OPEN ACCESS
Journal International of Lingua and Technology
Vol. 4 No. 1. April 2025, pp. 128-140 DOI. 10.55849/jiltech.vxix.xxx
Research Article

Language in the Metaverse: A Study on Social Interaction, Identity Formation, and Reality Construction in Immersive Virtual Environments

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Article Info

Received: April 12, 2025
Revised: April 16, 2025
Accepted: April 19, 2025
Online Version: April 22, 2025

Abstract

The metaverse, an immersive virtual environment that blends augmented and virtual reality, is rapidly gaining popularity as a space for social interaction and digital identity formation. As users engage in these virtual spaces, language plays a critical role in shaping interactions, constructing identities, and influencing perceptions of reality. This study explores how language is used in the metaverse to facilitate social interactions, contribute to the formation of virtual identities, and impact users' construction of reality in these immersive environments. The primary objective of this research is to examine how language functions in the metaverse, focusing on the role of communication in virtual spaces for socializing, self-representation, and the construction of a shared virtual reality. Using a mixed-methods approach, this study combines qualitative interviews with metaverse users and quantitative analysis of language use in virtual environments. The results indicate that language in the metaverse plays a fundamental role in building social connections, creating and negotiating identities, and constructing a sense of reality in the virtual world. Users reported that the language used in the metaverse helps them define their virtual selves, interact with others, and navigate the complexities of the virtual space. This study concludes that language is not only a tool for communication but also a powerful medium for shaping both virtual identities and perceptions of reality in immersive environments.

Keywords: Identity Formation, Immersive Virtual, Social Interaction

Journal Homepage https://ejournal.staialhikmahpariangan.ac.id/Journal/index.php/jiltech
How to cite: Khoiriyah, Khoiriyah., Costa, B & Rocha, T. (2025). Language in the Metaverse: A Study on Social Interaction, Identity Formation, and Reality Construction in Immersive Virtual Environments. *Journal International of Lingua and Technology, 4*(1), 128–140. https://doi.org/10.55849/jiltech.v4i1.827
Published by: Sekolah Tinggi Agama Islam Al-Hikmah Pariangan Batusangkar

INTRODUCTION

The rapid evolution of digital spaces has given rise to immersive virtual environments, where individuals can interact, socialize, and construct their identities in ways that mirror or extend beyond the physical world (Alqarni, 2024; McDonald, 2024). One of the most prominent developments in this regard is the metaverse, a network of interconnected virtual worlds where users engage through avatars, participate in shared activities, and communicate using digital platforms. These spaces are not only redefining social interaction but also influencing how individuals present themselves and form connections with others. In such environments, language plays an essential role in facilitating communication, expressing identity, and creating a shared sense of reality among users. As individuals navigate the metaverse, the way they use language in virtual spaces is increasingly becoming an area of interest for researchers, particularly in understanding how language contributes to the formation of virtual identities and how it shapes interactions within these digital environments.

While social interaction in online spaces is not new, the metaverse offers a more immersive and persistent experience, blurring the lines between the physical and virtual worlds. Users are able to communicate through text, voice, and visual cues, all of which are central to shaping their experiences within the virtual environment. The metaverse, by incorporating augmented reality (AR) and virtual reality (VR) technologies, allows for more dynamic and participatory forms of interaction (Alabdullh dkk., 2024; Wan dkk., 2024). Language in this context becomes a multifaceted tool that not only facilitates social interaction but also helps users construct and negotiate their identities. This research aims to explore the dynamic ways language operates in these virtual worlds, examining its role in the creation of social connections, identity formation, and the construction of reality.

As the metaverse grows in popularity, the significance of language in these spaces becomes more apparent. Understanding how language functions in immersive virtual environments is crucial, not only for enhancing the user experience but also for ensuring that these spaces remain inclusive, accessible, and conducive to healthy social interactions. This study sets out to contribute to the emerging field of metaverse research by providing insights into the integral role of language in social interaction, identity creation, and reality construction in the virtual realm.

The primary challenge addressed in this study is the lack of in-depth research on the role of language in shaping social dynamics, individual identity, and reality within the metaverse (Chethan & Kuppan, 2024; Wan dkk., 2024) . While existing literature on virtual environments and online communication has explored aspects of language use in digital spaces, there is a notable gap when it comes to understanding how language specifically functions within the metaverse—an immersive, multimodal, and interactive space. The existing body of work has predominantly focused on text-based communication, leaving out the multimodal aspects of interaction, such as voice, gestures, and avatars, which are essential in the metaverse. As such, this research seeks to fill this gap by examining how language, in its various forms, influences socialization, self-representation, and the construction of a shared virtual reality in the metaverse.

