



# Onboarding for a new playful narrative adventure in game metaverses

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## ARTICLE INFO

### Keywords:

Game metaverse  
Narrative immersion  
Affordances  
Mirror world  
Video games

## ABSTRACT

Metaverses represent a new iteration of the internet, blending physical and digital realms (e.g., augmented reality, mixed reality, virtual reality) alongside technologies. They manifest in diverse forms such as game metaverses that encourage real-world interaction while featuring fictional contexts and gaming elements. These game metaverses use narrative affordances to enhance user immersion and improve overall experience. Employing an interpretive approach involving online ethnography and interviews with 15 users, we highlight the significant role of narrative affordances in enhancing narrative immersion, demonstrating how ACNH has evolved from a traditional video game into a game metaverse by users. This research contributes to the understanding of narrative dynamics in game metaverses, emphasizing the interplay between formal and material affordances and their impact on user immersion.

## 1. Introduction

In 2022, firms such as KPMG and McKinsey and Company (2022) reported a significant increase in the development of virtual simulations and multiplayer virtual worlds, collectively referred to as “metaverses” (e.g., Fortnite, Roblox). In turn, research has made a concerted effort to delineate the fundamental attributes of metaverses (Ball, 2022; Dwivedi et al., 2022; Mystakidis, 2022), often establishing a connection between metaverses and the historical lineage of massively multiplayer online games (MMOs) from the Web 2.0 era. The challenge in defining characteristics of the metaverse stems partly from its conception as a vision rather than a mature technology (Ball, 2022). The metaverse is a new form of the internet, integrating physical and digital realms through technologies such as augmented reality (AR), mixed reality (MR), virtual reality (VR), haptic interfaces, and blockchain (Lee et al., 2021; Dwivedi et al., 2022; Rejeb et al., 2023). Some researchers define the metaverse as an interconnected, persistent 3D virtual environment that allows real-time interactions among users, devices, and data, emphasizing the fusion of physical and digital realms (Lee et al., 2021; Ball, 2022). However, whereas most research has favored a socio-technical approach to defining and understanding metaverses, focusing on their technological infrastructure, capabilities, and immersive potential, we aim to shift this focus toward a cultural approach. We align with scholars who have studied virtual gaming worlds through the narrative lens (Ermi and Mäyrä, 2005; Adams and Rollings, 2006), emphasizing the importance

of storytelling in these environments. We argue that narrative complexities deserve greater attention within the metaverse, as gaming has been critical in seeding the metaverse and continues to influence its development (Koster, 2023). Therefore, observing how game metaverses are narratively designed and analyzed is important, as is how users immerse themselves.

Research on the metaverse identifies immersion, or the feeling of being transported into a simulated environment, as a central pillar (Murray, 1997). According to Nilsson et al. (2016), immersion is a broad concept that spans multiple domains and encompasses four perspectives: (1) as an intrinsic property of the virtual world's presentation system (Slater, 2003), (2) as sensory immersion from multisensory environment representation (McMahan, 2003; Ermi and Mäyrä, 2005), (3) as a response to challenges within the virtual world (McMahan, 2003; Ermi and Mäyrä, 2005; Adams and Rollings, 2006), and (4) as related to narrative content (McMahan, 2003; Ermi and Mäyrä, 2005; Adams and Rollings, 2006; Ryan, 2015). Narrative immersion is specifically linked to the sense of presence within the fictitious universe, emotional attachment, and captivation by the unfolding storyline (Ryan, 2015). Metaverses are complex assemblages of technological elements that facilitate a persistent, interconnected 3D virtual environment. While these components aim to enhance immersion, their relationship within a narrative design remains understudied. Thus, given the importance of narrative design in metaverses (Lee and Kim, 2023), our research aims to answer the following question: *How do narrative designs influence*

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<https://doi.org/10.1016/j.techfore.2025.123999>

Received 29 September 2023; Received in revised form 18 December 2024; Accepted 16 January 2025

Available online 29 January 2025

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## immersion within game metaverses?

To address this question, we focus on *Animal Crossing: New Horizons* (ACNH), a game metaverse characterized by its shared, persistent virtual environment in which users, through avatars, can freely create, interact, and shape their digital spaces. The technological apparatus also includes a dynamic virtual economy, extensive modding, and social interactions that strengthen community bonds. We carried out a six-month virtual ethnography, exploring user-created islands and documenting detailed observations on narrative themes, island identities, and social interactions. To complete our study, we conducted semi-structured interviews with 15 players from the ACNH community. Our findings reveal that ACNH supports embedded narratives (pre-constructed storylines and missions provided by the game metaverse) and emergent narratives (stories created by players through their interactions and choices) (Jenkins, 2004; Calleja, 2011). We argue that narrative affordances serve a dual function, influencing the embedded narrative through formal affordances and the emergent narrative through material affordances, which enable the development of mirror worlds. Building on this, we conceptualize the game metaverse as a balance between a rule-driven game universe and a mirror world that grants players creative freedom. In addition, we argue that the COVID-19 pandemic significantly contributed to the rise of game metaverses by transforming them into virtual spaces that continued physical life amid social isolation. Finally, we find that narrative affordances play a central role in enhancing immersion in game metaverse, allowing players to experience a sense of ownership, emotional connection, and temporal progression. This study advances understanding of game metaverses by highlighting the critical role of narrative affordances in shaping immersive experiences.

## 2. Literature review

### 2.1. Metaverses: definitions and applications

The term “metaverse” was initially introduced by Neal Stephenson's (1992) in his novel *Snow Crash*. It gained significant attention in 2003 with the success of Linden Lab's *Second Life*, leading to increased exploration by researchers (Papagiannidis et al., 2008). Recently, its usage in scientific literature has grown rapidly, reflecting renewed interest from academics (Dwivedi et al., 2022). Although its definition exhibits some variability and draws inspiration from various conceptual sources such as the omniverse, simulation, lifelogging, and mirror world (Lee et al., 2021), researchers concur on a fundamental notion: the metaverse represents a novel manifestation of the internet, seamlessly merging physical and digital realms by incorporating technologies such as AR, MR, VR, haptic interfaces, and emerging blockchain and cryptographic innovations (Lee et al., 2021; Dwivedi et al., 2022; Rejeb et al., 2023). Ball (2022, p. 41) defines the metaverse as “a massively scaled and interoperable network of real-time rendered 3D virtual worlds that can be experienced synchronously and persistently by an effectively unlimited number of users with an individual sense of presence, and with continuity of data, such as identity, history, entitlements, objects, communications, and payments.” While current definitions of the metaverse are predominantly socio-technical, focusing heavily on technological infrastructure, capabilities, and immersive potential, they often overlook the cultural dimensions and the diversity of metaverse types, each of which are governed by distinct underlying logics and purposes. For example, Park and Kim (2022) classify metaverses into two categories: tools and targets. Metaverses as tools help address challenges in the physical world, focusing on areas such as office life, social interactions, education, and healthcare. Conversely, metaverses as targets are stand-alone environments highly reliant on virtual settings, encompassing applications in gaming, business, role-playing, and real estate. These metaverses use advanced technologies to create specialized virtual environments that cater to various needs and applications. Our research specifically examines game metaverses, which are immersive

virtual environments designed for interactive gaming experiences.

