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Research Article

Children's behavior at metaverses: Interactions, digital identities, and parent's perceptions

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ABSTRACT

Children are considered one of the main user profiles of metaverses, since they get into those digital universes by playing sandbox video games as Fortnite, Minecraft, or Roblox. However, a lack of research focused on the how, why and outcomes of this vulnerable target in metaverses has been noted. This study aims to investigate the behavior of children in the metaverses through their use of video games and the perceptions of their parents, considering them an indirect target. A total of 31 semi-structured interviews were conducted with children aged between six and 12 years old and their parents. Also, a non-participatory observation of five children while they were playing video games in their domestic environments were carried out. Results show that children play sandbox video games to have both online and offline presence, interacting with familiar people and strangers to feel connected to the community. Also, they recognize brands in those universes and the importance of designing avatars. For its part, parents identify some negative outcomes of video games, but their perception is mainly positive, above all in terms of collaboration and participation. A dichotomy between observation findings and parents' response has been noted, reflecting a need of digital literacy in terms of communication.

Keywords: avatars, metaverses, video games, family, digital identities

INTRODUCTION

Children are highlighted as the population group that more time spend online (Bonales-Daimiel et al., 2022). Millions of children and young people are already active in virtual environments and game spaces, which they enable experiences that may not have been possible otherwise (UNICEF, 2023).

17% of kids ages eight to 18 report owning a virtual reality headset, and about one in five tweens (22%) and one in four teens (27%) have already tried virtual reality (Reed, 2022). Most of them have online identities and use them to get into those digital universes, where they can play and interact with other users, familiar or strangers. They can be connected all the time as long as they have access to a device, and the increase of video games genres has had one main consequence: more children feel attracted to them and more parents accept their use at home.

That fact has both positive and negative outcomes, considering that video games can be good entertainment and educational tools but also harmful for social skills and development of children (Gee &

Esteban-Guitart, 2019; Kordyaka et al., 2020; Li et al., 2020). However, from an academic approach, a lack of research focused on the use of video games by children has been noted. Same occurs with metaverses and the presence of children in them, since the majority of studies about those virtual worlds are focused on definition, fundamental or specific uses by organizations (Duan et al., 2021; Sparkes, 2021; Wang et al., 2022).

Because of the dichotomy between video games outcomes and the lack of research focused on the uses and perceptions of children as players, noted in previous studies (Bajic et al., 2023), this research aims to analyze how children understand video games and use them as gates to metaverses, delving into their reasons, virtual behaviors and social outcomes. However, considering the vulnerability of the sample group, their point of view is going to be complemented with the one from their parents, who allow them to spend their spare time in those virtual worlds.

In this way, the study intends to make a social contribution to the communications field, by analyzing children in their personal contexts to observe their relationship with video games through behaviors, reasons and digital identities; but also considering the perception of the parents as indirect target. This research aims to analyze the attitude of children aged between six and 12 years old as metaverses target and users through their use of video games. This age range has been selected according to the article 4 of the Children and Adolescents Code (2003).

From this general goal, three specific ones have been proposed: Evaluate children's knowledge about metaverses as communication scenarios; study virtual identities through their design of avatars; and observe parent's perceptions as an indirect target.

LITERATURE REVIEW

Video Games: Gates to Metaverse

The term 'metaverse' is not new (Stephenson, 1992) and definitely not an isolated one, since some authors tend to associate it with the world of video games attending to different platforms (Bonales-Daimiel et al., 2022), such as Fortnite or Roblox that are considered gates to those digital universes. They both share two main characteristics (Acevedo-Nieto, 2022): their virtual personalities and the presence of avatars, designed and controller by the users.

Previous literacy reflects a predominant user profile, children aged between five and 14 years old (Ante, 2021) who are more connected than ever, considering that the time that they spend playing online has increased by a 23% since 2021 (Shi et al., 2021). Among the metaverse platforms that they use for that Fortnite, Minecraft, and Roblox can be highlighted.

The three of them allow users to design avatars after them and offer players the opportunity not just to play in a specific 3D scenario, but to design it themselves (Meier et al., 2020; Roblox, 2022). They present themselves as immersive experiences, and that is a feature that attract users, who like to experience the game from the inside; and brands, that opt for the metaverse to host their own universes, where the audience interact directly with the corporate symbology and organizations can build brand communities. Create, design, build ... metaverses are widely related with ideation, and they support the theory of 'learner hero', since players pursue both individual and common goals at the same time (Rigby & Przybylski, 2009).

