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## **ENGAGING WITH VIRTUAL INFLUENCERS: A NETNOGRAPHY STUDY**

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# ENGAGING WITH VIRTUAL INFLUENCERS: A NETNOGRAPHY STUDY

*Research in Progress*

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## Abstract

*Virtual influencers on social media are an intriguing phenomenon on the rise. They are computer-generated characters that attract a large number of followers and audiences who interact and engage with virtual influencers. Audience engagement with virtual influencers is an interesting phenomenon; yet little is known about the motivation and essence of such engagement. This research takes a qualitative approach of netnography to study audience engagement with virtual influencers. Content analysis on audience comments left on three virtual influencers' Instagram accounts (including Miquela, Noonouri, and Guggimon) is conducted. Four major content themes emerge in audience comments: emotional attachment, source admiration, novelty, and expertise. We propose a conceptual model that postulates the impacts of these factors on engagement, moderated by the anthropomorphism of virtual influencers. This research reveals insights into drivers of audience engagement with virtual influencers, providing a theoretical model and practical implications.*

*Keywords: Virtual influencer, Netnography, Text analysis, Engagement.*

## 1 Introduction

Virtual influencers are a fast-developing, intriguing phenomenon. They are computer-generated characters with an established "personal" identity and a large number of followers on social media (Sands et al., 2022). They are designed and operated by marketing teams and establish their identity and personality via social media posts. For example, Miquela Sousa (shown in Figure 1) assumes the image of a California-based young girl and has over 3 million followers on Instagram; Noonouri (shown in Figure 2) lives in France and is followed by 402,000 users on Instagram. Instagram alone has more than 150 active virtual influencers (Schwarz, 2022). They are growing to be a major force in digital culture and commerce (Arsenyan & Mirowska, 2021).

Similar to human influencers, virtual influencers benefit from and rely on audience engagement to increase their visibility, influence power, and market value. Curiously, audience and followers interact and engage with virtual influencers, knowing that they are unreal. While a large body of research has been devoted to understanding audience engagement with human influencers on social media, little is known about that with virtual influencers.

Indeed, as virtual influencers are a new phenomenon, research is only emerging. An interview with 30 participants who posted a comment on virtual influencers' Instagram posts suggests factors such as entertainment, coolness, visual attractiveness, fun, trust, creativity, novelty, curiosity, and mystery can all prompt audiences to follow and engage with virtual influencers (Choudhry et al., 2022). Additional

insights are needed to identify and conceptualize the key antecedents to audience engagement in the context of virtual influencers.

This research takes a qualitative approach, particularly through netnography, to study audience engagement with virtual influencers. Content of a total of 127,603 audience comments on the posts of three virtual influencers (Miquela, Noonoori, and Guggimon) are analyzed, coded, and studied. The results reveal four major themes of content in audience comments: emotional attachment, source admiration, novelty, and expertise. Differences among virtual influencers of various levels of anthropomorphism are evident. These findings lead to a conceptual model that postulates attachment, admiration, novelty, and expertise as key antecedents to audience engagement, with anthropomorphism as a moderator.

## **2 Background**

### **2.1 Virtual influencers**

A rising trend, virtual influencers are garnering research interest in the past few years. Most existing studies have focused on comparing virtual and human influencers. For instance, Robinson (2020) compared a virtual influencer (Miquela) with real-life influencers and suggested that there are no significant differences between them in terms of motivation and moral responsibilities. However, they indicate serious concerns about virtual influencers' authenticity and transparency. Arsenyan & Mirowska (2021) compared virtual and human influencers' posting behavior by analyzing posts published by a human, a humanlike virtual, and an anime-like virtual influencer. Results showed that virtual influencers receive lower positive reactions compared to human influencers. Moustakas et al. (2020) conducted a semi-structured interview with six digital media experts who indicate no difference regarding the effectiveness of human vs. virtual influencers.

In addition, several studies have examined virtual influencers and follower experience using qualitative approaches. In a case study, Block and Lovegrove (2021) examined Miquela as the most successful virtual influencer and reported that identity intrigue, discordant storytelling, and emotional release and provocation are Miquela's crucial communication strategies. Choudhry et al. (2022) conducted an interview of 30 participants who posted a comment on virtual influencers' Instagram posts and reported that followers find virtual influencers funny, entertaining, and cool, while content creativity, novelty, and visual attractiveness drive engaging with virtual influencers.

Anthropomorphism is an important issue for virtual influencers. It refers to the human tendency to attribute human traits to non-human objects (Złotowski et al., 2014) and is an important element of virtual influencers (da Silva Oliveira & Chimenti, 2021) analyzed the top four humanlike virtual influencers (Miquela, Imma, Shudu, and Bermuda). Anthropomorphism has been studied in various contexts and applications, such as robots (Mende et al., 2019), chatbots (Go & Sundar, 2019), and digital assistants (Al-Natour et al., 2011; Chattaraman et al., 2019), showing significant impact on user responses. However, its effect in the context of virtual influencers has not been studied.