### 2.2. Characteristics of a game metaverse

According to Ahn and Kwak (2021), game metaverses are virtual environments that, while promoting interaction with the real world, typically feature fictional contexts and gaming components. Despite the growing integration of real-world interactions in game metaverses, their potential remains constrained. Current metaverses are limited by their design or technology, and many are not capable of supporting haptic devices or extended reality (XR) technologies or are predominantly centralized. Nevertheless, according to Ball (2022), metaverses exhibit fundamental similarities, such as persistence, massive scale, social interaction, interoperability, modding, and mirror world capabilities.

While gaming has been instrumental in laying the groundwork, the game metaverse represents a new iteration that does not entirely align with traditional online video games or multiplayer games, which are often mistakenly associated with them. Table 1 synthesizes the characteristics of a game metaverse and distinguishes it from other MMOs or online video games.

The primary characteristic of a game metaverse is its persistence (Kumar et al., 2008). In traditional MMOs, such as *World of Warcraft*, persistence refers to the permanent state of the virtual world, independent of user presence. Game metaverses offer more complex, large-scale persistence than MMOs, driven by users' independent actions rather than a publisher-defined theme (Lee et al., 2021), fostering long-term engagement (Gamor, 2012). The second characteristic is the large scale of game metaverses, which support many users and items while ensuring performance and a smooth experience. Unlike game metaverses, MMOs use server clusters divided into shards, with players choosing a shard for each session (Kumar et al., 2008). The third characteristic is social interaction. MMOs facilitate self-expression via avatars (Cole and Griffiths, 2007), and similarly, in game metaverses, collaboration and sharing are key aspects of social engagement (Zackery et al., 2016; Ning et al., 2023). The fourth characteristic is interoperability, or the ability of multiple software components to work together despite differences in language, interfaces, and execution platforms (Wegner, 1996). While cross-metaverse interoperability is still in its early stages (Lee et al., 2021), a form of interoperability already exists through transmedia consumption experience (Ilhan et al., 2013), which enables sharing content, data, and features across platforms, allowing smooth collaboration and media integration. The fifth characteristic is

**Table 1**  
Comparison among online video games, MMOs, and game metaverses.

|                    | Online video games                                                  | MMOs<br>(e.g., MMORPG,<br>MMORTS)                                          | Game metaverses                                             |
|--------------------|---------------------------------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------------------------|
| Persistence        | No                                                                  | Persistent                                                                 | Persistent and evolving world by players                    |
| Massive scale      | From small to large                                                 | Large scale but divided in shards                                          | Largest scale                                               |
| Social interaction | Variable                                                            | High                                                                       | High                                                        |
| Interoperability   | No                                                                  | Limited within the game's ecosystem                                        | High                                                        |
| Modding            | Hard (skill required and not available by the game)                 | Hard (skill required and not available by the game)                        | Easy (skill not required because game allow this)           |
| Examples           | <i>TrackMania</i> ,<br><i>CounterStrike</i> ,<br><i>StarCraft 2</i> | <i>World of Warcraft</i> , <i>Forge of Empires</i> , <i>Clash of Clans</i> | <i>Roblox</i> ,<br><i>Decentraland</i> ,<br><i>Fortnite</i> |

Note. MMORPG = massively multiplayer online role-playing game; MMORTS = massively multiplayer online real-time strategy game.

modding, defined as the practice of modifying or customizing the experience of an existing video game/MMO using tools and software (Kow and Nardi, 2009; Scacchi, 2010). Unlike traditional MMOs, game metaverses offer user-friendly tools for easy environment modification, allowing players to retain ownership of most content. In summary, game metaverses are designed with features such as persistence, massive scale, social interaction, interoperability and modding capabilities, all of which are intended to enhance the user's immersion.

### 2.3. The process of users' immersion in narratives

In the ongoing discourse on the defining attributes of the metaverse, scholars emphasize the role of immersion (Ball, 2022; Mystakidis, 2022). Murray (1997) characterizes immersion as the sensation of being transported into a simulated environment. According to Witmer and Singer (1998), immersion is a psychological sense of perception tied to the feeling of interaction within a virtual environment, providing the user with a range of specific experiences. Furthermore, the literature establishes connections with the flow experience, of which immersion is one of its characteristics, that describes the feeling of concentration and joy experienced during an optimal experience (Csikszentmihalyi, 1990).

In the context of game metaverses, narrative immersion can provide critical insights into how users engage with and navigate these environments. Game metaverses often rely on rich narrative structures to immerse users in their worlds. According to Ryan (2015), mental absorption in the story, characters, and diegetic space is central to the experience of narrative immersion. This concept translates well to the game metaverse, in which the boundary between the fictional and the real becomes blurred as players invest emotionally in the unfolding narratives. In a game metaverse, immersion can drive the creation of these environments. The ability to interact with the world fosters a deeper connection with the metaverse, enabling players to engage emotionally and psychologically. Studying how players experience narrative immersion reveals how virtual spaces can become extensions of their identity, intertwining narrative and lived experience. Thus, narrative immersion plays a key role in the construction and development of game metaverses. In this context, examining how narrative immersion contributes to the game metaverse is essential. By analyzing the affordances that enhance player engagement with the narrative, we can gain insights into how these spaces are crafted to encourage immersive and dynamic interactions.