In this sense, and back to the relation between video games and metaverses, those new universes are considered sandbox games (Yi & Lane, 2019), since they offer to users a virtual environment, where they can build and shape their own game scenery (Han et al., 2021; Rivero, 2016; Rospigliosi, 2022).

Considering the role of video games as gates to metaverses and children as one of the predominant group of users, a first research question is proposed: How do children behave in those virtual worlds?

Tools for Socialization?

About reasons for children to use metaverses, previous studies highlight a predominant social use. They experience a virtual life there to reduce their loneliness in real life (Gillet & Jung, 2023). This trend has been increasing itself since the COVID-19 lockdown in 2020, due to the zero physical contact policy (Poquet et al., 2018). In this sense, metaverses offered the youngest a sense of belonging, allowing them to feel part of a digital community (Marsh, 2020; Reeves, 2013). At this respect, there is a majority of research that promote

sandbox platforms as socialization tools, evidencing a lack of correlation between people who abuse video games and people who present poor social skills (Caules et al., 2019). At this respect, it has been proved that children with autism spectrum disorder are able to improve their social interaction by playing video games (Lee et al., 2021).

Although most studies found reflect positive outcomes, concluding that virtual worlds facilitate interactions between millennials and members of the Generation Z through virtual group activities and shared experiences (Oh et al., 2014); and pointing out an increase of 'self-efficacy' (Choi & Kwak, 2017; Oh et al., 2023), the perceived competence in social skills, the 50% of teenagers boys and the 25% of teenagers girls who play video games in Spain admit that, by playing on a daily basis, they reduce their time for homework and socialization with friends (Etxeberría Balerdi, 2008; Jaramillo-Mujica et al., 2017). In this way, social isolation is identified as the first negative outcome of video games (Poquet et al., 2018).

Considering those mixed results, a second research question is proposed: Why do children spend time in the metaverse?

Digital Identities Through Avatars

As already mentioned, users are present in metaverses through online self-representations called avatars (Gionés-Valls & Serrat-Brustenga, 2010). In this sense, users tend to design them according to their existing identities in the physical world, but they can also build virtual identities without any connection to their actual selves (Gokce, 2021). At this respect, it's been proven that the more similar the illustration of a virtual avatar is to the user, the more immersive is the experience (Bailenson et al., 2006; Garau et al., 2003; Van Vugt et al., 2008). Regardless of its appearance, those virtual characters allow players to access digital worlds and to interact with other users.

A bibliographic review about avatars shows a remarkable number of studies focused on their benefits for children education (Barráez-Herrera, 2022; Reis et al., 2019; Ruiz-Campo et al., 2022), pointing out creativity, transformative learning, and innovative knowledge as some of their positive outcomes. However, it's not common that those authors delve into the social effects and dangers of those digital identities, considering that the study sample is often integrated by minors, a vulnerable target.

These facts, young children who develop digital identities in metaverses and who become a sort of personal brands; and the dangers of virtual worlds (Cheong, 2022), have led various authors to propose that avatars should have a legal personhood (Lim, 2021; Osborne, 2021) in a foreseeable future.

Considering the importance of avatars to get into digital universes and the user profile that usually design them, this research aims to answer a third research question: Do children create and manage themselves their digital identities?

METHODOLOGY

This work is based on an ethno-graphic approach, through two methods that have allowed authors to obtain both qualitative and quantitative data. A non-participatory observation of children and semi-structured interviews to children and their parents have been carried out (**Table 1** and **Table 2**). Both tools allow participants to describe their own experiences in familiar scenarios (Dearnley, 2005; Rabionet, 2011), providing authors the opportunity to capture voices and personal stories (Armstrong & Towery, 2022; Kallio et al., 2016).

The sample universe was integrated by six volunteer schools (three private and three public) located in the region of Madrid. About the study object, it was selected by using a non-probabilistic sample of convenience (18 children and 13 parents). All participants were provided with informed consent, guided by an ethics committee from our universities, to establish the protocol. Moreover, schools and parents were provided with an informational document, given that they involved minors, explaining the nature of the project, the reasons for their collaboration, the conditions, possible risks, and our contact information.