### **2.2 Engagement**

Engagement is an important concept in the business literature and has been studied in various contexts, including management (Saks, 2006), marketing (van Doorn et al., 2010), and information systems (O'Brien & Toms, 2008). Social media has greatly facilitated user engagement, which can be assessed through various metrics such as the number of likes, comments, and shares of social media posts (Syrdal & Briggs, 2018). User engagement impacts content visibility enhances brand loyalty (Powers et al., 2012), and increases return on investment on social media (Escobedo, 2017).

Enhancing followers' engagement is the main goal of social media influencers (McLachlan, 2020). Brands and firms usually use engagement as the metric to choose the influencers for collaboration (Escobedo, 2017). Hence, understanding followers' motivation to engage and interact with influencers is important. Extant studies have investigated the followers' motivation to engage with human

influencers (e.g., Hughes et al. 2019); however, factors leading to engagement with virtual influencers are still largely unknown. This study intends to identify salient themes underlying audiences' comments on virtual influencers' Instagram post to understand factors affecting virtual influencers' engagement rate. Therefore, the following research question is advanced:

**RQ1:** What are the factors affecting audiences' engagement with virtual influencers?

### 3 Methodology

This study uses a qualitative study of netnography to examine followers' engagement with virtual influencers and derive a research model on crucial factors leading to engagement. We followed the approach developed by Nicholas et al. (2003) to analyze web-based qualitative data, which includes (1) elicitation, (2) reduction, and (3) visualization steps. We collected 571 posts published by the three virtual influencers and 79,384 associated audiences' comments using a python script in the elicitation step. Next, the reduction step includes selecting, simplifying, abstracting, and transforming row data (Miles and Huberman, 1994). We used LIWC tools (Eckardt et al., 2019) to create word list frequencies. A careful reading of the top frequent words reveals eight potential categories. In the next step, we used these eight groups of keywords to extract a smaller corpus to identify significant themes. Although the initial dataset was large, the reduction step narrowed the number of pertinent comments to a manageable level, allowing for an in-depth analysis.

We utilized Nvivo software to find associated comments with keywords within these categories. By understanding the social contents of these words, we labeled the categories amazed and curiosity as "novelty," anthropomorphism, other environments, and social activity as "expertise," affinity as "emotional attachment," and appearance as "source admiration". It results in identifying the four major themes of content in follower engagement with virtual influencers.

#### 3.1 Netnography

To understand key factors associated with audience engagement with virtual influencers, we conducted an exploratory qualitative study through netnography. Netnography is an ethnographic approach that investigates consumer online behavior by observing online textual discourses (Kozinets, 2002). It applies ethnography to "cultural experiences that encompass and are reflected within the terraces, networks, and systems of social media" (Irawan, 2021). Using the netnography method, researchers interpret and understand individual behavior in a naturalistic interactive setting (Mkono & Markwell, 2014). For this purpose, we focus on virtual influencers on Instagram. Virtual influencers are active across social media platforms such as Instagram, TikTok, and YouTube. We chose to focus on the Instagram platform because it is the most popular medium for influencers. It has over 1.28 billion users (Statista, 2022) and more than 35 verified virtual influencers (Travers, 2022).

From the top 10 virtual influencers on Instagram (Molenaar, 2022), we selected three virtual influencers, including Miquela (@lilmiquela), Guggimon (@guggimon), and Noonouri (@noonouri), and studied the audience comments on their Instagram posts. The choice of the three within the top ten is based on the different levels of anthropomorphism the three virtual influencers represent. Anthropomorphism is an important feature of virtual influencers and can significantly affect audience engagement (Dabiran et al., 2022; Miao et al., 2021). By selecting virtual influencers of various levels of anthropomorphism, the qualitative



Figure 1. Miquela (right) and Bella Hadid (left).



Figure 2. Noonouri (left) and Kendall Jenner (right).

study covers a broader range of scenarios and can better identify common factors related to audience engagement.

Miquela, or Miquela Sousa or Lil Miquela, has high anthropomorphism with a high humanlike appearance. Miquela is a 19-year-old Californian virtual robot model who constantly posts photos and videos on her Instagram account and has more than 3 million followers on Instagram and 2.5 million on TikTok. Miquela presents herself as a singer and social activist. She released the music track "Not Mine" and her first music video, "Hard Feelings" in 2017. She has appeared with top fashion brands such as Prada, Dior, and Calvin Klein and celebrities such as Bella Hadid and Ariana Grande. Figure 1 shows Miquela (with Bella Hadid).

Noonoouri has a medium level of anthropomorphic appearance. She is humanlike, but the shape of her eyes is more cartoonish than real, so audiences can quickly distinguish her from real humans. Furthermore, her Instagram posts mainly include photos and rarely videos, decreasing her anthropomorphic design level (Miao et al., 2021). Noonoouri has more than 400,000 followers on Instagram and is a 19-year-old virtual fashionista living in Paris who is interested in fashion, beauty, luxury, art, and social issues. She is vegan, advocating for a clean environment, feminism, and sustainable fashion. Noonoouri has appeared in advertising campaigns for brands such as Dior, Vogue, Hugo Boss, Louis Vuitton, Swarovski, and Tommy Hilfiger. In addition, she has been photographed alongside celebrities such as Kim Kardashian, Kendal Jenner, Zendaya, Bella Hadid, and Cardi B. Figure 2 shows the image of Noonoouri.