### 2.4. The role of narrative affordances

Narrative design constitutes a fundamental element (Bulatovic Trygg et al., 2024) as it encompasses the creation and implementation of narrative content within virtual environments. It leverages affordances to create a compelling story through visual, textual, or auditory means. The term "affordance," introduced by Gibson (1977), suggests that humans perceive objects on the basis of their utility rather than their materiality. Departing from Gibson's psychological framework, Norman (2013) reinterprets the concept of "affordances" within the domain of design, establishing a foundation for its application in virtual worlds. Affordances act as cues or suggestions for the use of objects, which can either facilitate or impede actions. These affordances vary depending on context, objectives, and individual users, while the material properties of objects remain constant; what changes is the perception of action possibilities by different users. In game design, narrative affordances are artefacts (notably, narrative events) that evoke mental structures, allowing players to imagine intuitive outcomes for the ongoing story (Young and Cardona-Rivera, 2011). In open-structured games, narrative affordances provide cues for players to construct their own story based on the game systems, interactions with the environment, and available choices.

Within game metaverse, narrative affordances not only help users navigate the environment through embedded gamified elements but

also enhance users' empowerment by providing tools for engaging with narratives. While research on metaverses has explored various aspects, affordance theory has also been used to analyze the opportunities offered by the metaverse, potential barriers, and the complex interactions between these elements, to better understand how users perceive and adopt this technology (Bao et al., 2024), both from the organizational (Marder et al., 2024) and customers perspective (Singh et al., 2025). However, a significant gap remains in how players interpret narrative affordances and how these affordances drive the construction of a game metaverse. Our study addresses this gap by examining these factors in an effort to shed more light on narrative dynamics in game metaverses.

## 3. Methodology

In this research, we aim to explore the immersive experience within the ACNH game metaverse, focusing on how narratives design influence immersion within this virtual environment. By analyzing the narrative structures and narrative affordances within ACNH, we seek to understand their impact on each component of narrative immersion in game metaverse. Our methodology consists of three distinct parts: the research field, data collection, and the analysis of data.

### 3.1. Research field: ACNH

*Animal Crossing* is a life simulation game franchise developed by Nintendo, first released in 2001. In the game, players create an avatar that moves into a town populated by anthropomorphic non-player characters (NPCs). Avatars must repay a mortgage on their homes while engaging in daily activities, such as working, socializing, and shopping. Since 2005, this game has been the subject of various studies focusing on consumerism and social dynamics (Scully-Blaker, 2019) and virtual identity construction and user-generated content (Kim, 2014). However, research on *Animal Crossing* intensified in 2020 with the release of the latest installment, *Animal Crossing: New Horizons* (ACNH). Released during the COVID-19 pandemic, ACNH achieved remarkable success, selling more than 45 million copies worldwide by 2024. The unique context of the pandemic spurred a surge in scholarly interest in ACNH. Studies have examined its impact on social isolation and anxiety (Comerford, 2020; Yee and Sng, 2022), online sociability (Wiederhold, 2021), and virtual marketing opportunities (Blom, 2022; Gibson, 2021). Some researchers have quickly drawn parallels between ACNH and game metaverses (Ahn and Kwak, 2021; Duan et al., 2021), noting that ACNH creates a persistent virtual world where users can socialize, trade goods, participate in community events, and even replicate routines at a time when these activities were disrupted.

### 3.2. Data collection

This research is an online ethnography conducted with ACNH with the aim to understand the narrative framework of a game metaverse and users' perceptions of it. Research commonly employs ethnographic methods to investigate MMOs such as *World of Warcraft* (Nardi, 2010) or *Second Life* (Boellstorff, 2008). In a similar vein, Steinkuehler (2006) employed a multifaceted ethnographic approach in her study on *World of Warcraft*, which included participant observation, analysis of in-game conversations, and a review of messages on various community forums. Similarly, our approach adopts methodological triangulation (Denzin, 2012), which involves the combination of multiple research methods to investigate a single phenomenon and ensure data corroboration (Saukko, 2003). This methodology integrates six months of participant observation from November 1, 2021, to April 1, 2022, across 32 player islands; semi-structured interviews with 15 players from February to April 2022; and comprehensive document analysis.

### 3.2.1. Observation within the game metaverse

We created an avatar and played for more than 75 h on a Nintendo Switch from November 2021 to April 2022 to familiarize ourselves with the environment's features. This understanding was crucial for effective (Hine, 2005) and methodical (Nascimento et al., 2022; Hair et al., 2023) data collection. We visited 32 user islands, observing them randomly. We developed an observation grid to record (1) users' narrative themes and island identity, (2) the environmental narrative (e.g., gameplay, affordances), and (3) social interactions. In addition to taking notes, we captured screenshots of each island for a visual record (Appendix A). We then encoded these data into an Excel sheet to observe and compare users' interpretations of the ACNH environment (Appendix B). We also conducted a comprehensive document analysis of materials related to ACNH, including official game guides, to better understand its features and gameplay.

### 3.2.2. Interviews with players

Following McNamara's (2009) interview preparation principles, we conducted semi-structured interviews over two months, from February to April 2022, with informants recruited from a French-speaking ACNH Facebook group. Gallagher (2013) assert that social media platforms facilitate collaborative projects through active individual participation. Accordingly, one of the primary objectives of the ACNH Facebook group is to engage in online gameplay, provide mutual assistance, and exchange items. We consulted the largest French ACNH Facebook group, which in 2021 had 71,000 members, including 55,000 daily active users. With the assistance of the group's administrator and a post explaining the purpose of our study, we recruited users from diverse sociodemographic backgrounds, including nine women and six men, aged 18 to 50 years. Among them were eight intensive players with more than 500 h of gameplay, five occasional players with more than 100 h, and two less experienced players with fewer than 50 h (Table 2).

We reviewed the literature on players' relationships with their avatars and their narrative choices (Blinka, 2008; Kim, 2014) to develop an interview guide in line with our study's objectives. Four themes, following a funnel approach, progressively explored: (1) users' motivations, (2) narrative choices and relationship with ACNH (sample questions included "How would you describe your way of playing ACNH?" and "Do you have any positive or negative anecdotes about ACNH?"), (3) limitations encountered with the narratives, and (4) users' interactions with other forms of media. This structure, validated by a pilot test in June 2021, ensured flexibility in the interviews, which lasted between 30 and 60 min depending on informants' responses. With the informants' permission, we recorded the interviews in audio format and later transcribed them. After the 11th interview, data redundancy occurred, confirming by the 12th and the 15th interview, indicating that

data collection had reached saturation (Grady, 1998).