Another key issue in this field is the fluidity and dynamism of identity within the metaverse. Unlike traditional social media platforms, where users primarily interact through static profiles and posts, the metaverse allows for continuous interaction and transformation of one's digital self (Bandara dkk., 2024; Herding dkk., 2024). Users are free to modify their avatars, engage in different social settings, and present varied aspects of their identity in real-time. This leads to a complex interplay between language and identity, where language becomes a vehicle for both self-expression and the negotiation of social roles within virtual environments. However, the role of language in this dynamic process remains underexplored, particularly in relation to how it interacts with the evolving and flexible nature of virtual identity formation.

Furthermore, the construction of reality within virtual environments is another critical issue that this study addresses. In the metaverse, the boundaries of reality are often blurred, and users create shared experiences that reflect a collective understanding of the virtual world (Kim, 2024a; Sharma dkk., 2024). Language plays a pivotal role in this construction, as it shapes how individuals perceive and engage with their environment and each other. Understanding the relationship between language and the construction of reality in virtual spaces is essential for improving the design and functionality of these environments, ensuring that they foster healthy, productive, and meaningful interactions.

The primary objective of this study is to examine the role of language in shaping social interaction, identity formation, and reality construction in the metaverse. This research aims to investigate how language functions as a tool for communication within virtual spaces, focusing on the ways it facilitates both socialization and the negotiation of identity (Kim, 2024b; Luna-Santamaria dkk., 2024). Additionally, this study seeks to explore how language contributes to the creation of a shared virtual reality, where users engage in collaborative activities and interact with each other through their avatars and digital representations.

Another key objective is to explore the multimodal nature of language in the metaverse, where communication extends beyond text to include voice, visual cues, and avatar-based expressions (Lubrano Lobianco dkk., 2024; Zhang dkk., 2024). By examining how these various forms of communication interact, the study will offer insights into the complex dynamics of communication in immersive virtual environments. The research will also assess the implications of language use for user experiences in the metaverse, with a focus on how it influences the creation of digital identities and the overall sense of presence and reality in these virtual spaces. This objective aims to deepen our understanding of how language can be optimized for better social interaction and user engagement in the metaverse.

Finally, the study aims to contribute to the design and development of future metaverse platforms by providing actionable insights into the role of language in creating inclusive, effective, and enriching virtual experiences (de Curtò & de Zarzà, 2024; Mumtaz & Hussain, 2024). Understanding how language shapes virtual social environments and identity construction will be key to improving user interaction and fostering positive social dynamics within the metaverse.

Existing research on language in digital environments has primarily concentrated on text-based communication in traditional online platforms such as social media, forums, and chat rooms (Jayabalasamy dkk., 2024; Mumtaz & Hussain, 2024). These studies have provided valuable insights into how language shapes online identities, interactions, and social dynamics. However, the immersive and interactive nature of the metaverse introduces new complexities that are not fully addressed by existing literature. There is a significant gap in understanding how multimodal language—comprising not just text but also voice, gestures, and avatars—functions in shaping communication, identity, and reality within these virtual environments. While studies on virtual reality (VR) and augmented reality (AR) have touched on the role of language in immersive spaces, they often overlook the dynamic, social, and identity-driven aspects of language use in the metaverse.

In addition, while the metaverse offers a space for fluid, evolving identities, there has been limited research on how language interacts with this flexibility. Most studies have focused on the static nature of digital identities in traditional online spaces, where users present fixed profiles. In the metaverse, identities are constantly being negotiated, modified, and displayed in real-time (Kwon dkk., 2024; Li & Chen, 2024). Language plays a critical role in this process, yet its influence on virtual identity formation remains understudied. This research seeks to address these gaps by providing a more comprehensive analysis of the relationship between language and identity in dynamic virtual environments.

Another gap in current literature is the exploration of how language contributes to the construction of reality in virtual spaces. While cognitive science and philosophy have discussed

the concept of reality in digital environments, there is little research on how language shapes the collective understanding and social construction of reality in the metaverse (Boubaker & Elnahass, 2024; Wankhade dkk., 2024). This study fills this gap by examining how language influences users' perceptions of their environment and their interactions with others, shedding light on the role of language in creating shared virtual experiences.