Guggimon has a low level of anthropomorphic design. Guggimon is a rabbit-like cartoonish character with more than 1.5 million followers on Instagram. He introduced himself as a "Fashion horror artist" and appears in his Instagram posts mostly with his friend Janky, trying to create fun scenes by doing crazy activities, including torturing Janky, driving an ax into his head, or lighting his face on fire. Guggimon also appears in Fortnite online gaming environment (Rottgers, 2019). Figure 3 shows the image of Guggimon (with Janky).



Figure 3. Guggimon (right) and Janky (left).

### 3.2 Data collection

A python script was developed to collect post and comment data from the Instagram accounts of the three virtual influencers. We collected posts published from July 1, 2021, to October 1, 2022, all comments that are associated with these posts, and the number of likes of each post and comment. The sample for analysis includes a total of 571 posts of the three virtual influencers and 79,384 comments on these posts. These posts accrued a total of 13,307,196 likes, and the comments accrued a total of 187,154 likes.

### 3.3 Data analysis

We used content analysis to analyze audience comments using a three-stage process. First, we apply word frequency analysis to our large dataset to identify the top frequent words. Second, we scrutinize the top frequent words and identify words with shared commonalities and generate initial descriptive categories. Third, we extract audience comments with the identified words and apply holistic analysis (Lieblich et al., 1998) to the corpus to generate a central theme. Holistic content analysis is a way to investigate narrative material to generate significant themes in texts. For conducting holistic analysis,

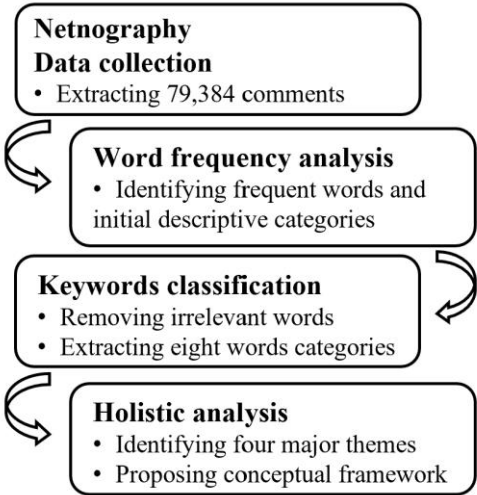


Figure 4. Research methodology

Lieblich et al. (1998) suggest that they (1) read the sentences several times until a pattern appears (2) record the initial impression (3) make a list of the text's focuses or themes; (4) colour code the themes; and (5) maintain track of the themes as they appear in the text.

## 4 Results and discussion

### 4.1 Word frequency analysis

Word frequency analysis is used to identify frequent words in audience comments on the virtual influencers' posts. Audience comments come in multiple languages. A substantial portion of comments is in English, whereas some are in other languages such as Spanish, French, Arabic, and Persian. Following previous studies on multi-language online comments (Katz et al., 2018; Maryamah et al., 2021; Windsor et al., 2019), we use Google Translate to translate comments in non-English languages to English. The generated English corpus is analyzed by LIWC tools (Eckardt et al., 2019) to generate word frequencies. Table 1 summarizes the top fifty frequent words in the audience comments on the three virtual influencers' Instagram accounts.

Virtual Influencer	Frequent Words
Miquela	robot, love, human, look, see, people, girl, face, robots, cute, life, confused, time, beautiful, feed, stop, eat, lol, omg, baby, thought, person, filter, cool, ai, guys, question, body, understand, photo, video, amazing, age, god, water, live, account, hair, hope, pretty, food, post, happy, hate, humans, better, eyes, wtf, work
Noonoori	Love, happy, amazing, beautiful, thank, look, best, comment, people, post, friend, birthday, fan, model, god, great, congratulations, photo, see, wonderful, fashion, life, girl, sweet, beauty, support, planet, work, princess, heart, thanks, voice, stop, better, gorgeous, hope, together, animals, bees, hair, save, vegan, doll, queen, bless, care, protect, earth, perfect, Ukraine
Guggimon	skin, Fortnite, Janky, love, pass, best, guy, see, battle, game, time, look, play, day, favourite, music, guys, season, happy, bunny, dude, cool, said, rabbit, playing, ass, axe, life, damn, lol, series, epic, better, smile, character, real, huge, awesome, crazy, ps5, fan, glad, post, grind, superplastic, win, dead, sick, omg

Table 1. Top fifty frequent words in the audience comments on the three virtual influencers' Instagram accounts.

A careful reading of the top frequent words reveals eight potential categories in comments. We use these groups of keywords to extract a smaller corpus to identify major themes.

