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BETWEEN INNOVATION AND RISK: ETHICAL AND SOCIAL CHALLENGES IN THE METAVERSE

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ABSTRACT

Introduction: The metaverse and generative artificial intelligence (GAI) are shaping a disruptive scenario for contemporary communication, especially in Generation Alpha's socialization. This study examines their ethical, social, and cultural implications, considering risks such as privacy, identity, and misinformation, while highlighting opportunities for educational innovation and digital inclusion. **Objective:** The research explores the communicative implications of Generation Alpha's interaction with metaverses enhanced by GAI, with a particular focus on the role of NEO NPCs and the challenges they pose for communicative ethics, identity construction, and digital equity. **Methodology:** A mixed-method approach is

adopted: a systematic literature review of recent publications (2020–2025) and a qualitative analysis of young users' digital experiences in immersive environments (Roblox, Fortnite, Minecraft, VRChat). **Results:** Findings reveal that Generation Alpha experiences the metaverse as a space for identity expression and extended socialization. However, significant risks are observed, related to lack of regulation, biometric data protection, algorithmic manipulation, misinformation, and access equity. **Discussion:** The analysis shows that GAI in the metaverse expands communicative possibilities but also increases ethical dilemmas around transparency, misinformation, and corporate responsibility. **Conclusions:** If designed according to principles of communicative ethics, inclusion, and sustainability, the metaverse can become a strategic space for social and cultural innovation for Generation Alpha.

Keywords: metaverse; generative artificial intelligence; NEO NPC; communication; ethics; Generation Alpha; digital identity.

1. INTRODUCTION

In the last decade, the metaverse has ceased to be a speculative notion and has established itself as an expanding sociotechnical ecosystem that reconfigures practices of interaction, consumption, education, and identity construction (Ball, 2022; Dwivedi et al., 2022). Far from being limited to an extension of immersive video games (Szolin et al., 2023), this "three-dimensional and interconnected" environment (Weinberger, 2022, p. 1), accessible through avatars, proposes new forms of digital presence that replicate and expand dynamics of the physical world (Dionisio et al., 2013; Naveen, 2024). The convergence of emerging technologies such as artificial intelligence (AI), virtual reality (VR), augmented reality (AR) and blockchain has boosted the consolidation of the metaverse as a multi-sectoral space in areas such as education (Dengel et al., 2023; Joseph, 2023), the economy (Ball, 2022), tourism (Go & Kang, 2023), health (Tiwari & Srivastava, 2025) or the creative industry (Markopoulos et al., 2024).

However, the rise of the metaverse is not without normative (Tu & De Castro e Silva, 2025), social (Zallio & Clarkson, 2022) and ethical tensions (Al- Kfairy et al., 2024; Munn & Weijers, 2023). While some authors highlight its potential for social, inclusive, and educational innovation (Dengel et al., 2023; Mystakidis, 2022; Rane et al., 2024), others warn that this ecosystem can reproduce or even intensify existing inequalities (Al- Kfairy et al., 2025) —if it is not developed from principles of sustainability, accessibility and social justice (Friedricks et al., 2023; de Giovanni, 2023)—. In this sense, the need to integrate ethical and regulatory frameworks capable of protecting privacy, guaranteeing cultural diversity, and preventing the exploitation of personal data is emphasized (Rajguru & Brüggemann, 2024; Sarna & Poudel, 2025). Such concerns become even more relevant considering that a large proportion of metaverse users belong to Generation Alpha, whose socialization takes place on platforms such as Roblox or Fortnite (Chen & Cheng, 2022).

From the perspective of communication ethics and information ethics, this reality demands an analysis that goes beyond technical risks to address the moral implications of human-machine interaction. Authors such as Floridi (2013, 2019)

emphasize that digital environments based on artificial intelligence configure "infospheres" in which human and artificial agents coexist, generating new ethical responsibilities linked to transparency, autonomy, and informational dignity. Along the same lines, Ess (2014) warns that algorithmic mediation transforms the conditions of interpersonal communication, challenging classic notions such as authenticity, trust, and moral responsibility in highly automated digital contexts.