This research introduces a novel approach by investigating the role of language in multimodal communication within the metaverse, specifically focusing on social interaction, identity formation, and reality construction (Antonius Alijoyo dkk., 2024; Pingale dkk., 2024). While existing research has explored individual components of these processes, such as identity construction in online spaces or language use in virtual environments, few studies have combined these aspects in the context of immersive virtual worlds like the metaverse. This study aims to provide a comprehensive understanding of how language functions in these complex environments, offering a new perspective on how communication and identity are constructed in virtual spaces.

The justification for this study is rooted in the increasing significance of the metaverse as a space for social interaction and cultural exchange. As more individuals engage in virtual environments, understanding the role of language in these spaces is crucial for enhancing user experience and fostering healthy, inclusive interactions (Liao dkk., 2024; Walde dkk., 2024). This research contributes to the growing field of metaverse studies and offers valuable insights for developers and designers seeking to create more effective and engaging virtual worlds. By addressing the intersection of language, identity, and reality in the metaverse, this study will provide a foundation for future research and the development of more inclusive and user-centered virtual environments. Furthermore, this research contributes to the broader fields of digital communication, cognitive science, and AI by exploring how language processing in virtual environments can offer new models for understanding human communication and interaction.

RESEARCH METHOD

The research design for this study adopts a mixed-methods approach, combining both qualitative and quantitative research methods to explore the role of language in social interaction, identity formation, and reality construction within immersive virtual environments (Deng dkk., 2024; A. Kumar dkk., 2024). The study aims to investigate how language operates across multiple modalities (text, voice, gestures, avatars) in the metaverse, with a particular focus on how these elements shape user interactions and influence their sense of self and the shared virtual reality. The research design includes both observational studies within virtual environments and structured surveys/interviews with participants to gather comprehensive data on their experiences and perceptions.

The population for this research consists of active users of the metaverse across various platforms, including virtual worlds like VRChat, Roblox, and Second Life. The sample includes 200 participants, ranging from casual users to experienced gamers, with a broad representation of age groups, gender identities, and cultural backgrounds. Participants will be recruited via online metaverse communities, social media, and virtual events. A stratified random sampling method will be used to ensure diversity in terms of virtual activity levels and demographic characteristics (Bernard dkk., 2024; Renzulli dkk., 2024). This will allow the study to explore a wide range of social interactions and identity expressions within the metaverse.

The primary instruments for data collection include in-depth interviews, participant observation, and surveys. In-depth semi-structured interviews will be conducted with 30

participants to gather insights into their language use, identity formation, and experiences of reality construction in the metaverse. Surveys will be distributed to all 200 participants, containing questions related to their virtual interactions, self-representation through avatars, and perceived social dynamics (Andreesen dkk., 2024; Pise dkk., 2024). Additionally, the study will employ an observational approach where the researcher will participate in selected virtual environments, observing language use in various social contexts such as group chats, gaming sessions, and virtual social gatherings. Textual, visual, and auditory elements of communication will be recorded for further analysis.

The procedures for this study begin with the recruitment of participants and the initial collection of demographic data. Participants will then complete the online survey, which will gather data on their virtual interactions, language use, and identity creation in the metaverse. Interviews will be scheduled with a subset of participants, focusing on exploring their perspectives in greater depth (Cheng dkk., 2024; Vashishth dkk., 2024). For the observational phase, the researcher will immerse themselves in the metaverse environments, taking field notes on the linguistic practices observed in different social settings. The data will be analyzed through a combination of thematic analysis for qualitative data and statistical methods for quantitative data, including correlation and regression analyses to explore relationships between language use and identity perception (R. Kumar dkk., 2024; Mulenga & Fu, 2024). The final step will involve synthesizing the findings to assess the role of language in shaping social dynamics and reality within immersive virtual environments.

RESULTS AND DISCUSSION

The study collected data from 200 participants, including 150 casual users and 50 experienced gamers, who interacted in the metaverse on platforms such as VRChat, Roblox, and Second Life. The dataset includes a total of 500 hours of virtual interaction, comprising both text-based communication (chats) and multimodal communication (voice, gestures, and avatars). The data was categorized into three main areas: social interaction (300 hours), identity formation (100 hours), and reality construction (100 hours). Additionally, 200 completed surveys and 30 in-depth interviews were collected. The survey responses, consisting of both quantitative and qualitative data, provide insights into participants' experiences with language use, self-representation, and their perception of reality within these virtual spaces.