### 3.3. Data analysis

The combination of methods produced a large and heterogeneous corpus, typical of qualitative research, which often uses a significant amount of data. Subsequently, we conducted thematic analysis, employing an emergent logic to develop themes from the triangulated data. Our analysis began with the coding of data, which we then organized into themes (Bingham, 2023). From these themes, we distilled overarching theoretical dimensions and formulated dynamic relationships among them. The inductive approach used allowed us to systematically analyze the narrative frames present in the ACNH player interactions and interviews. We adopted a recursive process, alternating between data analysis and the literature review, to interpret emerging concepts. We analyzed the data using the three-level structure recommended by Gioia et al. (2013). The initial coding phase involved identifying and labeling data segments pertinent to our research questions, including direct quotes and paraphrased statements from observations and interviews. We then grouped these initial codes, or first-order themes, into broader categories that captured the essence of the data. In the subsequent phase, we organized the first-order themes into second-order themes representing more abstract concepts. Finally, we aligned the themes derived from our interviews with the literature review, culminating in what Gioia et al. (2013) refer to as an aggregated theme: the first major theme pertains to *Animal Crossing* as a video game, the second theme to *Animal Crossing* as a mirror world, and the third theme to *narrative immersion within the game metaverse* (Appendix C).

## 4. Findings

### 4.1. From embedded narratives to emergent narratives

#### 4.1.1. Starting from a world governed by rules

To prevent users from becoming overwhelmed in these open worlds, an embedded narrative subtly guides them through formal affordances, which function as predefined rules and constraints within the game mechanics (Mateas, 2001). In ACNH, this narrative integrated into the game's programming has a final goal: to create the most beautiful and popular island. The narrative is thus structured around four main missions to achieve this goal, the first of which is island maintenance and development:

*When I start the game, I do everything there is to do, a bit of daily tasks, if there are little missions, like picking up something, or someone asks you to deliver something, or if there's a character that has come to visit the island, et cetera.*

(Lisa)

The second mission is repaying the loan taken out at the beginning of the game. This encourages players to invest time and effort to acquire items and earn Bells (virtual currency) to understand the logic of resource collection and wealth accumulation. The third mission is participating in seasonal events during the year. This mechanic requires players to engage with the game world at specific, predetermined times, thereby encouraging them to adapt their play to real-world rhythms. The fourth mission is to assist virtual agents (NPCs), as having a good relationship with them leads to better island harmony.

#### 4.1.2. Toward a world shaped by players' narratives

According to Kim (2014), players are not required to complete the pre-defined missions, as *Animal Crossing* does not impose fixed objectives. Consequently, even if users fail to achieve these missions, they can still continue playing without penalties. This freedom is supported by two key elements. First, ACNH incorporates a multitude of material affordances, which, in contrast with formal affordances, represent the potential actions available to players (Mateas, 2001). Second, a

**Table 2**  
Sociodemographic profiles of the semi-structured interviews.

|    | Name     | Age | Gender | Professional status              | Time spent (ACNH) |
|----|----------|-----|--------|----------------------------------|-------------------|
| 1  | Rosa     | 25  | Female | Sales assistant                  | 150 h             |
| 2  | Nora     | 27  | Female | Administrator                    | 700 h             |
| 3  | Amélie   | 21  | Female | Student                          | 800 h             |
| 4  | Sylvie   | 33  | Female | IT student                       | 740 h             |
| 5  | Aurore   | 26  | Female | Marketing executive              | 45 h              |
| 6  | Mary     | 19  | Female | Early childhood educator         | 500 h             |
| 7  | Susan    | 24  | Female | Air hostess                      | 600 h             |
| 8  | Thomas   | 24  | Male   | Order picker                     | 1300 h            |
| 9  | Jonathan | 22  | Male   | Job seeker                       | 10 h              |
| 10 | Sammy    | 24  | Male   | Art student                      | 255 h             |
| 11 | David    | 27  | Male   | Teacher                          | 760 h             |
| 12 | Joseph   | 50  | Male   | Care assistant                   | 425 h             |
| 13 | Rohan    | 50  | Male   | Postman                          | 2840 h            |
| 14 | Jolyne   | 32  | Female | Video game seller and bookseller | 200 h             |
| 15 | Lisa     | 37  | Female | Company director                 | 270 h             |

fundamental aspect of *ACNH* is the autonomy players possess in interpreting these material affordances offered by the game metaverse. This flexibility enables them to shape their gameplay experiences, thereby transforming the embedded narrative into an emergent narrative (Jenkins, 2004). Having the autonomy to interpret these affordances enables the development of three main categories of emergent narratives: (1) collection-oriented narratives, such as collections of in-game items (e.g., decorations, avatar clothing, NPCs) and virtual collectibles (e.g., artwork, custom clothing, commercial items); (2) narratives focused on creative adventure, in which residents concentrate on customizing their avatars, virtual landscaping, and content creation (e.g., virtual art, custom clothing, patterns); and (3) socialization narratives, in which players focus on building social connections. This socialization narrative reflects the game's original design intention by Katsuya Eguchi to facilitate social connection among family members (Sheffield, 2006). The three emergent narratives are interconnected and can adapt to individual player motivations, reflecting diverse playing styles. This overlap underscores the flexibility of the game's design to accommodate various player experiences.

#### 4.2. Video game transitioning into a mirror world

While emergent narratives allow players to create personal stories within the game world, in the next step the video game becomes a mirror world, reflecting elements of players' real lives and serves as an early iteration of what we recognize as the metaverse. This concept functions as a digital counterpart to reality, enabling the replication and manipulation of various elements from the physical world. However, as Kye et al. (2021) observe, the mirror world does not fully encompass all aspects of reality; rather, it is often augmented to enhance and enrich user experiences. In the case of *ACNH*, the mirror world during the COVID-19 pandemic. Confronted with mobility restrictions and social isolation, players invested in *ACNH* to re-create familiar environments, maintain social interactions, and extend physical world activities (Blakey, 2022) (Appendix D):

*I started playing [the game] during the first lockdown since everyone was stuck at home. AC is a game I had played before, it's really fun. You can play without getting bored.*

(Susan)

This transition from emergent narrative to mirror world in *ACNH* is facilitated by five characteristics that enable players to project and reconstruct elements of their lived experiences, influenced by personal, social, and cultural dynamics. First, in-game time aligns with real-world time, fostering a sense of daily island evolution and encouraging players to adapt their gameplay to real-world rhythms. This persistence motivates players to stay engaged, as changes prompt them to return. Second, the game enhances social interactions, replicating real-life relationships through features such as letters, gifts, and collaborative events. Third, the mirror world is built on artefacts and symbols related to real life: for example, seasons, biodiversity, and a virtual economy allow players to re-create everyday life experiences in a virtual setting. Fourth, the ability to modify the environment, such as terraforming and customizing objects, deepens the reflection of players' real-world habits. Fifth, for players for whom modding is a complex task requiring creative skills, interoperability characteristics assist them in finding specific resources or support from the transmedia *ACNH* community. They can incorporate real-world patterns into the virtual environment, thus creating continuity between real and virtual objects, as referenced by Rohan in relation to Facebook and Pinterest:

There are two people in the Facebook groups who showed us codes for wearing Disney prince and princess outfits. We displayed them in the shop. My wife created a birthday cake hat. But no, we haven't really done much with the creation side of the game, like creating objects. However, my wife spent a lot of time on Pinterest looking for

decorations. We could have created them ourselves, but whenever she saw something cool on Pinterest—she's really into Pinterest—she would download the codes for the decorations. On Pinterest, we didn't copy, but we took ideas for making fake walls or flooring.... But we didn't copy because we want to make our own island, without copying others or getting too inspired by them, except for some of the flooring.