In all, 13 boys and five girls; and nine moms and four dads were interviewed in person (**Table 1** and **Table 2**). The questions were designed according to two main topics: consumption (knowledge, habits, digital identity, and brands) and impact (positive and negative outcomes and future approach). It has to be

Table 1. Demographics of children observed

Code	Gender	Age	Education level
E1	Male	6 years	Elementary
E2	Female	6 years	Elementary
E3	Male	6 years	Elementary
E4	Female	10 years	Elementary
E5	Female	9 years	Elementary
E6	Male	7 years	Elementary
E7	Female	8 years	Elementary
E8	Male	12 years	Secondary
E9	Male	7 years	Elementary
E10	Male	7 years	Elementary
E11	Male	12 years	Secondary
E12	Male	9 years	Elementary
E13	Male	7 years	Elementary
E14	Male	7 years	Elementary
E15	Male	12 years	Secondary

Table 2. Demographics of parents

Code	Gender	Age
P1	Female	44 years
P2	Female	41 years
P3	Female	42 years
P4	Female	43 years
P5	Female	46 years
P6	Female	47 years
P7	Male	41 years
P8	Female	38 years
P9	Male	56 years
P10	Male	45 years
P11	Female	45 years
P12	Male	42 years
P13	Female	44 years

highlighted that parents were chosen as objects of study since they can be considered an indirect target, playing the role of trainers and behavior models (Peñalva-Vélez et al., 2018).

Findings were encoded by using the software ATLAS.ti, highly validated in qualitative research (Lopezosa et al., 2022; Rambaree & Nässén, 2021), since allows the organization of the data in conceptual networks (Cipollone, 2022) (**Figure 1**).

Also, five children (three boys and two girls) were observed while playing in metaverses at home. This tool allowed researchers to witness some of the interviewed children in their family environments, playing video games according to their daily routines (Kawulich, 2005). It's necessary to mention that the observer acted in a neutral manner and did not try to interact with the children at any time during the process. In this sense, the sample does not pretend to represent the entire population, but to obtain as much information as possible about different coexisting realities (Anguera, 1995; Díaz de Rada, 2011).

RESULTS

Children's Interviews

Knowledge about video games & metaverses

100% of children interviewed (n=18) are into video games. As their favorites, they mention Fortnite (n=3), Fifa (n=3), Roblox (n=2), Minecraft (n=2), Rocket League (n=1), Super Mario Bros (n=1), Mario Kart (n=1), Nintendo Dogs & Cats (n=1), Among Us (n=1), Fall Guys (n=1), and Stumble Guys (n=1). It's remarkable that only two children mention two and only one child cannot decide among three options.

According to the genre of video games, results show a difference between girls and boys. While the first ones do prefer simulation games; the latter tend to play football and "Battle Royale" games.