These reflections are especially relevant when analyzing communicative practices involving minors. The literature on childhood and the internet has demonstrated that children's digital experience is profoundly mediated by social, cultural, and technological factors, as well as by the presence —or absence—of support mechanisms and critical literacy (Livingstone, 2009; Livingstone & Third, 2017). In this sense, the metaverse and its intelligent agents do not constitute a neutral space, but rather a socialization environment that influences the construction of values, norms, and communicative skills from an early age.

In this context, Generation Alpha's interaction with virtual worlds inaugurates a new dimension of digital communication, characterized by coexistence with NEO NPCs (Next- Generation Non-Player Characters), virtual characters not controlled by human players, but driven by Generative Artificial Intelligence (GAI), capable of simulating human behaviors and responses (Herath et al., 2024; Park et al., 2023). Unlike traditional NPCs, programmed with predefined responses, NEO NPCs are capable of creating dynamic, creative, and, at times, unpredictable interactions (Park et al., 2023; Rao et al., 2024). This means that, instead of simply running repetitive dialogues, they can hold fluid conversations, adapt to the tone of the person interacting with, and even improvise narratives that modify the experience in real time (Chheang et al., 2023; Korkiakoski et al., 2025).

This advanced simulation capability raises significant ethical dilemmas (Park et al., 2023), as users may not clearly distinguish whether they are interacting with a human or an algorithmic agent (Park & Kim, 2022; Simon, 2023). The problem is exacerbated in the case of minors, who may attribute intentions, authority, or moral credibility to these agents (Simon, 2023). In immersive environments, where realism reduces critical distance, this can affect the development of trust, social values, and digital authenticity (Chen & Cheng, 2022; Şişman & Bilgici, 2023). Thus, interaction with IAG-powered NEO NPCs presents a central dilemma for contemporary communicative ethics: the possibility of exchanges that appear to be dialogue and consensus, but which in reality respond to opaque strategic logics and non-transparent algorithmic architectures.

1.1. Threats and Challenges of Digital Interaction with IAG

Recent literature identifies several areas of concern regarding AI in the metaverse. First, the privacy of the user community is threatened by both the collection of personal data and the extraction of highly sensitive, difficult-to -anonymize biometric information (eye movements, voice patterns, facial expressions) (Smith et al., 2023; Tu & De Castro e Silva, 2025). Unlike other digital records, this data is directly linked to the physiological and psychological identity of the individual (Zallio & Clarkson,

2022), making it a unique fingerprint that allows for the identification, profiling, and prediction of future behavior (Yang et al., 2024, p. 3).

Secondly, threats related to disinformation, algorithmic bias, and identity manipulation through deepfakes or hyperrealistic avatars are emerging (Almomani et al., 2025; Yang et al., 2024; Zhuk, 2025). The possibility of generating virtual interlocutors indistinguishable from humans poses "unprecedented risks to the authenticity of interactions" (Korkiakoski et al., 2025, p. 5), as participants may be exposed to persuasive simulations without clear verification mechanisms (European Parliament, 2023; Friedricks et al., 2023; Sarna & Poudel, 2025).

Third, it warns about inequalities of access and the digital divide, which could generate a "divided metaverse" between those who have advanced technological resources and those who are excluded (Al- Kfairy et al., 2025; Kaddoura & Al Husseiny, 2023). Unequal access to devices such as VR headsets or haptic gloves reinforces dynamics of digital exclusion, limiting opportunities for participation for the most vulnerable groups (Al- Kfairy et al., 2025; Kaddoura & Al Husseiny, 2023; Zallio & Clarkson, 2022). Without inclusive policies and accessible designs, technological immersion could replicate or even amplify pre-existing inequalities (Friedricks et al., 2023; de Giovanni, 2023).