*ACNH*'s modding and interoperability characteristics significantly facilitated brand integration such as Gucci and Ikea in 2021. By leveraging the game's extensive customization capabilities, these brands were able to re-create their commercial universe and provide players with an immersive experience. This dynamic indicates that the game metaverse is not an inherent state for *ACNH* but rather a constructed one. The convergence of physical and virtual spheres demonstrates how the game metaverse evolves through the interpretation of narrative affordances in *ACNH*, thereby enhancing narrative immersion.

#### 4.3. Game metaverse as a merging of the video game and mirror world through narrative immersion

Narrative affordances affect users' narrative immersion by encouraging a full understanding of the embedded narrative through formal affordances, while also providing opportunities for action that allow users to develop emergent narratives. According to Ryan (2015), narrative immersion comprises three subcategories: (1) spatial immersion, fostered by players' interaction with the virtual environment; (2) temporal immersion, driven by interest in the plot's progression; and (3) emotional immersion, tied to players' emotional investment in the story's characters. However, both formal and material affordances affect spatial, temporal, and emotional immersion differently, influencing how players engage within the game metaverse.

##### 4.3.1. Formal affordances on spatial and temporal immersion

Spatial immersion evokes a feeling of being present in a fictional universe (Ryan, 2015). In *ACNH*, players reported a sense of presence in the game metaverse, facilitated by formal affordances such as gameplay mechanisms (e.g., fishing, gardening, terraforming) and game objectives, which promote spatial immersion. For example:

*The island I chose, I don't want to change it much. That is, there will be very few modifications once I have the Island Designer tool, because I don't have it yet. I really want to keep the island as it is, and just add houses, decorate them, and create small different areas on each side... The theme is quite broad right now; it's more nature-focused—farming, fishing... Something related to nature in general, like agriculture, farming, and fishing.* (Joseph)

Formal affordances also influence temporal immersion by aligning with players' desires to comprehend the progression of the narrative. These formal affordances related to real-time synchronization, for example, foster player enthusiasm for *ACNH*'s seasonal changes, time progression, and events that sync with the physical world. For example, some players manipulate game time to accelerate progress: "*Sometimes I advance a few days; there are no spoilers. At first, I advanced for my villagers, then I advanced to make money*" (Sammy). This behavior underscores players' engagement with the game metaverse's virtual time, reflecting efforts to tailor the experience to personal expectations and needs.

##### 4.3.2. Material affordances on emotional immersion

Players of *ACNH* emotionally attach themselves to their emerging stories, islands, and avatars (Wasko et al., 2011). This suggests that a powerful imagination can make situations feel real even when they involve fictional characters (Ryan, 2015). The extensive freedom of actions within a world that aligns with codes reminiscent of the physical realm (e.g., daily realistic routines, biodiversity) can create lasting memories that have a real impact on players. Moments spent in *ACNH*

supported by material affordances create unique memories that evoke emotions when players recall them. The material affordances related to modding, and interoperability characteristics play a significant role, as the ability to personalize their islands and avatars according to their preferences allows players to create a space or character that reflects their own identity:

*I'm more adventurous with clothes on AC because there are outfits I wouldn't wear in real life... But in AC, I imagine myself in clothes I really like. I also sew, so it gives me ideas for my sewing projects! There are also clothes I'd never wear in real life, but they look great in the game. (Mary)*

Narrative affordances exert a significant influence on the three dimensions of narrative immersion identified by Ryan (2015). These narrative affordances, both formal and material, act as mechanisms through which users interact with the virtual world, thereby shaping their immersive experiences. Formal affordances play a crucial role in the embedded narrative by aiding users' understanding of the virtual environment and the formal constraints of the game they inhabit. The various material affordances in *ACNH* empower players to exert a sense of control over their islands through the unique customization of their narratives, contributing to the construction of a mirror world, which serves as a fundamental subset of a broader metaverse. This deep narrative immersion arises from a harmonious balance between the game's formal affordances and the material affordances of the mirror world. As a result, *ACNH* can evolve into a game metaverse in which players' experiences and interactions reflect their real-world identities and social dynamics.

## 5. Discussion

### 5.1. *ACNH*: From a video game to a continuously expanding game metaverse

Though not initially conceived as a gaming metaverse, *ACNH* has gradually transformed into one, with user practices driving this evolution. This transformation reflects a natural evolution of the gaming system, resulting from player behaviors and emerging uses. Interviews suggest that the COVID-19 pandemic acted as an accelerator in this process, significantly influencing player practices. Faced with mobility restrictions and social isolation, many players engaged in *ACNH* to maintain social interactions and extend activities from the physical world (Blakey, 2022). In a study on games, Caillois (1967) distinguishes two forms of play: *ludus* and *paidia*. *Ludus* represents the structured and regulated dimensions of the game. In *ACNH*, *ludus* is expressed through predefined missions tied to formal affordances, which align with a form of *mimicry* play, engaging in tasks such as building the most beautiful island, repaying a mortgage, and crafting resources. This embedded narrative aims to entertain players and immerse them in the lore of *ACNH*. Although *ACNH* does not rigidly enforce adherence to game rules, many players still follow them, experiencing narrative immersion in which compelling plots are essential to the narrative experience (Ryan, 2015). However, for many players, the non-punitive and highly flexible nature of the material affordances presents an opportunity to transcend these rules and create emergent narratives. This is what Caillois (1967) refers to as *paidia*—the free, creative, and spontaneous aspect of gameplay. In *ACNH*, *paidia* is captured by the ability to terraform and personalize islands, allowing players to become fully immersed in their own emergent narratives rather than the game's storyline. It is here that some players, and even companies or political parties, develop mirror worlds by enriching the game's *paidia*, especially during the COVID-19 pandemic. Examples include events such as Marc Jacobs's fashion show (Bramley, 2020) and Joe Biden's electoral campaign (Ahn and Kwak, 2021) or virtual representations of social events, such as weddings (Blakey, 2022). Thus, *ACNH* is characterized by a dual modality of play, or what Caillois (1967) terms *panacea*—a balanced blend of *ludus* and *paidia* tailored to a player's desired

