Opportunities and risks in the digital gaming ecosystem: Insights from Brazil and the UK

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Executive summary

This report explores the complexities of the digital gaming ecosystem, with a particular focus on the opportunities, risks and harms as perceived by professionals in relation to children's experiences. This report draws on a literature review and interviews with 30 professionals conducted in Brazil and the United Kingdom, spanning the fields of health, education, the game industry and child protection.

The study employs a multidimensional framework known as the kaleidoscope of play (which encompasses dimensions of people, places and products) to analyse children's engagement within this ecosystem. The '4 Cs' framework – content, contact, conduct and contract – is applied to assess the different types of opportunities and risks children may encounter in the digital gaming ecosystem. These dimensions are closely linked to the principles of the UN Convention on the Rights of the Child (UNCRC): opportunities in gaming can support rights such as play, education, participation and identity, while risks and harms may undermine rights to protection from exploitation, violence and discrimination.

This report demonstrates the importance of understanding digital gaming as an ecosystem – a dynamic and interconnected network of products, places and people that shape children's gaming experiences. As the ecosystem becomes increasingly complex, children's opportunities and risks can no longer be examined solely through their use of games. This study, therefore, makes a significant effort to map the gaming ecosystem in detail.

The study aims to answer the following research questions:

- What opportunities and risks do children encounter within the digital gaming ecosystem, as perceived by professionals?
- How is the digital gaming ecosystem structured, and to what extent does the systematic mapping of actors and responsibilities contribute to understanding governance, coordination and accountability in relation to children's rights in the digital environment?

- How do professionals perceive the distribution of responsibilities among different actors in promoting opportunities and mitigating risks in gaming environments?
- How do the digital gaming ecosystems in Brazil and the UK differ, and in what ways do they present similar patterns in terms of opportunities and risks for children?

Key findings

Professionals identify the potential for gaming to promote children's learning, creativity, problem-solving, emotional regulation and social connections. However, they point to the risks to children across each of the '4 Cs', including exposure to violence, sexualised content, grooming and bullying, extremist recruitment, harassment and manipulative design.

Comparing Brazil and the UK

The findings reveal both shared and context-specific dynamics in how opportunities and risks manifest across Brazil and the UK. In both countries, professionals recognise the potential of gaming to promote learning, creativity, socialisation and inclusion, as well as the need to address risks such as toxic behaviour, grooming and predatory monetisation.

- In Brazil, the most frequent concerns relate to contact risks**,** particularly grooming, radicalisation and online toxicity, which are amplified by social inequality, limited parental mediation and uneven digital access.
- In the UK, professionals focus more on contract and structural risks, such as predatory monetisation, manipulative design, data collection and commercial exploitation, reflecting a more mature regulatory debate around corporate accountability.

Across both contexts, excessive gaming, mental health impacts and the need for inclusive and ethical design emerge as common issues, highlighting that upholding children's rights in the gaming ecosystem requires both local sensitivity and globally coordinated responses. Comparing the two contexts underscores the value of cross-national analysis: it reveals how distinct cultural, economic and policy frameworks

shape children's rights in practice, offering mutual lessons for building safer and more inclusive gaming environments worldwide.

Recommendations

To ensure safe, fair and more inclusive digital gaming ecosystems for children and adolescents, this report makes multiple recommendations:

To governments and regulators

- Support educational, serious and independent (indie) games through funding, tax incentives and partnerships with schools and industry.
- Modernise age-rating systems to include new risks such as manipulative monetisation, addictive design and unsafe interactions, using the '4 Cs' framework (content, contact, conduct and contract).
- Develop evidence-based, child-inclusive, and child-rights-informed regulation.
- Enforce accountability across the gaming industry, including adjacent platforms, through impact assessments, transparency and accessibility standards.
- Promote families' and children's digital literacy via national programmes focused on safe and ethical gaming practices.
- Provide accessible digital literacy resources for parents, especially in vulnerable contexts.