1. Anthropomorphism [robot, human, doll, toy, filter]
2. Amazed [wow, omg, amazing, surprise, believe, Jesus, wtf, stunning, wonder, incredible]
3. Affinity [love, adore, dear, marry, hug, darling]
4. Curiosity [curious, understand, explain, weird, confused, how tf, how?, robot?]
5. Appearance [nice, beautiful, pretty, cute, look, gorgeous]
6. Other environments [game, Fortnite, music, catwalk, video, NFT, skin, play]
7. Gender [girl, princess, guy, dude, bro]
8. Social activity [earth, save, bees, vegan, feminism, Ukraine, black]

## 4.2 Major themes

We used NVivo 12 to extract comments containing each keyword in the eight identified categories. The analysis of selected comments reveals four main themes: emotional attachment, source admiration, novelty, and expertise. The result of the comments' thematic analysis can be found in Table 2

### 4.2.1 Emotional attachment

Emotional attachment refers to an emotion-laden target-specified bond between audiences and influencers (Ladhari et al., 2020). Emotional attachment increases the persuasive power of influencers (Sánchez-Fernández & Jiménez-Castillo, 2021), enhances followers' relationship with influencers (Jun & Yi, 2020), increases the time followers spend watching influencers' posts, and impacts the popularity of influencers (Folkvord et al., 2019).

There are keywords and emojis representing the emotional attachment, such as "💖, 😊, 🥰, 🤍, ❤️, 🍷, love, fan, hug, marry." Different emotions can be found in comments, from friendship and being an enthusiastic devotee (fan) to love and marriage requests. Some people express their emotions: "I love you guggi 💧 🍷", and "🥰🥰🥰 i love you a lot @noonouri 🤍🤍", and "omg. I'm already in love 😊". However, there are more strong emotional expressions, especially when the level of anthropomorphism increases. Comments such as "how can you marry anyone other than me 🥰 I love you more than anyone else 🤍", and "will you marry me sweetheart 🤍 😊" show virtual influencers are capable of establishing emotional solid relationships with their audiences.

### 4.2.2 Source admiration

Admiration refers to "to feel respect and approval for (someone or something)" (Merriam-Webster, n.d.). Previous studies show that admiration impacts loyalty to influencers (Kim et al., 2022) and enhances the influencers' advertisement effectiveness (Basil, 2012). Admiration is also an important reason individuals continue to follow and engage with an influencer (Uzunoğlu & Misci Kip, 2014). Comments containing keywords and emojis such as "😊, 🍷, 🍷, cute, beautiful, cool, pretty" are recognized as admiring. Physical attractiveness of virtual influencers is the primary reason for virtual influencers' admiration: "OK I'm sorry but I'm pretty sure it's illegal to look so good 💧💧💧", "My angel you look absolutely beautiful in pink 🍷🍷🍷🍷", and "can't describe your beautiful face and figure, you are ideal for some girls 😊😊💧💧".

Audiences also admire virtual influencers' content. They show admiration toward the story behind a post, their artworks, and their social activities: "these Halloween posts are so fucking cool!! 😊", "the song masterpiece is a masterpiece you definitely deserve a spa day or even a week enjoy your time :)," and "@noonouri You are such a beautiful soul 🍷 sweetie. And the lions are Majestic.#neverbesilent 🤍🤍🤍".

### 4.2.3 Novelty

Novelty refers to the extent that audiences consider the information new, unique, and different (Masseti, 1996). Influencers' novelty increases the followers' intention to interact with, follow the advice, and recommend the influencer (Casaló et al. 2018). Novelty is an important feature of virtual influencers. Keywords and emojis such as "😊, wow, wonder, Jesus, my god, omg" represent the novelty in audiences' comments. Although audiences' reactions to novelty can be found in the comments of the three virtual influencers, the source of novelty is different. For Miquela, the high level of anthropomorphism is the most important reason for novelty. It surprises many people when they find out that she is not a human, arises their curiosity and leads them to ask thousands of questions about her entity and functions, such as: "plz plz clear my doubt are you human or robot i am so confused ... if you are human how do u look like robot.... and if you are a robot, how did you grow up or how do you eat"

and "woah i just saw your feed and you seem like an amazing robot! you can even swim which is great! hope you enjoy with us humans ❤️."

Noonoori is less anthropomorphic, and most people can easily distinguish her cartoonish face from real humans. Therefore, there is a limited number of comments asking Noonoori whether she is a human, doll, or robot. Noonoori's novelty mainly stems from the contents' aesthetic design, as shown in comments such as: "Wow.... that looks amazing" 🙌🙌🙌🙌 😊😊😊😊", "Incredible 🙌🙌🙌❤️😊❤️😊 WOW! Love when she dances ❤️ amazing 🙌🙌🙌" and "That outfit omg."

Lastly, Guggimon's posts engage audiences with his stories. In most comments, people ask questions about Guggimon's stories. Here are some examples of these comments: "how tf did he die? It's the thought he couldn't shawty wtf" and "I noticed Janky got a hit on you once! How did it feel?" Furthermore, before seeing his posts on Instagram, many people are familiar with Guggimon from other environments, such as online games and the NFTs market. They see him on Instagram for the first time and get surprised: "OMG it's the Fortnite guy 😬😬", and "OmG! It's the guy from Fortnite 😬, seriously though, love it the skin! It looks identical, congrats!"