experience (Fig. 1). *ACNH* is a game metaverse that offers players the freedom to interpret affordances and become narratively immersed either by adhering to the rules (*ludus*) or by breaking free of constraints to explore and personalize the game, developing mirror worlds (*paidia*). Beyond *ACNH*, this modality of *panacea* is central and explains the association with the term “gaming metaverse” found in the literature for *Minecraft*, *Roblox*, *Play Together*, and *Grand Theft Auto* (Duan et al., 2021). These games' metaverse share the characteristic of allowing players to engage for hours, with or without specific objectives (*paidia*) and with or without success conditions (*ludus*), simply by interpreting the game's affordances as they see fit.

Although *ACNH* has evolved from a traditional video game into a game metaverse, it retains its core playful and interactive elements, preserving its identity as a video game. This evolution is driven by several factors, in line with Bao et al. (2024). However, the essence of *ACNH* as a video game persists, even as it expanded into a game-metaverse experience since the COVID-19 pandemic.

### 5.2. Role of narrative affordances in immersive experiences

This narrative framework is based on a system of narrative affordances that play a central role in the immersive experience. Our study reveals that narrative affordances, formal or material, significantly influence users' narrative immersion within emergent narrative and mirror worlds. Formal affordances within a game metaverse help structure the embedded narrative, encouraging users to immerse themselves in the main plot rather than remain passive observers. Conversely, material affordances enable users to experience agency by achieving a certain degree of autonomy, control, and personalization in the universe. This aligns with the findings of Singh et al. (2025), who demonstrate that positive affordances related to personalization and control in a metaverse lead to increased engagement in metaverse.

In this context, narrative affordances empower users by providing a logical universe that they can easily understand and navigate. Through formal affordances related to persistence and reality simulation characteristics, the power to shape own experiences in a familiar reality and to create opportunities for meaningful choices significantly leads to narrative immersion. This, in turn, allows for dynamic narratives and a diversity in user motivations, while fostering a sense of ownership through spatial immersion in the game metaverse. Formal affordances also increase temporal immersion by enabling players to experience a continuous flow of events and actions over time, thereby fostering a deeper engagement with the emergent narrative. Material affordances related to modding and interoperability help evoke emotional immersion. By placing users in the shoes of their avatars, users experience stories not just as observers but as extensions of themselves, enabling them to feel the emotional weight of their own stories. Interoperability through transmedia consumption experience appears to significantly influence emotional immersion within the game metaverse. Ilhan et al. (2013) discuss transmedia consumption experience as involving “patching,” in which users create their own interpretation of the narrative universe by collecting and combining story elements from various media platforms. By exploring and incorporating narrative elements from other players on different platforms, players acquire additional narrative content. This process enriches players' emergent narratives and aids in the creation of mirror worlds by introducing new patterns, custom clothing, and exclusive items, enabling some players to more easily replicate aspects of the physical world. In turn, this replication deepens narrative immersion, with a notable impact on emotional immersion.

### 5.3. Immersive experiences in the game metaverse

Research has explored immersion in the metaverse, primarily linking it to XR technologies, with a particular focus on VR (Mystakidis, 2022; Shin, 2022). This interest stems from the ability of these visual

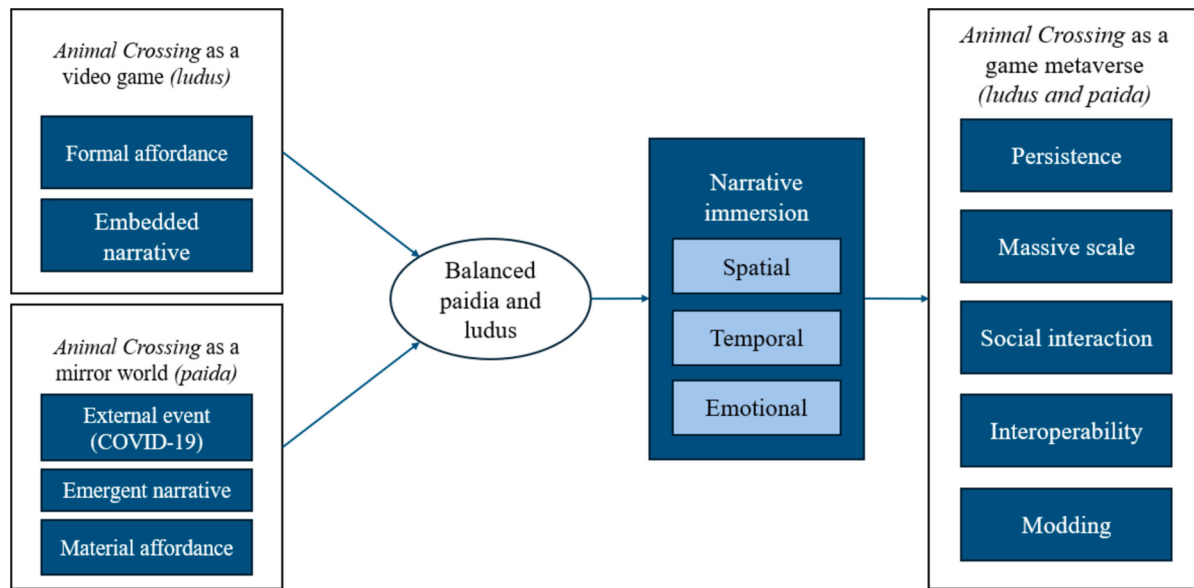


Fig. 1. The role of narrative design in game metaverse.

information technologies to captivate the sensory faculties of users within the metaverse. While XR technologies enhance the sensory experience, narrative immersion focuses on how stories and personal agency within those stories draw players into the virtual universe. By analyzing immersion through the triptych of time, space, and emotions, our research provides new insights into the immersive experience of users in game metaverses. This approach not only describes how players interact with the game world but also emphasizes their emotional connection with it, their creation of meaning within it, and their personal investment.