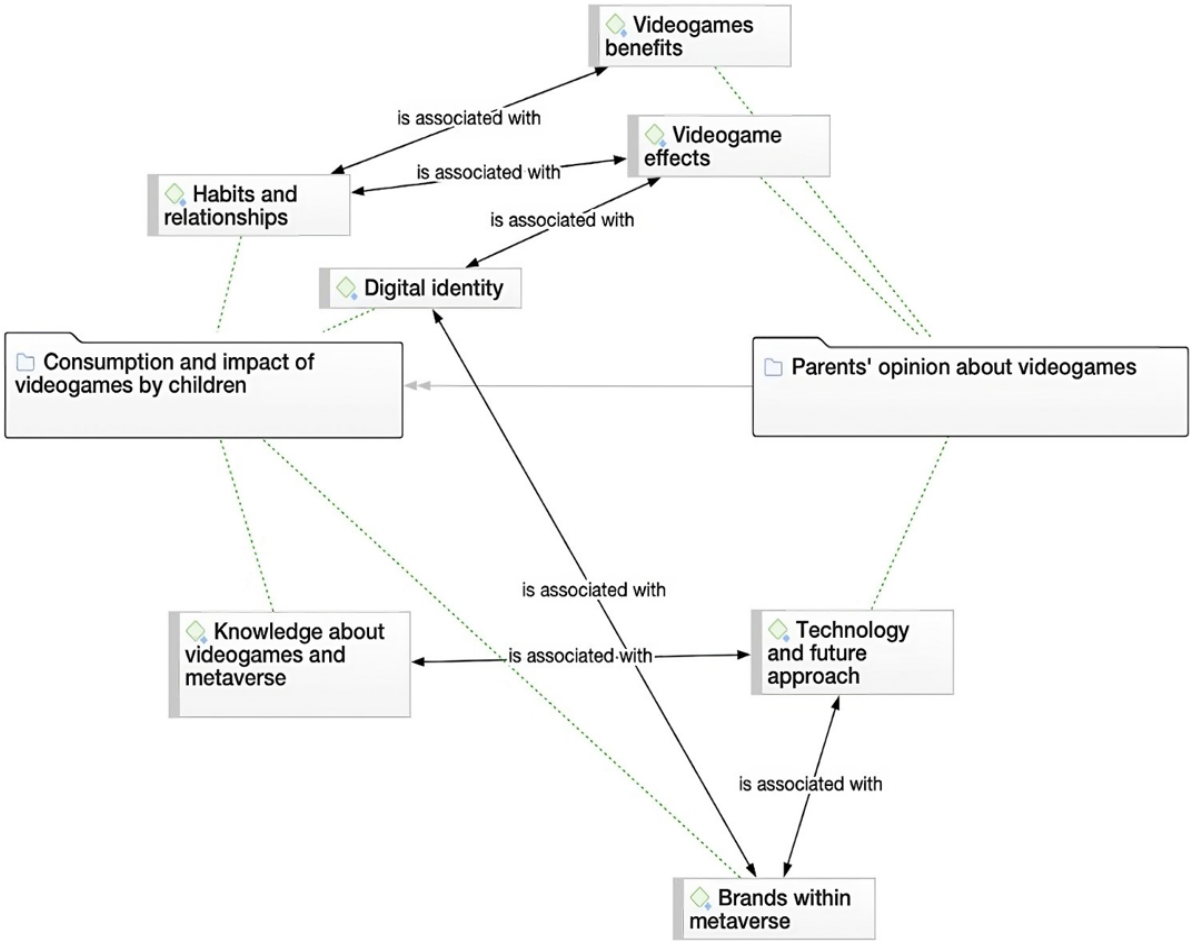

Figure 1. Conceptual network about researched topics (Source: Authors)

Figure 2. Word cloud (children's perceptions of video games) (Source: Authors)

Also, there is a knowledge gap considering age: those children aged between seven and nine years old speak more about Minecraft and Roblox; and those older than nine years old mostly mention Fortnite. Specifically, 94% of children know Minecraft and Roblox; and 83% have heard of Fortnite. However, only 50% have played Roblox or Minecraft and only 17% have done it in Fortnite. In this sense, this latter game is represented as a personal aspiration by the youngest respondents.

When they were asked about the reason why they play, most of them highlight the fact of playing online with friends, the freedom offered by virtual worlds, the wide variety of games and the possibility of designing new universes (**Figure 2**).

About metaverses, 28% of them claim to know what they are. However, only 17% are able to define them by themselves (**Table 3**). Regarding that question, they were asked about avatars, and results show that 94% of children interviewed are aware of them and know what they are.

Table 3. Main words used in definition of metaverse

Videogame	Popularity: Awareness & usage	Quote
Roblox	94% know it & 50% have played it.	"It has plenty of games." & "It includes different worlds."
Minecraft	94% know it & 50% have played it.	"You can use weapons to kill monsters." & "I used to like building huge houses, programming them myself."
Fortnite	83% know it & 17% have played it.	"You can use guns and kill people"; "Because you can play in groups"; "I like it because of its strategies"; & "It's highly competitive."

Table 4. Comparative about knowledge, reality, & desire of avatars

What is an avatar?	Characteristics of ones you like	What is your perfect avatar like?
E1. "It's a character that you have to design. I have one in Roblox. It looks like me."	"Strength & a gun."	"Messi & one that I use in Roblox these days."
E3. "It's a virtual character that you design."	"Yellow with blushed cheeks (Pikachu)."	"A Pokémon character."
E4. "It's a character. Someone who looks like me, but inside of a videogame."	"Everything."	"Laurayo is my avatar, & I would like her to look more like me."
E7. "It's like a doll in different video games."	"Square body & personalized clothes, hair, & accessories."	"With a face that I like, cool accessories, & more like me."
E8. "A type of custom-made character created according to your taste."	"Accessories that I would like to wear in real life."	"Yellow hair, white clothes, & white sneakers."
E11. "A character that you create & who you play through."	"Big, strong, & agile."	"Tall, agile, strong arms & legs, & medieval outfit."

Habits & time

Most of the children mention boundaries regarding playing time, specifically between two and five hours per week. Only one child, 12 years old, speaks about more time, five or six hours per day on weekends if "he has not anything else to do."