#### 4.2.4 Expertise

We consider expertise as the main activity of virtual influencers which is defined by virtual influencers themselves. For instance, Miquela introduces herself as a 19-year-old robot, singer, and fashionista.

Theme	Sample Keywords and Emojis	Data Instances
Emotional attachment	❤️, 😊, 🙌, ❤️, ❤️, 🙌, love, fan, hug, marry	<ul style="list-style-type: none"> <li>• if love was a person, she'd be you ❤️ • you are so surreal .. your face equals a beautiful and wonderful doll, i am seeing your photos and videos, i'm in love with you my angel, love you veryoooo. 🙌🙌🙌🙌❤️❤️❤️❤️ • i love you for many years. but i have a question in my mind, are you really a robot? • a good girl, a special girl, a charming girl and a naughty and lovely girl. i want to marry you and choose you, the unique girl, as my love until the end of my life 🙌🙌❤️</li> </ul>
Admiration	👑, 🙌, 🙌, cute, beautiful, cool, pretty, beauty, princess, nice, doll	<ul style="list-style-type: none"> <li>• You look absolutely beautiful! Queen ❤️❤️❤️❤️❤️❤️ • You look so beautiful and cute! Real Angel 🙌 • Pretty nice artwork, 🙌 keep making amazing work 🙌 • Large bunny teeth, really love them so much, your styles so awesome and cool 😊 • Wow this is the coolest shots, and those bunnies are awesome • you are amazingly gorgeously marvelously beautifully prettyyyyyyyyyy ❤️❤️❤️</li> </ul>
Novelty	😬, wow, Jesus, my god, omg, awesome, amazing, wtf, curious, incredible	<ul style="list-style-type: none"> <li>• wow... even the robots (ai) are taken... guess I'll be single for the rest of my life... 😬😬 • okay i am really curious. are you really a robot? 'cause this is unbelievable like wow • wow!!!! 😬😬😬 you're upgraded! • omg just smooch already, Jesus • how tf did he die? i thought he couldn't shawty wtf</li> </ul>
Expertise	Miquela	<ul style="list-style-type: none"> <li>• have you seen a robot who drinks and eats. 😬😬 • ohhh robot can eat meh? stop saying u are a robot. there's no perfect creation other than God 🙌 if u are a robot. why do u need veins? insane bruhh 🙌 • but you're a robot right why do you have started as a baby...you could start as you are right...? and how is that your body is growing? do you have bones? • so all ur memories when you were a baby , a kid , teen all that are programmed ?</li> </ul>
	Noonoori	<ul style="list-style-type: none"> <li>• 🙌🙌🙌🙌🙌🙌 ..@noonoori ...our QUEEN BEE 🙌🙌🙌.....mankind IS killing our bees with pesticide... 😬😬😬 🙌🙌 • such an important message #bees #savetheplanet • Should have been on the catwalk. 🙌🙌🙌 Great reminder from the Queen 🙌🙌🙌 #worldhoneybeeday 🙌🙌 • I love your fashion week content so much 🙌🙌🙌 • Your amazing. You're an advocate. A fashion inspiration. Your amazing my dear. Amazing ❤️❤️❤️</li> </ul>
	Guggimon	<ul style="list-style-type: none"> <li>• Your Fortnite season was the best battle pass I have you on your Gold version 🙌🙌🙌🙌 AND I love the axes • They are from Fortnite dude I have seen them 😬😬 I think this is first ever skin verified 🙌🙌🙌 hat off @fortnite • Fortnite season 8 already?! Dang- that went by fast- I'm gonna miss you in Fortnite ❤️ I'm so glad you were in season 7 • Does Janky use soap? I bet Guggimons gonna kill him for being so stinky 😬 • You've combined your DJ skills with magician skills and have become too powerful! 🙌</li> </ul>

Table 2. Thematic analysis results.

Therefore, keywords and emojis representing expertise for Miquela include: "🙌, robot, human, eat, baby, ai, filter, water, age, hair, food, grow, bot, wear, drink, skin."

Noonoori is introduced as a social activist, artist, and fashionista. Her posts include environmental issues, supporting feminism, and congratulating famous artists' birthdays or successes. The following



keywords and emojis are considered for referring to Noonouri's expertise: "👑, 👗, 🐱, 🐰, 🌱, fashion, noonouri, life, girl, planet, animals, bees, save, vegan, doll, earth, hair, queen, protect, dress, Versace, peace, fight, war, wear, congrats, congratulation, support, congratulations, hbd, birthday, stop, bee, savethebees".

Guggimon is an animated rabbit, torturing and making fun of his friends to create fun scenes. He consumes alcohol and smoke cigarette in his posts. He is also one of the outfits in the Fortnite online game, with more than 350 million registered users. We determine the following keywords and emojis for his expertise: "🐰, 🎮, battle, game, play, music, skin, Fortnite, pass, season, rabbit, playing, axe, series, crazy, match, skins, superplastic, win, ass, ps5, drunk, drink, blood, kill".

