite communication in order to lessen the negative effects of impoliteness.

Furthermore, this study emphasizes that impoliteness in public contexts is not only an act of verbal aggression but also a reflection of social and cultural attitudes. The lack of direct consequences and education regarding social media encourages individuals to communicate by applying social norms. Understanding strategic impoliteness is crucial for raising awareness about digital communication ethics and developing strategies to encourage a more orderly online environment. The results of this study emphasize the need for digital education that teaches social media users to manage their language choices in expressing opinions on social media. By understanding how impoliteness is used and can affect interpersonal relationships, both individuals and communities, it can contribute to a positive, empathetic, and inclusive social media culture.

References

Afriana, A., & Mubarak, Z. H. (2024). Impoliteness strategies used by netizens towards Tasyi Athasyia on Instagram. IdeBahasa, 6(1), 81–93. https://doi.org/10.37296/idebahasa.v6i1.172

Akinmusuyi, S. (2023). "STOP THIS NONSENSE, HARRY!": An analysis of impoliteness strategies in cyberbullying commentary targeting Harry Maguire. Journal of Languages, Linguistics and Literary Studies, 3(4), 183–192. https://doi.org/10.57040/jllls.v3i4.541

Culpeper, J. (2011). Impoliteness: Using language to cause offence. Cambridge University Press. https://doi.org/10.1017/CBO9780511975752

Culpeper, J. (2013). Impoliteness: Questions and answers. In D. Jamet & M. Jobert (Eds.), Aspects of impoliteness (pp. 2–15). Cambridge Scholars Publishing.

Diatma, N. W. T., & Wijayanto, A. (2024). Impoliteness used by haters on Instagram comments of Federation Internationale de Football Association (FIFA). Jurnal Onoma: Pendidikan, Bahasa, dan Sastra, 10(1), 66–79. https://doi.org/10.30605/onoma.v10i1.3075

Fajhira, N. (2023). Impoliteness strategies in The Ellen Show [Undergraduate thesis, Universitas Andalas]. Universitas Andalas Research Directory.

Hartanto, R. A., Djatmika, D., & Sawardi, F. X. (2023). Impoliteness strategies and impolite responses to swearing utterances at Javanese slapstick shows. International Journal of Multicultural and Multireligious Understanding, 10(10), 236–249. https://doi.org/10.18415/ijmmu.v10i10.5168

Hendar, H., Astarina, A. N., Heryono, H., Zuraida, I., & Sujatna, M. L. (2022). Impoliteness strategies on online comments at Kompas TV YouTube channel: A pragmatic analysis. Ethical Lingua: Journal of Language Teaching and Literature, 9(2), 659–668. https://doi.org/10.30605/25409190.480

Hulu, M. T., & Zebua, E. P. (2024). Analyzing the impoliteness of netizens in commenting on the Deddy Corbuzier Podcast. Journal of Language Education, 2(1), 217–224. https://doi.org/10.69820/jole.v2i1.138

Meylana, A., Yuliasri, I., & Rozi, F. (2024). Impoliteness strategies implied among characters of The Simpsons Movie. Rainbow: Journal of Literature, Linguistics and Culture Studies, 13(1), 55–64. https://doi.org/10.15294/rainbow.v13i1.3809

Patimah, S., Rusmawaty, D., & Asih, Y. U. (2022). Impoliteness strategies in Joe Biden's Instagram comment section. E3L: Journal of English Teaching, Linguistic, and Literature, 5(1), 39–49. https://doi.org/10.30872/e3l.v5i1.988

Sani, F. R. (2020). Impoliteness strategies used by the main character in the Hancock movie [Undergraduate thesis, UIN Sunan Ampel Surabaya]. UIN Sunan Ampel Surabaya Digital Library. http://digilib.uinsa.ac.id/43939/

Salim, A. (2020). Impoliteness strategies used by the characters of Mind Your Language TV series [Undergraduate thesis, Universitas Islam Negeri Maulana Malik Ibrahim Malang]. UIN Maulana Malik Ibrahim Malang Repository. https://etheses.uin-malang.ac.id/80649/2/13320144.pdf

Santoso, D., & Fauzia, A. A. (2023). A negative impoliteness strategy used by the judge. Proceeding of the Symposium of Literature, Culture, and Communication (SYLECTION), 3(1), 1266–1274. https://doi.org/10.12928/sylection.v3i1.14381

Siahaan, R., Saragi, C. N., Sidabutar, U., & Saragih, E. L. (2023). Impoliteness strategy used by netizen in the comment column on Nadiem Makarim's Instragram post about online policy. Innovative: Journal of Social Science Research, 3(2), 1199–1214. https://doi.org/10.31004/innovative.v3i2.419

Tahir, I., & Ramadhan, M. G. F. (2024). Hate speech on social media: Indonesian netizens' hate comments of presidential talk shows on YouTube. LLT Journal: A Journal on Language and Language Teaching, 27(1), 230–251. https://doi.org/10.24071/llt.v27i1.8180

Wahab, A. I., & Ahmed, M. B. (2024). Impoliteness strategies in The Daily Show (TDS). Journal of Language Studies, 8(2), 285–303. https://doi.org/10.25130/Lang.8.2.14

Wijayanti, I., & Mubarak, Z. H. (2020). Impoliteness utterances in column comment Chaitlyn's posts on Instagram: Pragmatics approach. eScience Humanity Journal, 1(1), 71–82. https://doi.org/10.37296/esci.v1i1.3