Considering devices, they use to play, they all mention TV, tablet or both of them. If they use the TV, they tend to play in the living room or another common space but, otherwise, they affirm to play in their bedroom, without supervision. About this latter, it's important to mention that only 17% of interviewees tend to play with friends, although they all prefer to play with someone else, either virtually or sharing the same physical space. In this sense, 22% of interviewees (n=4) acknowledge some virtual friend, but only two of those children delve into his identity and provenance and admit that they have talked about them to their friends in real life. When they are asked about the dangers of meeting people online, the four of them are aware of them, recognizing the difference between virtual friends and real-life ones, with reflections as "a virtual friend can lie to me more than a real friend" or "virtual friends can fake their identity."

In connection with these habits and the time that they spend playing video games, they were asked about their parent's perceptions. It's remarkable that most children claim that they agree, but others recognize some issues provoked by the fact that he plays, above all when it's a violent game, not recommended for his age.

Digital identities

As it's been mentioned previously, most children know what an avatar is. However, only 50% of them are able to explain what they like about them. In fact, 56% of respondents do not specify any characteristic owned by their ideal avatar. On the contrary, those who do it, mention clothes and accessories, including weapons; and some specific physical trait, as strength. Also, results reflect a trend to describe their perfect avatar after themselves, simulating their real physical features (**Table 4**).

Besides their knowledge about avatars and their characteristics, they are aware of how to get one. 44% of children identify friends and relatives who have bought one of those characters in video games. Even so, only 39% of those respondents know, where other people buy them, mainly Fortnite and Roblox. In this sense, only 17% have bought it or designed avatars themselves. As to their motivation to do so, they recognize that they want to personalize them as a fad, to imitate other gamers. On the contrary, the rest of children consider avatars as nonsense and something unnecessary that they would only buy if they would not have to spend their own money.

Table 5. Parent's quotes on video games outcomes

Positive outcomes	Negative outcomes
"He has become more confident."	"He used to become aggressive."
"He is shyer but when he is playing, he becomes more outgoing."	"I have noticed some 'addiction' & I am worried that I cannot control it."
"He speaks about it with his friends, & he tries again applying advice from his friends."	"He can feel anxiety & if that happens, he stops playing."
"They can develop certain skills thanks to them: Thinking, creativity, strategy, mental agility …"	"I have noticed 'addiction' & I am worried that I cannot control it."
"I like when my children play together, & I notice a good vibe between them. Also, I think they help children to develop tech management skills."	"More they play, more they want to play. It's 'addictive'. Sometimes you notice that they are nervous, as if they were in another world."
"Playing video games he can interact with other children & develop his creativity."	"She started hiding to play. She gets mad when we stop game."

Table 6. Main words used in definition of metaverse

Keyword	Quote	Number (%)
World	"Virtual world", "parallel world", "fictional world on Internet", "unknown world with opportunities"	60%
Space	"Virtual space" & "space for virtual interactions"	20%
Universe	"Parallel universe related to video games"	10%
Reality	"Virtual reality"	10%

Moreover, 33% of interviewees do not relate the fact of owning a cool avatar with the time that those people spend playing, but other 22% does it, justifying the need of designing a better avatar to be better in the game; and connecting the coolest avatars that they have seen with people who spend more time playing.

The allure of avatars is often related with brands that they use, and children recognize, specifically in the 11% of answers. They mention companies such as Adidas, Coca Cola, JOMA, Marvel, Nike, and Puma; and TV shows that sponsor certain characters, such as "Dragon Ball". It's remarkable the fact that they also identify those brands as their favorites in real life.

Parent's Interviews

The first question that parents have to answer concerns their opinion about their children's lifestyle with reference to video games. On the one hand, 54% of them are fine with their habits and time, and they tend to use words such as "boundaries" and "control", above all regarding violent video games. On the other hand, parents who do not agree with their children playing include negative terms in their responses, such as "social obligation" and "addiction". In general, most parents do not care about what their children do in their free time, whether it's watching TV or playing video games. Only 15% of interviewees prefer that their children play in the street instead of virtually, using expressions as "active leisure". In any case, regardless of whether the opinion is positive or negative, 54% of parents affirm to play with them now and then, as a family plan.

Parents are also asked about their perception of changes in their children since they play video games and have an online presence, and only 23% of them deny it. Thus, most of them have noticed a change, good or bad (**Table 5**).

In this sense, most parents interviewed do not have a clear opinion about positive outcomes of video games, above all in terms of socialization and sports. Only 23% of them think that they do not promote social relationships at all, and 54% of respondents consider them harmful for an active life.