We show that two forms of narration coexist in game metaverses: embedded narration and emergent narration. Embedded narration, related to formal affordances in *ACNH*, guides players through a structured experiential journey, featuring a well-defined narrative universe, progression systems (missions), and virtual agents (NPCs) provided by the game. This embedded narrative sets the foundation for a balanced and coherent initial immersive experience, echoing the human capacity to engage with fictional worlds (Walton, 1993). However, a significant contribution of our research is highlighting the importance of emergent narratives, which contribute to the construction of mirror worlds, made possible by characteristics of these environments, such as modding, persistence, and social interaction. In the context of game metaverses, a mirror world develops because of the open narrative structure of a game, driven by player choices and interactions.

#### 5.4. Theoretical contributions

Our research makes two significant contributions to the literature. First, we contribute by defining the characteristics of a game metaverse. Current discussions on the metaverse focus mainly on technological aspects, marketing opportunities, and economic systems based on virtual goods (Buhalis and Karatay, 2022; Chalmers et al., 2022; Dwivedi et al., 2022), neglecting narrative content. However, Lee and Kim (2023) argue that narrative is crucial for user immersion by shaping metaverse stories. Our research emphasizes narrative design as the cornerstone of a game metaverse. We identify dimensions that define a game metaverse and enable the creation of deeply immersive narrative programs. Similar to Bao et al. (2024), who highlight technological factors driving metaverse adoption, our findings emphasize complementary dimensions. Persistence, massive scale, social interaction, and modding stand out as pivotal elements that enhance game metaverses' immersive potential. These features shape dynamic user experiences and contribute to

technology adoption through a narrative framework, offering a broader perspective on immersion mechanisms within metaverses.

Whereas Ball's (2022) definition highlights large-scale interoperability and real-time experience, we add the customizable nature of the metaverse, aligning with Singh et al.'s (2025) exploration of personalization and control as key affordances in metaverse engagement. Modding transforms *ACNH* into "mirror worlds" of reality, where users can create and connect their personal narratives with the real world to varying degrees. Thus, our research offers a thorough understanding of the game metaverse, highlighting the essential role of emergent narratives in facilitating the creation of mirror worlds, a fundamental characteristic that elevates a simple game into a game metaverse.

Second, our study builds on existing research, aligning with the work of Bao et al. (2024), in emphasizing how affordances shape the immersive potential of metaverse environments. While Bao et al. highlights technological affordances driving user adoption, we extend this by exploring the role of narrative affordances in shaping game metaverses. This study builds on a perspective of affordances that views humans and technologies as co-constitutive, in which technological affordances encourage or discourage specific actions (Gibson, 1977; Davis, 2020). Technology, therefore, does not deterministically dictate actions through its affordances but participates in the power dynamics of narrative construction. In the context of our research, affordances operate at various levels within metaverses, influencing persistence, social interaction, and modding. More specifically, they play a crucial role in the construction of game metaverse narratives, particularly emergent narratives that are intrinsic to these digital environments and dynamically interpreted by players through the lens of these affordances. Indeed, affordances serve as mediating factors that shape the narrative possibilities and constraints within the metaverse, facilitating or hindering certain player interactions and experiences. By offering users a degree of freedom that is necessary in the game metaverse (et al., 2023), they enable deeper engagement in immersive experiences.

#### 5.5. Managerial implications

Our findings also offer perspectives on user immersion and new work practices. They highlight the importance of playful storytelling for engaging users. However, given diverse approaches to these immersive environments, not all users are equally engaged. The vast amount of data, combined with transmedia consumption experience (in-game and out-of-game), risks losing players' attention. Storytelling is therefore

crucial to guide and support players throughout their experiences. Moreover, correlated with our results, different storytelling elements enhance the immersive experience and user engagement through the underlying story of the game. The data storytelling approach (Dykes, 2019), especially in video games (Gomez et al., 2019), provides a method for improving user interaction with the game's story and other elements of the gaming experience, including interactions with other players and external data (e.g., social networks, websites, online videos).

Such an approach is already used in cinematic experiences in which scripts adapt in real time to viewers' emotions. Applied to video games and the metaverse, this method could enhance user immersion by incorporating external data to enrich the experience. For example, in the summer of 2024, the Sea Life aquarium in Paris offered visitors a unique experience in the world of ACNH called "Desert Island Escape," a first in Europe. The event's goal, as described on its official website, was to "discover marine fauna through the eyes and words of the game's iconic characters." The company integrated ACNH storytelling because the game "offers an immersive experience in a world where you can build the life you want while interacting with colorful villagers." This made the organization's educational goal more engaging. By treating users and video games as integral parts of the information system, organizations can offer visual narratives to capture visitors' interest (see Mirkovski et al., 2019). Moreover, this study offers game designers guidance on how to create connections between several universes, outside the game, by bringing in principles from gamification (Thomas et al., 2023), following the example of the Roblox game (Afacan, 2023).

### 5.6. Limitations and future research

Through an online ethnography and analysis of the French-speaking

ACNH community, we identify multiple narrative affordances within key dimensions of a game metaverse in ACNH. We explore how these narrative affordances assist users in understanding ACNH's initial narrative framework and subsequently encourage a mirror world by interpreting material affordances, enhancing the three dimensions of narrative immersion in a game metaverse: spatial, temporal, and emotional. However, this research is subject to certain limitations. First, our focus is limited to a single game metaverse. Exploring other game metaverses such as Roblox or Minecraft, which offer more open environments than ACNH, would be useful. Studying other game metaverses would also allow for assessing whether players are similarly guided by narrative affordances, validating observed emerging narrative trends or revealing new ones pursued by players, akin to ACNH. Second, analyzing the gamer community across various transmedia platforms experiencing these immersive experiences and collecting testimonies would be pertinent. This approach can enhance result accuracy and support a transmedia study of these communities. Third, beyond the immersive experience and narrative affordances studied in this article, analyzing the cognitive impacts of ACNH on gamers would be worthwhile.

### CRediT authorship contribution statement

**Eloïse Yang:** Methodology, Investigation, Formal analysis, Data curation, Conceptualization, Writing – review & editing, Writing – original draft. **Damien Renard:** Validation, Supervision, Conceptualization, Writing – review & editing, Writing – original draft. **Antoine Chollet:** Validation, Conceptualization, Supervision, Writing – review & editing.

### Appendix A. Screenshots of players' island



Island n°21: Caliste Island- Representation of a small urban town with a princess theme added.

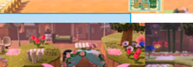


Island n°17: Ananas Island- A residential and paradisiac island with

The left screenshot shows a wedding ceremony in a garden. A bride in a white dress and a groom in a blue suit are standing under a blue and white floral arch. A large pink crescent moon is in the foreground. A small map icon is visible in the bottom right corner.