### 4.3 Conceptual framework and hypothesizes

The content analysis indicates that emotional attachment, admiration, novelty, and expertise are major underlying mechanisms for engaging audiences in virtual influencers' posts. Based on the findings from audience comments, we propose a research framework. We suggest that four elements of emotional attachment, admiration, novelty, and expertise can drive engagement, and these relationships would be moderated by anthropomorphism. Results of the content analysis showed that anthropomorphism would make changes in the audiences' reactions. For instance, keywords associated with emotional attachment, novelty, and expertise are found to be more salient in the comments of Miquela's posts. On the other hand, there are studies suggesting less anthropomorphic characters have more social attractiveness (Nowak & Biocca, 2003), which is a source of audiences' admiration. Therefore, we propose that for highly anthropomorphic influencers, emotional attachment, novelty, and expertise would be the main drivers of engagement. For less anthropomorphic influencers, admiration would be a more critical element.

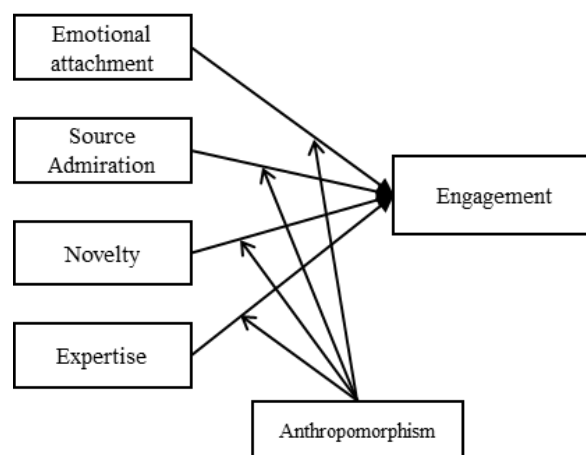


Figure 3. Proposed research model

## 5 Conclusion

Conducting content analysis on 79,384 comments of three virtual influencers' posts shows that four main elements of emotional attachment, source admiration, novelty, and expertise can drive audience engagement. Comparing the three influencers regarding their anthropomorphism level shows that the effects of these four elements on engagement would be different. Based on the content analysis findings, this study proposes a research framework to understand the factors affecting customer engagement. We call for future research to empirically test the proposed research model by conducting an online experimental survey and collecting data from audiences of virtual influencers. We also acknowledge the following limitations of this study to call for future research. First, this study identified major themes in audiences' comments on virtual influencers' Instagram accounts. However, individuals who "like" virtual influencers' content or are following their accounts have some levels of "engagement." Previous studies (e.g, Harrigan et al., 2017) also discussed different facets of customer engagement. Future research needs to fill this gap by considering a more comprehensive range of customer engagement. Furthermore, in this study, we conducted a word frequency analysis to extract major themes in comments. Future research can exploit other text-analysis methods, such as Latent Dirichlet Allocation (LDA), to distinguish topics in audiences' comments.