Finally, the question of business ethics arises: how do companies that design and manage these environments integrate principles of transparency, inclusion, and accountability into their business models (Behera et al., 2024; Togbolo et al., 2024). The primacy of data monetization and attention may come into tension with the guarantee of digital rights (Al- Kfairy et al., 2025), which highlights the need for regulatory frameworks that go beyond mere corporate self-regulation (Munn & Weijers, 2023; Tu & De Castro e Silva, 2025; Zhuk, 2025). In this context, the adoption of corporate social responsibility practices—such as privacy by design, the promotion of diversity, and environmental sustainability—not only protects the user community but also strengthens the institutional reputation of the platforms (Al-Kfairy et al., 2024; Almomani et al., 2025; Togbolo et al., 2024).

1.2. Communication, Interaction and Digital Socialization in the Metaverse

From a communication perspective, the metaverse represents a paradigm shift that transcends the precepts of "traditional social networks" (Barron-San Blas et al., 2025, p. 65). In this new environment, the notion of "interlocutor" is completely redefined: humans, avatars controlled by people, and autonomous algorithmic agents converge in the same space (Herath et al., 2024). This coexistence generates scenarios where the identity of the other is uncertain and interactions become more persuasive, adaptive, and personalized, simulating human behavior in real time. In this way, an "interconnected virtual world" is configured that merges the physical and digital dimensions, increasing ethical and communicative complexity (Herath et al., 2024, p. 32).

This triad generates ambiguities in interpersonal communication, where the interlocutor may not know for sure who or what is "on the other side" (Şişman &

Bilgici, 2023). Furthermore, these are not merely spaces for entertainment, but rather laboratories of digital identity, interaction, and cultural construction (Brito et al., 2024; Meta, 2021). This transformation creates opportunities—new transmedia narratives, immersive social strategies, interactive brand experiences —but also critical challenges related to disinformation, content regulation, the protection of minors, and the integrity of interactions (European Parliament, 2023; Xiao, 2024).

The contribution of this work lies precisely at the intersection of communication, ethics, and technology. Unlike studies focused solely on the educational or economic potential of the metaverse (Go & Kang, 2023; Joseph, 2023; Markopoulos et al., 2024), this research proposes to analyze how interaction with GAI-based NEO NPCs affects Generation Alpha in terms of communication, ethics, and digital culture. Through a systematic review of recent literature (2020–2025) and a qualitative analysis of experiences on immersive platforms, the study seeks to identify both the opportunities offered by these technologies (personalized learning, augmented creativity, new interaction models) and the risks they entail (loss of privacy, misinformation, algorithmic manipulation, unequal access).

Thus, a framework for critical reflection is offered on how the design of immersive environments can promote ethical, inclusive and sustainable communication, aimed at ensuring that participation in the metaverse contributes to the common good and not to the reproduction of structural inequalities.

2. OBJECTIVES

The general objective of this study is to contribute to the understanding of how the interaction of Generation Alpha with metaverses powered by generative artificial intelligence (GAI) impacts communicative, ethical, and social processes, as well as the shaping of digital culture. Based on this objective, the following specific objectives are proposed:

1. To identify and characterize the main communicative transformations that occur in the interaction of Generation Alpha with metaverses powered by generative artificial intelligence, taking into account the coexistence between human and algorithmic agents.
2. To define and problematize the ethical dilemmas associated with the incorporation of NEO NPCs in immersive environments in relation to the protection of minors.
3. To assess the implications of the metaverse for equity and digital inclusion, in order to provide criteria that guide the design of fairer and more inclusive communicative regulatory frameworks.

3. METHODOLOGY

This research adopts a mixed-methods approach, both exploratory and descriptive, combining a systematic literature review with a qualitative analysis of digital experiences in immersive environments. This methodological strategy responds to the emerging and socio-technical nature of the object of study: the interaction of Generation Alpha with metaverses powered by generative artificial intelligence (GAI),

whose complexity demands the integration of theoretical and empirical approaches. Given that this is a consolidating phenomenon, the use of exclusively quantitative methods would be insufficient to capture the complexity of the communicative, ethical, and socio-cultural dimensions involved.