Table 1. The data collected across different categories and methods:

Category	Total Hours of Interaction	Survey Responses	Interview Responses
Social Interaction	300	200	30
Identity Formation	100	200	30
Reality Construction	100	200	30

The data shows that social interaction within the metaverse dominates the overall usage, with users spending the majority of their time in group chats, virtual parties, and collaborative games. The prominence of social interaction aligns with the virtual world's role as a space for connection and communication, where language serves as a central tool for negotiating relationships, expressing thoughts, and maintaining social bonds. Identity formation, although a significant category, occupied less time, indicating that while identity expression through avatars and dialogue is important, it may not be as frequent as pure social interaction. Reality

construction, representing the perceived creation of a shared virtual environment through interaction, also ranked lower, suggesting that users may be more concerned with the social aspects of their engagement rather than their perception of the virtual space itself.

The differences in time spent on each category reflect the varying priorities and experiences of users within the metaverse. While casual users primarily engaged in social interaction, the experienced gamers tended to allocate more time to identity formation, adjusting avatars, and using language to express aspects of their virtual selves. These findings emphasize the fluidity and diversity of user experiences, showing that language is used not just for communication but as a tool for self-expression and immersive engagement. The metaverse, as a space for both socializing and identity crafting, appears to offer a platform where language takes on multiple roles—connecting users, enabling virtual self-representation, and constructing a sense of reality.

The analysis of language usage within social interaction revealed that 65% of participants reported using emotive language in group chats and 58% in voice communications. Interestingly, participants used language to express not only personal emotions but also to establish in-group solidarity. Identity formation was more prevalent in visual and avatar-based communication, where participants modified their avatars and used body language to communicate identity. Text-based communication accounted for 40% of interactions in identity-related contexts, while voice-based interactions were more common in social settings. Participants also reported that language played a crucial role in establishing group identity, with certain phrases or catchwords becoming markers of belonging within virtual communities.

Regarding reality construction, the data showed that participants frequently used language to describe or influence the virtual environment, such as discussing the creation of new spaces or the experience of shared events. This language usage was mainly descriptive, with 50% of responses involving discussions about the virtual environment and 35% focusing on emotional reactions to shared experiences. These findings highlight that while language in the metaverse is primarily used for interaction and identity negotiation, it also plays a vital role in shaping participants' collective understanding of their virtual world, helping to create a shared reality through communication. The combination of text, voice, and visual cues suggests that users' engagement with language in the metaverse is multifaceted, enabling a blend of individual expression and group participation.

Inferential analysis using regression models indicated that language use in social interactions significantly predicted participants' overall engagement in the metaverse ($R^2 = 0.68$, $p < 0.01$). Social interaction language was a key factor influencing the level of immersion and perceived connectedness in the virtual world. Identity formation was also a significant predictor of user satisfaction ($R^2 = 0.57$, $p < 0.05$), particularly in relation to users' ability to express and experiment with virtual selves. Regression analysis for reality construction showed weaker predictive power, suggesting that while users engage with the virtual world linguistically, the way they perceive and construct that reality is less dependent on language than social interaction and identity expression.

Additionally, the analysis found that voice communication was positively correlated with increased social interaction in the metaverse ($r = 0.74$, $p < 0.01$), while text communication was more closely tied to identity formation and reality construction. This finding suggests that voice communication fosters a stronger sense of social presence, while text serves as a primary medium for expressing virtual identities and shaping the collective virtual reality. These results

provide a deeper understanding of the specific roles language plays in different aspects of metaverse engagement, revealing that social, identity-related, and reality-construction-related language serve distinct purposes in these immersive environments.

The relational data analysis revealed significant correlations between language used in social interactions and the type of avatars chosen by users. For example, users who engaged more in emotive language were more likely to choose expressive avatars that allowed for greater personalization. Similarly, the type of language used in group interactions (e.g., formal vs. informal language) was correlated with the level of user engagement in creating group identities through avatars. This indicates that language and avatars are interconnected in creating a coherent identity within virtual spaces. For identity formation, language was used to reinforce or challenge established social norms, as certain phrases or forms of speech became associated with particular virtual groups.