## References

- Al-Natour, S., Benbasat, I. and Cenfetelli, R. (2011). The Adoption of Online Shopping Assistants: Perceived Similarity as an Antecedent to Evaluative Beliefs. *Journal of the Association for Information Systems*, 12(5), pp.347–374.
- Arsenyan, J. and Mirowska, A. (2021). Almost human? A comparative case study on the social media presence of virtual influencers. *International Journal of Human-Computer Studies*, 155, p.102694.
- Bartl, M., Kannan, V.K. and Stockinger, H. (2016). A review and analysis of literature on netnography research. *International Journal of Technology Marketing*, 11(2), p.165.
- Batista da Silva Oliveira, A. and Chimenti, P. (2021). ‘Humanized Robots’: A Proposition of Categories to Understand Virtual Influencers. *Australasian Journal of Information Systems*, 25.
- Block, E. and Lovegrove, R. (2021). Discordant storytelling, ‘honest fakery’, identity peddling: How uncanny CGI characters are jamming public relations and influencer practices. *Public Relations Inquiry*, p.2046147X2110269.
- Casaló, L.V., Flavián, C. and Ibáñez-Sánchez, S. (2020). Influencers on Instagram: Antecedents and Consequences of Opinion Leadership. *Journal of Business Research*, 117(117), pp.510–519.
- Chattaraman, V., Kwon, W.-S., Gilbert, J.E. and Ross, K. (2019). Should AI-Based, conversational digital assistants employ social- or task-oriented interaction style? A task-competency and reciprocity perspective for older adults. *Computers in Human Behavior*, 90, pp.315–330.
- Choudhry, A., Han, J., Xu, X. and Huang, Y. (2022). ‘I Felt a Little Crazy Following a “Doll”’. *Proceedings of the ACM on Human-Computer Interaction*, 6(GROUP), pp.1–28.
- Dabiran, E., Fang, W. and Samira, F. (2022). Virtual influencer marketing: Anthropomorphism and its effect. *AIS Electronic Library (AISEL)*. Available at: [https://aisel.aisnet.org/ecis2022\\_rip/32](https://aisel.aisnet.org/ecis2022_rip/32).
- Eckardt, R., Crocker, A., Ahn, Y., Floyd, S.W., Boyd, B.K., Hodgkinson, G.P., Kozlowski, S.W., Moliterno, T.P. and Starbuck, W.H. (2018). Reflections on the micro–macro divide: Ideas from the trenches and moving forward. *Strategic Organization*, 17(3), pp.385–402.
- Escobedo, J. (2017). *How To Sell The Importance Of Engagement Over Fan Growth On Social Media*. URL: <https://www.forbes.com/sites/joescobedo/2017/06/12/social-media-engagement/?sh=336cbd7e2193> (visited on 23 Mar. 2023).
- Folkvord, F., Bevelander, K.E., Rozendaal, E. and Hermans, R. (2019). Children’s bonding with popular YouTube vloggers and their attitudes toward brand and product endorsements in vlogs: an explorative study. *Young Consumers*. 20(2), 77–90.
- Gholamhosseinzadeh, M.S., Chapuis, J.-M. and Lehu, J.-M. (2021). Tourism netnography: how travel bloggers influence destination image. *Tourism Recreation Research*, pp.1–17.
- Go, E. and Sundar, S.S. (2019). Humanizing chatbots: The effects of visual, identity and conversational cues on humanness perceptions. *Computers in Human Behavior*, 97, pp.304–316.
- Hughes, C., Swaminathan, V. and Brooks, G. (2019). Driving Brand Engagement Through Online Social Influencers: An Empirical Investigation of Sponsored Blogging Campaigns. *Journal of Marketing*, 83(5), pp.78–96. Available at: <https://doi.org/10.1177/0022242919854374>.
- Irawan, N. (2021) Netnography Unlimited: Understanding Technoculture Using Qualitative Social Media Research. *Critical Studies in Media Communication* 39 (2) p.154–157.
- Jun, S. and Yi, J. (2020). What makes followers loyal? The role of influencer interactivity in building influencer brand equity. *Journal of Product & Brand Management*, 29(6).
- Kiesler, S. and Goetz, J., (2002), April. Mental models of robotic assistants. In *CHI'02 extended abstracts on Human Factors in Computing Systems* (pp. 576-577).
- Kim, D.Y., Park, M. and Kim, H.-Y. (2022). An influencer like me: Examining the impact of the social status of Influencers. *Journal of Marketing Communications*, pp.1–22.
- Kowalczyk, C.M. and Pounders, K.R., (2016). Transforming celebrities through social media: the role of authenticity and emotional attachment. *Journal of product & brand management*, 25(4), pp.345-356.
- Kozinets, R.V. (2002). The Field behind the Screen: Using Netnography for Marketing Research in Online Communities. *Journal of Marketing Research*, 39(1), pp.61–72.