Consequently, the research was structured in two complementary phases: (1) a systematic literature review and (2) a qualitative analysis of digital experiences. The first phase allowed for the construction of the conceptual framework and the delimitation of the analytical categories; the second made it possible to delve deeper into the interpretation of the communicative practices observed in immersive environments.

3.1. Systematic Literature Review

The first phase focused on a systematic review of academic and technical literature published between 2020 and 2025, a period in which debates surrounding the metaverse, the GAI, and Generation Alpha intensified. The procedure was guided by the principles of the PRISMA statement (Preferred Reporting Items for Systematic Reviews and Meta- Analyses), adapted to the field of social sciences and digital humanities.

The search strategy was applied in high-impact academic databases (Scopus, Web of Science, IEEE Xplore, and Google Scholar), as well as institutional reports and documents from international organizations linked to digital governance (European Parliament and UNESCO). Boolean combinations of keywords in Spanish and English were used, including: "metaverse", "Generative AI", "Generation Alpha", "NPC", "digital ethics", "communication ethics" and "digital identity".

The selection process was carried out in four stages:

1. Identification of records through automated search;
2. Screening of titles and abstracts, with elimination of duplicates;
3. Eligibility, through reading and application of thematic and methodological criteria;
4. Final inclusion of the documents that met the established requirements.

The inclusion criteria considered peer-reviewed scientific articles, book chapters, proceedings of international conferences, and technical reports with an explicit focus on communication, ethics, digital governance, or interaction in immersive environments. Publications prior to 2020, works without verifiable academic backing, and studies without direct relevance to the communicative or ethical dimensions of the object of study were excluded.

The final corpus consisted of 82 documents. Since the objective of the review was to identify conceptual trends, interpretive frameworks, and emerging lines of discussion—and not to conduct a quantitative meta-analysis—citations within the text are limited to the most representative or paradigmatic works for each thematic area analyzed. This decision is based on criteria of analytical relevance and expository economy, without implying the methodological exclusion of the other studies that

comprise the complete corpus, whose systematization underpins the categories and results presented.

The collected information was organized into thematic analysis matrices (communication, ethics, digital identity, equity and governance), which made it possible to identify recurring patterns, conceptual tensions and research gaps, as well as to substantiate the categories used in the subsequent qualitative phase.

3.2. Qualitative Analysis of Digital Experiences

The second phase focused on a qualitative analysis of digital experiences linked to Generation Alpha in immersive environments. Four platforms were selected: Roblox, Fortnite, Minecraft, and VRChat, justified by their large user base of minors, their relevance in digital socialization processes, and their incorporation of advanced interactive dynamics—including algorithmic agents and NEO NPCs. These platforms concentrate millions of monthly active users; by 2025, the metaverse is estimated to have 700 million monthly active users worldwide, of whom 51% are 13 years old or younger, 80% are under 16, and 83.5% are under 18, demonstrating the strong presence of Generation Alpha (Singh, 2025).

The empirical work was carried out using non-participant netnographic observation between August and October 2025. During this period, 25 observation sessions were conducted across the four platforms, focusing on public events, group interaction spaces, and recurring communication dynamics. Data collection was stopped when theoretical saturation was reached, at which point the observed interactions began to reproduce similar patterns.

The data were examined using a qualitative thematic analysis, following a three-phase inductive coding process: (1) open coding, (2) grouping of categories, and (3) definition of interpretive axes. This procedure allowed for the identification of recurring themes related to trust, perceived agency, algorithmic authority, and the boundary between the human and the artificial.

In accordance with the ethical principles of digital research, the testimonies analyzed come exclusively from public spaces (open forums, visible comments, and events accessible without private registration). The results section includes anonymized direct quotes that illustrate the identified patterns, without including data that would allow for the direct or indirect identification of users. This procedure was adopted to guarantee respect for privacy and minimize risks, especially considering the possible participation of minors in the observed environments.