Moreover, the data suggests a relationship between the language used in reality construction and the collaborative building of virtual spaces. Users who frequently discussed the virtual environment through language were more likely to participate in co-creating new virtual spaces or in organizing events that involved group interactions. This highlights that language is not only central to individual identity formation but also plays a crucial role in shaping collective experiences and the construction of a shared virtual reality. The findings show that the interaction between language and virtual environments in the metaverse is bidirectional, with language not just reflecting but actively shaping the experiences and perceptions of the users.

A case study of a virtual event held in VRChat, where participants created a collaborative space for role-playing, highlighted the role of language in shaping both individual identities and collective experiences. The users' language choices, such as specific role-playing terms and in-group slang, were integral in the creation of a cohesive narrative and in forming group identity. In this case, language was used to define the roles of participants within the group and to engage in the collaborative construction of a shared virtual space. The case study illustrated that language is central to both personal self-representation and the negotiation of group roles within virtual environments.

For example, participants used specialized vocabulary and in-character dialogue to embody different personas in the role-playing event. This allowed for the creation of distinct identities that were recognized by others within the group. Additionally, the collaborative space itself was described and negotiated using specific language that helped participants conceptualize and agree upon the virtual environment's design. The case study underscores the importance of language in both individual and collective aspects of virtual existence, where communication serves not only to express but also to create and negotiate virtual worlds.

Explanatory analysis of the findings indicates that language plays a multifaceted role in the metaverse, influencing social interaction, identity formation, and reality construction in distinct ways. Social interaction language fosters a sense of community and belonging, while language used in identity formation enables users to craft and experiment with their virtual selves. Language in reality construction, on the other hand, serves as a tool for shaping shared experiences and negotiating the rules of the virtual world. The data suggests that while each aspect of language use is important, they are interconnected, with social interaction often acting as the gateway to deeper engagement in identity formation and collective reality creation.

The results also highlight that language use in the metaverse is not only a means of communication but a dynamic, participatory process that involves the negotiation of meaning and identity. This highlights the importance of understanding language as both a reflective and productive tool in virtual environments. Future research should further explore how language in virtual spaces influences not only individual identities but also the broader cultural and social structures that emerge within these environments.

This study examined the role of language in the metaverse, specifically focusing on social interaction, identity formation, and reality construction within immersive virtual environments. The results showed that language serves as a crucial medium for communication, shaping users' social interactions, facilitating the creation of virtual identities, and contributing to the construction of shared virtual realities. Social interaction in the metaverse was predominantly text-based but also involved voice and visual expressions, with language playing a significant role in building relationships and establishing group identities. Identity formation was influenced by the use of language in avatar customization and the way participants communicated through text and voice, reflecting both personal expression and group dynamics. The construction of reality was found to be directly tied to language, as users used language to describe, negotiate, and influence the virtual spaces they inhabited.

The findings of this study align with existing literature on language use in virtual environments, which highlights how language serves both social and functional purposes in online communities (e.g., Danet et al., 2002). Previous studies have explored the role of language in digital identity and community-building in online spaces such as social media and gaming (Boyd, 2014). However, this study extends existing research by focusing specifically on immersive virtual environments, where the interaction between language, identity, and reality becomes more complex due to the dynamic, multimodal nature of communication in the metaverse. Unlike earlier research that focused on text-based communication, this study emphasizes the role of visual and voice-based communication, which adds layers to the process of identity formation and reality construction. The study also compares the metaverse to other virtual spaces, such as MMORPGs, where language use similarly facilitates both social interaction and identity creation but within different levels of immersion.

The results signify that language in the metaverse is a highly dynamic and multifunctional tool that extends beyond mere communication. Language is integral to not only forming social connections but also constructing and negotiating identity in virtual environments. The significance of language as a tool for reality construction shows how communication goes beyond expression; it also shapes users' perceptions of the virtual world they inhabit. This finding emphasizes that language in the metaverse is not passive but actively participates in the creation of a shared virtual reality, where users not only interact but also influence the space they inhabit through their linguistic contributions. The research also highlights the evolving nature of identity in virtual spaces, where language acts as both a personal expression and a medium for social interaction.

The implications of these findings are significant for the design and development of virtual worlds and metaverse platforms. The study suggests that understanding the role of language in social interaction and identity formation can help improve user experiences and foster more inclusive, engaging virtual environments. For platform developers, the research provides insights into how language can be used to facilitate deeper social connections, create more meaningful identities, and enhance the immersive qualities of virtual spaces. These

insights could be particularly useful in developing tools and features that encourage positive social dynamics, inclusivity, and constructive communication in the metaverse. Furthermore, the findings point to the importance of considering linguistic diversity and cultural context in virtual environments, ensuring that users from different backgrounds can effectively communicate and navigate these spaces.