About their definition of metaverses, the most used word is "world", linking to other terms that reflect the virtuality of the context (**Table 6**). However, despite their actual awareness of the distinction between the real world and the digital one, most respondents agree that those metaverses are the future, spaces, where their children will work and form relationships. In this respect, only 31% of parents remain vague or refuse to believe in this possibility, mostly out of fear.

Observations

Children's observations while playing has allowed authors to get closer to their reality in relation to video games. In this sense, it's important to highlight the observer's neutral role since she is not playing or interacting with the child (**Table 7**).

Table 7. Observation data

CC	Background	Location	Device	Attitude	Game
E1	Virtual team game with three friends.	Living room	TV	Laughing and yelling. They chat, move, and eat a snack.	Cars
E4	Plays sitting on sofa.	Living room	Portable console (Nintendo)	Not very focused. She is attentive to the observer's conversation with her mother.	Dogs & Cats
E7	Virtual team game with a friend.	Bedroom	Tablet	No chatting while playing. Competitiveness over friendship.	Among Us
E9	Plays alone while his brother is next to him watching TV.	Living room	Tablet	Focused on the game. Agitated.	Jetpack
E18	Virtual team game. He plays with three friends online.	Living room	TV	He laughs, yells and swears (uncommon).	Zombies game

Note. CC: Children's code

DISCUSSION & CONCLUSIONS

Children and parents define metaverses by using terms as "world", "space" and "universe", and both of them consider the video games Fortnite, Minecraft, and Roblox as gateways to get to them. This finding agrees with previous theories (Acevedo-Nieto, 2022; Bonales-Daimiel et al., 2022). Also, it's been noticed that both parents and children do not only know what an avatar is, but most of them also have designed one for themselves. This trend agrees with a previous result too, since it has been noted before that children create theirs as a mandatory requirement to use all the functions of the games, including the ones that implies interactions with other users.

About the creation of the avatar, two different trends have been identified. The first one is their personalization according to the child's physical appearance (Van Vugt et al., 2008). The second one consists in the imitation of icons that have nothing to do with their real self (Gokce, 2018). Anyways, avatars enable them to access a digital world and interact with other users, familiar or strangers. Those two facts, young children who develop digital identities that become personal brands, and the dangers of virtual worlds (Cheong, 2022), have led several authors to propose that avatars should have a legal personality (Lim, 2021; Osborne, 2021) in the foreseeable future.

For their part, parents feel forced to allow video games at home due to the pressure that children experience in their social environments. If they do not play, they do not belong so, considering this fact, they give them permission to play even when they are not entirely convinced of their positive outcomes. In this sense, they point out addiction and behavioral changes as some of the effects of video games in their children. At this respect, they recognize a need of digital competences and literacy in order to set boundaries (Peñalva-Vélez et al., 2018), aware of the fact that new virtual technologies platforms are causing revolutionary changes in children and teenagers' behavior (Trabacca, 2023).

However, despite the risks observed by parents, they tend to identify more positive outcomes than negative regarding to video games and presence of children in the metaverse. Among them, an increase in their collaborative skills since they can play participative games, where they can ideate and build with other users. At this respect, most of them affirm that they have changed their minds about video games after their children started to play sandbox video games.

Comparing those answers with the responses of interviewed children, some contradictions have been detected. Thus, while adults point out the importance of setting times and genres limitations, most children reveal that they play without any time control and even that they play video games that disagree the national age-rating system.

Coming back to the research questions proposed at the beginning, it has to be said that the data obtained has allowed to answer them. Children get into the metaverses through sandbox video games that permit them to extend their offline social presence online. That is the main reason for them to be present in metaverses and play video games, because if they do not do it, they lose a part of their social recognition in real life. In terms of communication, video games are interaction tools for them, even if the conversations take place with people that they do not actually know. They use metaverses as entertainment scenarios, replacing playdates with screen time and developing some knowledge about the real world based on their

virtual experiences. In this context, most of them design their avatars, after their own appearance or even after famous people who inspire them in some way.

This research offers important data on behaviors and perceptions, but authors are aware of the limitations of the sample. This is considered small, which has led to exploratory results. Thus, as a future line of study, it would be helpful to analyze more children and parents who also live in different cultural and social contexts, with the goal of evaluating how different lifestyles parameters influence the knowledge, use and perceptions about metaverses and virtual identities. Also, it would be interesting to measure both children and parents as users, observing how the presence in those digital worlds influence domestic dynamics (Ortega-Ruiz et al., 2012), since some respondents of this work highlight the importance of video games as interactions tools between parents and children.

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