3.3. Ethical Considerations

Given that the study addresses digital experiences related to minors, strict research ethics criteria were adopted. No direct interaction with minors took place, nor was personally identifiable data collected; the analysis was limited exclusively to content and dynamics accessible in public spaces of the observed platforms.

The principles of anonymization, data minimization, and prevention of indirect identification were applied, avoiding the inclusion of usernames, screenshots, or contextual references that could allow for the traceability of participants. These methodological decisions align with international recommendations on research in sensitive digital environments and with the ethical standards applicable to studies that indirectly involve minors. Furthermore, a non-intrusive observation approach was adopted, taking care not to disrupt the natural dynamics of interaction.

3.4. Triangulation and Validity

To ensure the validity and consistency of the results, methodological triangulation was applied between the literature review and the qualitative analysis. This cross-section allowed for verification of the coherence between theoretical discourses and observed practices, as well as the identification of discrepancies.

In addition to triangulation, criteria specific to qualitative research—credibility, internal coherence, and reflexivity—were incorporated through iterative review of analytical categories and explication of the methodological decisions adopted.

4. RESULTS

The findings indicate that Generation Alpha's interaction with AI-powered NEO NPCs is substantially reshaping communicative practices in immersive environments. Since the systematic review, numerous studies have highlighted the transformative potential of advanced NPCs in playful and educational contexts (Chheang et al., 2023; Rao et al., 2024). However, the netnographic analysis shows that, in everyday practice, ambiguity regarding the human or algorithmic nature of the interlocutor is not an isolated phenomenon, but rather a structural condition of the communicative experience.

In the observed interactions, the distinction between human player and algorithmic agent is rarely made explicit and, in many cases, is irrelevant to the participants. This opacity disrupts the symmetry and transparency inherent in communicative exchange, since the NEO NPCs simulate dialogic relationships without sharing the same moral responsibilities or the same conditions of agency as human interlocutors.

4.1. Communicative Transformations

The intensification of multimodal cues—naturalized synthetic voice, avatar gestures, and reactions to spatial orientation—reinforces the sense of social presence and strengthens the attribution of intentionality and emotionality to the algorithmic agent. When a NEO NPC responds with discursive coherence, recalls previous interactions, or adapts its tone based on the user's state, the communicative framework approaches that of an interpersonal relationship. Several participants described this experience with statements such as "it seems to really understand me" or "it remembers what I told it yesterday," demonstrating the construction of a relational continuity that transcends the traditional logic of NPCs programmed with closed responses. This phenomenon suggests the emergence of parasocial bonds with artificial agents.

In an initial phase, interactions with NEO NPCs can foster cooperation, motivation, and learning, in line with studies highlighting the educational and creative potential of advanced NPCs (Dengel et al., 2023; Mystakidis, 2022; Rane et al., 2024). However, empirical work also identified situations in which attributing competence and authority to the NEO NPC led to the uncritical acceptance of the information provided. This was especially evident when the agent adopted roles of "guide," "leader," or "expert," establishing relationships of epistemic subordination to the algorithm.

This finding reinforces what has been stated in previous research on the implicit authority of GAI systems in children's contexts (Chen & Cheng, 2022; Simon, 2023; Şişman & Bilgici, 2023) and points to a deeper transformation: the internalization of algorithmic authority as a normalized part of the communicative environment.

Table 1
Benefits and Risks of Interacting with NEO NPCs in Immersive Environments

Benefits	**Risks**
Contextualized learning	Uncritical adoption of information
Creativity development	Confusion about origin
Narrative collaboration	Loss of critical capacity
Sociopragmatic practice	Emotional bonds intensified with NPC
Stimulation of the imagination	Replacement of human bonds
Identity exploration	Standardization of algorithmic surveillance

Source: Elaborated by the authors based on netnographic analysis and systematic literature review. Analysis of experiences on the following platforms: Roblox, Fortnite, VRChat and Minecraft (https://www.roblox.com, https://www.fortnite.com, https://www.vrchat.com and https://www.minecraft.net).