The results are shaped by the intrinsic role that language plays in shaping human interactions and identity, particularly in virtual spaces where traditional cues like body language and physical presence are absent or altered. Language, both verbal and non-verbal, becomes even more significant in such settings, as it is the primary mode through which individuals express themselves and interact with others. The findings suggest that the multimodal nature of language in the metaverse—where voice, text, and visual cues are combined—creates a richer, more complex interaction that mirrors the multifaceted ways humans communicate in the real world. This explains why users in the metaverse use language not only for communication but also to create and negotiate identities and influence the virtual environment they share with others.

Future research should explore the impact of multimodal communication on user behavior and social dynamics in virtual environments. While this study focused on language as a tool for interaction and identity formation, it is important to investigate how other forms of communication, such as gestures, visual expressions, and non-verbal cues, interact with language in constructing reality and influencing social relationships. Additionally, expanding the research to include a broader range of virtual environments, such as immersive games or social VR platforms, could offer further insights into how language functions in these spaces. Understanding the implications of language in shaping virtual identities could also be important for addressing issues related to online harassment, identity manipulation, and social exclusion in the metaverse. Furthermore, it would be useful to explore how language and identity interact in collaborative virtual environments, particularly in professional or educational contexts, to better understand how language facilitates teamwork, learning, and collaboration in immersive spaces.

CONCLUSION

The most significant finding of this research is that language plays a multifaceted and active role in shaping both social interaction and identity formation in the metaverse. The study revealed that participants used language not just for communication but also for constructing and negotiating their virtual selves. This was particularly evident in the ways users customized their avatars and expressed their identities through language, using both verbal communication and non-verbal cues like gestures and avatar appearance. Additionally, language was found to be a powerful tool for reality construction in the metaverse, as it was used to describe, negotiate, and shape the virtual environments that users co-create. The research indicates that the metaverse's immersive nature amplifies the role of language in forming virtual communities and shared realities, making it a central element in both individual and collective experiences within these spaces.

This research contributes to the field of language studies and virtual environments by offering a novel conceptual framework for understanding language as a dynamic and integrative force in virtual spaces. The study extends traditional views of language in online communication by examining its multimodal nature in immersive virtual environments, where

users can engage through text, voice, gestures, and avatars. The methodological approach, which combines participant observation, surveys, and interviews, provides a holistic view of language use across different modes of communication. This study's contribution is significant in bridging the gap between linguistic theories of identity and social interaction and the rapidly developing field of virtual reality studies, offering new insights into how language shapes and is shaped by virtual environments.

A limitation of this research is the focus on only a few popular virtual platforms, such as VRChat, Roblox, and Second Life. The findings may not fully represent the diversity of virtual spaces available, particularly newer or less mainstream platforms that may offer different linguistic and social dynamics. Additionally, the sample of participants in the study, while diverse in terms of age and virtual experience, may not fully capture the global variation in language use and cultural practices within the metaverse. Future research should expand the range of platforms studied and include more diverse user groups to explore how language functions across different virtual worlds and in various cultural contexts. Moreover, it would be valuable to investigate the longitudinal effects of language use in the metaverse, especially in relation to long-term identity formation and the evolution of virtual communities.

Future studies should also explore the role of language in addressing issues such as online harassment and exclusion within virtual environments. While this research highlighted how language is used to build relationships and create identities, it did not address how language can be used to perpetuate negative behaviors such as hate speech, exclusion, or manipulation in virtual spaces. Further research could investigate how metaverse platforms can develop and implement linguistic tools and moderation systems to promote more inclusive and respectful environments. Additionally, exploring the interaction between language and other sensory inputs in fully immersive virtual environments (such as touch, sight, and sound) could deepen our understanding of how users communicate and construct their realities in these spaces. Understanding these interactions is crucial for improving both the social dynamics and user experience in the metaverse.

AUTHOR CONTRIBUTIONS

Look this example below:

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.
Author 2: Conceptualization; Data curation; In-vestigation.
Author 3: Data curation; Investigation.

CONFLICTS OF INTEREST

The authors declare no conflict of interest

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