- Ladhari, R., Massa, E. and Skandrani, H. (2020). YouTube vloggers' popularity and influence: The roles of homophily, emotional attachment, and expertise. *Journal of Retailing and Consumer Services*, 54, p.102027.
- Lieblich, A., Tuval-Mashiach, R. and Zilber, T., (1998). *Narrative research: Reading, analysis, and interpretation* (Vol. 47). Sage.
- Maryamah, M., Arifin, A.Z., Sarno, R. and Hasan, A.M., (2021), January. Adapting Google Translate using Dictionary and Word Embedding for Arabic-Indonesian Cross-lingual Information Retrieval. In *2020 IEEE International Conference on Internet of Things and Intelligence System (IoT&IS)* (pp. 205-209). IEEE.
- Massetti, B. (1996). An Empirical Examination of the Value of Creativity Support Systems on Idea Generation. *MIS Quarterly*, 20(1), p.83.
- McLachlan, S. (2020). *How to Increase Social Media Engagement: A Guide for Marketers*. [online] Hootsuite Social Media Management. URL: <https://blog.hootsuite.com/social-media-engagement/>.
- Mende, M., Scott, M.L., van Doorn, J., Grewal, D. and Shanks, I. (2019). Service Robots Rising: How Humanoid Robots Influence Service Experiences and Elicit Compensatory Consumer Responses. *Journal of Marketing Research*, 56(4), pp.535–556.
- Merriam-Webster (n.d.) 'Admire', Available at: <https://www.merriam-webster.com/dictionary/admire> (visited on June 12, 2022).
- Miao, F., Kozlenkova, I.V., Wang, H., Xie, T. and Palmatier, R.W. (2021). EXPRESS: An Emerging Theory of Avatar Marketing. *Journal of Marketing*, p.002224292199458.
- Mkono, M. and Markwell, K. (2014). The application of netnography in tourism studies. *Annals of Tourism Research*, 48, pp.289–291.
- Molenaar, K. (2021). *Discover The Top 12 Virtual Influencers for 2023 - Listed and Ranked!* URL: <https://influencermarketinghub.com/virtual-influencers/#toc-7> [Accessed 26 Mar. 2023].
- Moustakas, E., Lamba, N., Mahmoud, D. and Ranganathan, C. (2020). Blurring lines between fiction and reality: Perspectives of experts on marketing effectiveness of virtual influencers. *2020 International Conference on Cyber Security and Protection of Digital Services (Cyber Security)*.
- Nowak, K.L. and Biocca, F. (2003). The Effect of the Agency and Anthropomorphism on Users' Sense of Telepresence, Copresence, and Social Presence in Virtual Environments. *Presence: Teleoperators and Virtual Environments*, 12(5), pp.481–494.
- O'Brien, H.L. and Toms, E.G. (2008). What is user engagement? A conceptual framework for defining user engagement with technology. *Journal of the American Society for Information Science and Technology*, 59(6), pp.938–955.
- Powers, T., Advincula, D., Austin, M.S., Graiko, S. and Snyder, J. (2012). Digital and Social Media In the Purchase Decision Process. *Journal of Advertising Research*, 52(4), pp.479–489.
- Robinson, B. (2020). Towards an Ontology and Ethics of Virtual Influencers. *Australasian Journal of Information Systems*, 24.
- Rottgers, J. (2019). *Superplastic Raises \$10 Million to Turn Janky and Guggimon Into Animated Instagram Stars (EXCLUSIVE)*. URL: <https://variety.com/2019/digital/news/superplastic-10-million-series-a-1203283671/> (visited on 26 Mar. 2023).
- Saks, A.M. (2006). Antecedents and consequences of employee engagement. *Journal of Managerial Psychology*, 21(7), pp.600–619.
- Sánchez-Fernández, R. and Jiménez-Castillo, D. (2021). How social media influencers affect behavioural intentions towards recommended brands: the role of emotional attachment and information value. *Journal of Marketing Management*, 37(11-12), pp.1–25.
- Sánchez-Fernández, R. and Jiménez-Castillo, D. (2021). How social media influencers affect behavioural intentions towards recommended brands: the role of emotional attachment and information value. *Journal of Marketing Management*, 37(11-12), pp.1–25.
- Sands, S., Campbell, C.L., Plangger, K. and Ferraro, C. (2022). Unreal influence: leveraging AI in influencer marketing. *European Journal of Marketing*, 56(6).
- Schwarz, R. (n.d.). *Council Post: Should Marketers Leverage Virtual Influencers?* URL: <https://www.forbes.com/sites/forbescommunicationscouncil/2022/05/23/should-marketers-leverage-virtual-influencers/?sh=3c6089a44b6a> (visited on 26 Mar. 2023).

- Statista. (n.d.). *Instagram users worldwide 2023*. URL: <https://www.statista.com/statistics/183585/instagram-number-of-global-users>.
- Syrdal, H.A. and Briggs, E. (2018). Engagement with social media content: A qualitative exploration. *Journal of Marketing Theory and Practice*, 26(1-2), pp.4–22.
- Thomson, M., MacInnis, D.J. and Whan Park, C., (2005). The ties that bind: Measuring the strength of consumers' emotional attachments to brands. *Journal of consumer psychology*, 15(1), pp.77-91.
- Travers, C. (2022). *Instagram Has Verified 35 Virtual Influencers*. URL: <https://www.virtualhumans.org/article/instagram-has-verified-35-virtual-influencers>.
- Uzunoğlu, E. and Misci Kip, S. (2014). Brand communication through digital influencers: Leveraging blogger engagement. *International Journal of Information Management*, 34(5), pp.592–602. Available at: <https://www.sciencedirect.com/science/article/pii/S0268401214000450>.
- Van Doorn, J., Lemon, K.N., Mittal, V., Nass, S., Pick, D., Pirner, P. and Verhoef, P.C. (2010). Customer Engagement Behavior: Theoretical Foundations and Research Directions. *Journal of Service Research*, 13(3), pp.253–266.
- De Vries, E., Schoonvelde, M. and Schumacher, G., (2018). No longer lost in translation: Evidence that Google Translate works for comparative bag-of-words text applications. *Political Analysis*, 26(4), pp.417-430.
- von Zitzewitz, J., Boesch, P.M., Wolf, P. and Riener, R. (2013). Quantifying the Human Likeness of a Humanoid Robot. *International Journal of Social Robotics*, 5(2), pp.263–276.
- Wiles, R., Bengry-Howell, A., Crow, G. and Nind, M. (2013). But is it Innovation?: The Development of Novel Methodological Approaches in Qualitative Research. *Methodological Innovations Online*, 8(1), pp.18–33.
- Windsor, L.C., Cupit, J.G. and Windsor, A.J. (2019). Automated content analysis across six languages. *PLOS ONE*, 14(11), p.e0224425.
- Złotowski, J., Proudfoot, D., Yogeewaran, K. and Bartneck, C. (2014). Anthropomorphism: Opportunities and Challenges in Human–Robot Interaction. *International Journal of Social Robotics*, 7(3), pp.347–360.