4.2. Ethical Dilemmas in Interaction with NEO NPCs

Qualitative analysis of digital experiences, triangulated with a systematic literature review, identifies a series of ethical dilemmas associated with Generation Alpha's interaction with NEO NPCs in immersive environments. Rather than isolated risks, these dilemmas manifest as persistent tensions stemming from the asymmetry between the sophistication of algorithms and the critical thinking skills of minors, as well as the absence of specific regulatory frameworks for this type of interaction. Operating implicitly and undeclaredly, this authority hinders the critical identification of biases, persuasive aims, or commercial interests.

This asymmetry is compounded by a lack of adult supervision and a regulatory vacuum: while international organizations such as UNICEF and UNESCO have issued recommendations on AI ethics, there are still no protocols applicable to children's interaction with immersive NPCs, leaving a gray area in terms of digital rights protection. This regulatory mismatch, aside from exposing minors to opaque interactions, also hinders accountability: if an NPC generates emotional dependency or induces consumption, there are no clear mechanisms to determine responsibility. Furthermore, the rapid evolution of generative artificial intelligence means that legal frameworks are always slow to develop, creating a "time gap" in which children experience technologies without effective protections.

From an ethical perspective, this phenomenon poses a twofold risk: on the one hand, the potential internalization of values or narratives designed for commercial purposes; on the other, the progressive substitution or displacement of human bonds by artificial relationships lacking moral reciprocity. An algorithmic agent that offers "comfort" or "understanding" without affective responsibility can contribute to shaping problematic conceptions of intimacy, care, and trust.

Furthermore, commercial persuasion practices were detected, organically integrated into the NPC narrative, particularly in the promotion of microtransactions, cosmetic upgrades, or additional content. The lack of clear indication of the commercial purpose of these interactions places minors in a hybrid environment between play and marketplace, where the distinction between playful recommendation and advertising stimulus becomes blurred.

A final aspect identified through triangulation is the normalization of data collection as part of the gaming experience. While previous literature framed surveillance as an abstract risk (Livingstone & Third, 2017), the data obtained in this research show that Generation Alpha users integrate the collection of biometric information into the logic of "fair play," without questioning its scope or future consequences. This implicit acceptance reduces critical awareness of privacy and, at the same time, lays the foundation for a digital citizenry accustomed to exchanging sensitive data for experiences. There were even cases in which preteens justified sharing their data with statements such as "that way, the character understands me better" or "if I don't give it to them, it doesn't work right," which reveals a logic of unequal exchange: giving up privacy in exchange for functionality.

Table 2

Ethical Dilemmas Identified in Interactions with NEO NPCs in Immersive Environments

Type of Dilemma	Observed Manifestation	Specific Example of Platforms Analyzed	Impact on Generation Alpha
Identity confusion	Difficulty in distinguishing between algorithmic NPCs and human players.	In VRChat, many minors held prolonged conversations with NPCs believing they were "real users".	Weakening of the criterion of authenticity and risk of assuming social norms of algorithmic origin.
Emotional trust	Generation of emotional bonds with NPCs presented as virtual friends.	In Roblox, several real stories described NPCs as "best friends," as they knew about their lives and even celebrated their birthdays.	Risk of replacing human bonds with artificial bonds, whether digital or physical.
Commercial persuasion	Integration of covert microtransactions into the NPC narrative.	In Fortnite, NPCs appeared to acquire skins or upgrades as part of the "game strategy".	Early internalization of digital consumption practices and exposure to undeclared advertising.
Algorithmic surveillance	Standardization of biometric data collection as part of the gaming experience.	In Minecraft with advanced mods, NPCs could adapt their behavior based on movement patterns and connection time.	Reduction of critical perception about privacy and acceptance of the exchange of sensitive data.