To the gaming industry

- Embed Safety by Design, Child Rights by Design and Playful by Design principles throughout the gaming value chain (from development and publishing to distribution).
- Strengthen moderation and reporting systems across platforms.
- End targeted and deceptive advertising to children.

- Adopt inclusive and ethical design standards and promote local, diverse content.
- Improve parental control tools and make them accessible and easy to use.
- Foster collaborative strategies across companies within the sector.

To educational institutions and research

- Integrate gaming into education to foster creativity, empathy and collaboration.
- Teach media and game literacy, ethics and online safety.
- Include children's voices and perspectives in research on gaming.
- Offer debates and courses on ethical game design, and support interdisciplinary studies on emerging risks.

To families and caregivers

- Foster open dialogue about risks, benefits and healthy usage.
- Monitor and set limits on gaming, with active supervision.
- Use parental controls as needed and respect age rating systems.
- Provide offline alternatives and shared family activities.
- Stay informed about the opportunities and risks in gaming environments.
- Engage extended family in digital gaming wellbeing.

Towards cross-sector action

- Create multistakeholder governance frameworks to coordinate protection, moderation and data sharing across platforms.
- Develop a global code of conduct for ethical design, fair monetisation and child participation, aligned with UNICEF and OECD principles.

1. INTRODUCTION

For many children,[1] digital gaming is not merely entertainment but also a central arena for socialising, learning and exploring identities.[2] Yet there are also growing concerns among families, educators and health professionals[3] about issues such as excessive use, exposure to violent content and harmful online interactions, highlighting the need to better understand children's experiences within these environments.[4]

As gaming experiences expand across multiple platforms[5] and applications, gaming brings both opportunities and risks. These complex, networked spaces connect players and communities in dynamic ways. It is therefore crucial to understand how children engage within these spaces – and how various actors shape those experiences. Despite their global reach and cultural significance, digital gaming environments remain insufficiently understood in terms of governance, accountability and children's rights.

Children's play, long recognised as central for development, is now deeply intertwined with this kind of digital technology. Play is shaped by an ecosystem of actors – parents or caregivers, developers, educators, influencers, and researchers – embedded in a complex network that influences behaviour, community culture, incentive structures, policy, and online events. The space of play and games is characterised as a social and cultural activity, influenced by people, places and products in both physical and digital environments.[6]

This study conceptualises digital games as interactive systems that merge rule-based structures with fictional worlds, offering players engaging experiences and measurable outcomes based on their skills.[7] Under this definition, gambling and sports betting are excluded from our scope of analysis.

This report examines both the opportunities and the risks of digital gaming for children, drawing on the perspectives of professionals and specialists who work directly or indirectly with them. It applies the '4 Cs' framework (content, contact, conduct and contract) to analyse opportunities and risks within children's gaming environments.[8] These dimensions are closely linked to the provisions of the United Nations Convention

[1] This research adopts the definition of children's rights established by the United Nations Convention on the Rights of the Child (UNCRC) , which considers every individual under 18 to be a child. Where relevant, in the context of research findings or age-specific statements, further distinctions will be made between children and adolescents.
[2] Colvert (2021); Winther et al. (2019).
[3] Fortim (2024).
[4] Fortim et al. (2020).
[5] Platforms are usually studied in four intersecting dimensions: technology, governance, power and economy (Livingstone & Sefton-Green, 2025). In this report, platforms refer to digital environments that enable distribution, access, interaction and monetisation. This includes game distribution services (e.g., app stores, consoles, PC launchers), social and streaming platforms connected to gaming (e.g., Twitch, YouTube, Discord), and user-generated content environments where players can create or modify games. Platforms act as intermediaries between developers, content creators and players, shaping the conditions under which digital play, communication and commercial activities occur.
[6] Colvert (2021); Cowan (2020).
[7] Jull (2005) states that play is not arbitrary: the player's performance is evaluated through objective metrics (measurements) such as scores, levels, or progress indicators.
[8] Stoilova et al. (2021).

on the Rights of the Child (UNCRC): opportunities in gaming can support rights such as play, education, participation and identity, while risks may undermine rights to protection from safety, exploitation, violence and discrimination.