The right screenshot shows a character with pink hair and a blue dress standing next to a black character. A speech bubble from the pink-haired character says "visiteuse de rêves".

## Appendix B. Observation data encoding of ACNH islands

| ID | Island name | Avatar Name | Narrative theme (key theme)             | Identity/description                                                                                       | Style of gameplay and players' narratives                                                                                                                                                                                                                                 | Gameplay features/ Affordances                                                                   | Social interactions (             | Additional observat                                                                                                       | Screenshots                                                                           |
|----|-------------|-------------|-----------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1  | Gig'île     | Klem        | Community, urban island                 | Personal narrative with external reference (Disney), cultural influence (LGBTQ)                            | Player representing what they seem to like in real life (Disney, Princess). Emphasis on the LGBTQ+ community                                                                                                                                                              | Crafting/items, terraforming, exchanging items, customizing objects                              | What's Up?                        | Pride march carpet, display of Disney princess outfits, trophy display.                                                   |    |
| 2  | ANGIELAND   | Angie       | Personal little town                    | Urban-themed inspiration (restaurants, makeup stores)                                                      | Gameplay focused on decorating and customizing the island. The player aims to highlight brands to represent reality (Sephora, McDonald's, Starbucks, Chanel). The game seems to be a way for the player to showcase what they love (princess castle, Chanel dress, etc.). | Crafting/items, terraforming, transmedia item exchange, object customization.                    | Arriving from the 'Sparkly island | Many brands on the island                                                                                                 |    |
| 3  | Ile LUCKY   | Mika        | Nature, community driven island         | Paradisical beach-themed island with external reference (Disney).                                          | The player aims to recreate a beach island in line with the game's context (bringing more NPCs to the island), with a residential area, deck chairs, palm trees, but with a personal touch.                                                                               | Crafting/items, terraforming, planting crops, collecting items, customization.                   | Hey Sailors!                      | The island is inhabited by three main players: Heyne, Mika, and Flo, making it a household with 3 players.                |    |
| 4  | KAWAI       | Valérie     | paradisical island, cute island         | Personal narrative (cute style)                                                                            | Decorations supporting this theme (pink house), structured island surrounded by flowers (residential area), fairy-tale pink flag.                                                                                                                                         | Crafting/items, terraforming, planting crops, collecting items, customization                    | Hi!                               | Pop culture reference: Harry Potter and Naruto (island flag)<br>Disney, Hello Kitty (Sanrio -collaboration with Nintendo) |   |
| 5  | Palmyre     | Nais        | Nature, flowers, pink,fairy-tale island | Fantasy and fairy-tale themed inspiration                                                                  | A very magical island, with lots of flowers and butterflies. Predominant colors: pink, blue, purple (very pastel). The environment references dreams and princesses. Reference: Cinderella.                                                                               | Main activities include terraforming, island customization with patterns, crafting, and planting | dreams visitors                   | Sanrio                                                                                                                    |  |
| 6  | Avalon      | Fuego       | Flowers, campaign                       | Nature-themed inspiration, focused on forest and countryside<br>Breath of the wild (another Nintendo game) | Use of seasons (autumn) to create a fall countryside atmosphere (pumpkins, etc.).<br>Terraforming to create forests and hills.<br>Use of modding and terraforming to recreate the world of Zelda: Breath of the Wild. Avatar wearing a custom BOTW pattern.               | Planting, terraforming, crafting,                                                                | Welcome                           | /                                                                                                                         |  |
| 7  | Faron       | Sophie      | Nature,video games                      |                                                                                                            |                                                                                                                                                                                                                                                                           | Terraforming, customization, crafting, planting                                                  | Welcome to Faron Jungle           |                                                                                                                           |  |

## Appendix C. Data-analysis with the three-level structure recommended by Gioia et al. (2013)

| 1st Order Code                                | 2nd order code                              | Aggregated dimension  |
|-----------------------------------------------|---------------------------------------------|-----------------------|
| Repay the home loan                           | Embedded Narratives                         | Video-game            |
| Make the island popular                       |                                             |                       |
| Maintain the island                           |                                             |                       |
| Recruit villagers                             |                                             |                       |
| Participate in seasonal events                |                                             |                       |
| Collect museum items, resources               |                                             |                       |
| Be wealthy                                    | Formal affordances (rules & constraints)    |                       |
| Time and seasons restriction                  |                                             |                       |
| NPC (non-players characteristic) interactions |                                             |                       |
| Resources collection mechanics                |                                             |                       |
| Escape from the COVID-19 pandemic             | Emergent Narratives (Player-Driven Stories) | Mirror-world creation |
| Construct world with artefacts and symbols    |                                             |                       |
| Freedom of choices                            | Decoration and Creative Expression          |                       |
| Decorate the island                           |                                             |                       |

9

(continued)

| 1st Order Code                                                | 2nd order code                            | Aggregated dimension |
|---------------------------------------------------------------|-------------------------------------------|----------------------|
| Create custom patterns (players/brands)                       | Social Interaction and Community Building | Narrative immersion  |
| Explore other players' islands                                |                                           |                      |
| Participate in online events                                  |                                           |                      |
| Interact with villagers                                       | Emotional immersion                       | Narrative immersion  |
| Share patterns via transmedia platforms (Pinterest, Facebook) |                                           |                      |
| A way to unwind from real-world issues                        | Temporal immersion                        | Narrative immersion  |
| Personalize the game experience with material affordances     |                                           |                      |
| In-game time aligned with real-world events                   | Spatial immersion                         | Narrative immersion  |
| Synchronized time with the real world                         |                                           |                      |
| Understanding of the environment through formal affordances   |                                           |                      |
| Terraform and modify the virtual environment                  |                                           |                      |

The data-analysis identifies three dimensions: Animal Crossing as a videogame, as a mirror world, and as a narrative immersion space, collectively leading to the creation of a game metaverse.

Appendix D. Recreation of physical-world spaces through player- or brand-created patterns



Island n°27: Tortuga Island - A highly personal island with a lot of cultural representation (Jumanji; Nintendo etc.). Integration of a McDonald fast-food.



Island n°11: Isle of Slam- an Ikea-like store created by a player.



Island n°2: ANGIELAND- An urban town with many brands (e.g., Chanel, Starbucks, McDonald's, Sephora, Hello Kitty). Integration of a Starbuck

coffee.

## Data availability

The data that has been used is confidential.

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