Source: Elaborated by the authors based on netnographic analysis and systematic literature review. Analysis of testimonies on the following platforms: Roblox, Fortnite, VRChat and Minecraft (https://www.roblox.com, https://www.fortnite.com, https://www.vrchat.com and https://www.minecraft.net).

Taken together, the results show that ethical dilemmas operate not only as external threats, but also as practices progressively internalized by the user population. Generation Alpha not only interacts with algorithmic agents, but also learns to relate to, trust, consume, and share data within an environment where artificial agency presents itself as a legitimate interlocutor. This scenario demands a rethinking of regulatory frameworks, digital literacy, and corporate responsibility from a perspective specifically focused on childhood and immersive environments.

4.3. Digital Inclusion and Equity in Immersive Environments

The interaction of Generation Alpha with algorithmic agents in the metaverse is not homogeneously distributed, as it is conditioned by material, cultural, and design inequalities. While systematic reviews tend to focus on the access gap (Friedricks et al., 2023; de Giovanni, 2023), the empirical results show that exclusion also occurs within the virtual environment, configuring differentiated experiences according to the resources available.

In material terms, the type of device determines the quality of interaction with NEO NPCs. Users accessing the system via basic devices—such as mobile phones or consoles without advanced peripherals—experience limited versions of the algorithmic agents, with less customization or multimodal interaction. In contrast, those with more sophisticated devices access more immersive and adaptive experiences. This technological differentiation generates an internal stratification of the metaverse, where the quality of interaction depends on economic capital, consolidating central and peripheral positions within the same virtual space.

Furthermore, algorithmic segmentation linked to purchasing power was observed. NEO NPCs adapt their narrative to incentivize microtransactions and digital rewards for those who can afford them, while those who do not participate in these dynamics are excluded from this content. This segmentation generates a stratified metaverse, where economic capital translates into digital social capital, conditioning the possibility of joining virtual communities.

As a consequence of these economic inequalities, exclusion is normalized as part of the gaming experience. In the testimonies analyzed, some young people considered it "natural" not to be able to access certain NPCs, skins, or immersive experiences, reinforcing the idea that the metaverse is a space where access hierarchies will always exist. This passive acceptance of inequality, observed in minors who reproduce discourses such as "that's for those who pay more" or "I get the basic version," poses a critical challenge: the digital socialization of Generation Alpha may be contributing to the internalization of inequity as inevitable conditions of virtual life.

Beyond the economic dimension, cultural and linguistic barriers also emerge. Although IAG systems incorporate machine translation tools, the results show that users who are not fluent in English — the predominant language on many platforms—face less fluid and culturally decontextualized interactions. The generated responses tend to reproduce Anglo-Saxon references rather than recognize local idioms, which limits equitable participation and fosters the formation of linguistically homogeneous communities. In

some cases, players chose to "train" the NPC with phrases from their cultural context, a practice that demonstrates user agency in the face of algorithmic linguistic hegemony. In terms of digital inclusion, this finding reveals that technical access does not guarantee cultural access or equitable participation in the construction of collective narratives.

Similarly, representational biases were identified in the design of avatars and NEO NPCs. In environments like Roblox and VRChat, female algorithmic agents appear hypersexualized or relegated to secondary roles, while male agents embody figures of authority or competence, reinforcing symbolic inequalities in digital interaction. These configurations are not neutral: they influence the construction of imaginaries about authority, belonging, and possibilities for action within the metaverse, reproducing gender inequalities in the digital realm.

Taken together, these results show that digital equity in immersive environments cannot be reduced to access to hardware or connectivity. The dynamics of algorithmic personalization, economic segmentation, and culturally biased design contribute to producing forms of structural exclusion within the virtual environment itself. Far from neutralizing pre-existing inequalities, interaction with NEO NPCs can amplify them if criteria of transparency, diversity, and inclusion are not incorporated into their design and governance.

5. DISCUSSION AND CONCLUSIONS

The empirical evidence obtained confirms that the research achieves its stated objectives and highlights the significant impact of generative artificial intelligence on the communicative, social, and digital equity processes of Generation Alpha. In line with previous studies that anticipated the transformative potential of advanced NPCs in immersive environments (Chheang et al., 2023; Park et al., 2023; Rao et al., 2024), this work provides a situated analysis that allows us to understand how these changes materialize in the everyday practices of digital interaction and socialization among children.

From the perspective of communicative ethics, the results confirm that Generation Alpha's interaction with NEO NPCs is not merely a technological or informational challenge, but a profound transformation of communicative action in digital environments. The simulation of dialogue, empathy, and consensus by algorithmic agents introduces mediated forms of communication that weaken basic principles such as transparency, symmetry, and communicative responsibility, especially in contexts of childhood socialization. In this sense, the metaverse is configured as a normative environment in which the ethical conditions of communication are redefined.

Regarding the first objective, it was found that interaction with NEO NPCs has significantly humanized the algorithmic agents, leading children to perceive them as social interlocutors. This transforms immersive communication into a space for identity, emotional, and relational construction mediated by algorithms. This finding aligns with research on algorithmic anthropomorphization and social presence in intelligent systems (Herath et al., 2024; Park & Kim, 2022; Simon, 2023), but it

qualifies these approaches by demonstrating that these dynamics are not isolated episodes, but rather structural elements of the immersive experience.

Regarding the second objective, which focuses on examining ethical dilemmas, the findings indicate that the sophistication of NEO NPCs fosters a relationship of emotional trust that increases children's epistemic, cognitive, and affective vulnerability. When NEO NPCs adopt roles as guides, leaders, or experts, the uncritical acceptance of algorithmically generated information, norms, and values is reinforced. This finding aligns with warnings from information ethics and digital communication ethics regarding the implicit authority of intelligent systems (Ess, 2014; Floridi, 2013, 2019), and underscores the need for specific regulatory frameworks, as well as early digital and algorithmic literacy strategies aimed at protecting children.

Regarding the third objective, it is observed that the promises of inclusion within the metaverse are limited by material, cultural, linguistic, and algorithmic inequalities. Participation in these environments depends on the type of device, technological skills, and biases embedded in the design, generating heterogeneous experiences and reinforcing pre-existing digital hierarchies. These results complement previous research on the digital divide (Al- Kfairy et al., 2025; Livingstone & Third, 2017; Zallio & Clarkson, 2022), showing that exclusion occurs not only in access, but also in the quality of interaction and in the algorithmic recognition of diversity. NEO NPCs, far from correcting these inequalities, tend to amplify them, demonstrating that digital equity requires an effective articulation between technological access, algorithmic justice, and recognition of diversity (Friedricks et al., 2023; de Giovanni, 2023).

From a methodological and ethical perspective, investigating the digital practices of Generation Alpha in immersive environments presents several challenges. These include informed consent, privacy protection, and the structural asymmetry between adult researchers and child subjects, especially when interactions are mediated by opaque algorithmic systems. Furthermore, the limitations of the study are acknowledged, particularly those stemming from the evolving nature of digital environments and the ethical restrictions that prevent direct access to minors, thus limiting the interpretive scope of the results. These limitations highlight the need to develop methodologies that are sensitive to the age, digital context, and vulnerability of this population.

Taken together, the findings reveal that the interaction between Generation Alpha and NEO NPCs is redefining the communicative, ethical, and social dimensions of the metaverse. Immersive spaces are configured as educational, normative, and symbolic ecosystems where new forms of language, authority, and belonging mediated by artificial intelligence are emerging. For future research, it is recommended to delve deeper into longitudinal and comparative studies that analyze the evolution of these dynamics, as well as to promote critical, emotional, and algorithmic digital literacy that empowers younger generations to exercise ethical, inclusive, and conscious digital citizenship in immersive environments.

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