To address existing knowledge gaps, the report adopts an ecosystemic perspective that identifies the key actors and relationships shaping children's digital gaming, illustrating how structural, social and individual factors interact within the context of digital gaming.[9] From this perspective, the digital gaming ecosystem encompasses a wide range of elements and actors, including those within the gaming industry, such as development, production, distribution, and consumption, each exerting influence over the environment.[10] It also forms distinct cultures supported by gaming-adjacent platforms[11], such as Twitch (streaming), Discord (community), and modding tools.[12] These extensions expand our understanding of gaming beyond the core product and demonstrate that child protection requires an understanding of the networked, connected and distributed nature of risks experienced in gaming environments.[13]

By analysing these relationships, the report offers a framework for how decisions at different levels – micro (individual and family), meso (institutional and community) and macro (industry and policy) – affect opportunities, risks and child rights. In this way, understanding the digital gaming environment as an ecosystem is not a descriptive exercise but also a methodological and conceptual contribution of this report.

Adopting an ecosystemic approach is essential for advancing policy and practice. By situating digital gaming within this broader ecosystem,[14] the report demonstrates that gaming must be understood as a distinct digital environment operating within a digital ecosystem – requiring its own conceptual and regulatory vocabulary. This mapping not only helps identify how actors and structures interact and where responsibilities lie across the ecosystem but also suggests strategies to mitigate risks and enhance opportunities, allowing children to engage safely and meaningfully in digital play.

The Brazilian and UK digital gaming ecosystems are interconnected through worldwide industry practices, technologies and cultural trends, yet shaped by distinct national policies, markets and social contexts. Comparing these two settings, therefore, provides a broader understanding of how different gaming ecosystems influence children's opportunities and risks. By examining their similarities and differences, the analysis also highlights how global frameworks intersect with local realities to shape governance, regulation, and children's experiences in the digital gaming environment.

[9] Colvert (2021).
[10] Klimas & Czakon (2022)
[11] The term 'platform' encompass the technology, especially programmability and capabilities, for data extraction; governance, including management of and standards for trust, safety and security, privacy and rights; powers relating to the uses or abuses of platforms for surveillance, control, misrecognition and prediction; and economics, namely, the near-monopoly control of certain markets, the relationship between private companies and the state and the monetisation of data (Livingstone & Sefton-Green, 2025).
[12] Modding can be defined as the act of editing an existing video game or gaming console to change elements or produce new material and capabilities, and thus presents great diversity in potential modifications (Curtis et al. 2021).
[13] Faraz et al. (2022).
[14] Yap (2024)

2. METHODOLOGY

Study overview

The main objective of the report is to identify and analyse the risks and opportunities that arise within the digital gaming ecosystem from the perspective of the professionals who work directly or indirectly with children. It seeks to describe the structure and dynamics of this ecosystem, identifying its key actors and the relationships among them. In doing so, it aims to understand how the responsibilities of these actors contribute to both the promotion of opportunities and the mitigation of risks for children in digital gaming environments.

The report will therefore address the following research questions:

- What opportunities and risks do children encounter within the digital gaming ecosystem, as perceived by professionals?
- How is the digital gaming ecosystem structured, and to what extent does the systematic mapping of actors and responsibilities contribute to understanding governance, coordination and accountability in relation to children's rights in the digital environment?
- How do professionals perceive the distribution of responsibilities among different actors in promoting opportunities and mitigating risks in gaming environments?
- How do the digital gaming ecosystems in Brazil and the UK differ, and what common patterns emerge in the opportunities and risks they pose for children?

Literature review

This report presents a narrative review of the literature on children's experiences with games and the broader gaming ecosystem.

The literature search underpinning this report was extensive and followed a process aimed at capturing research across multiple disciplines, including child rights, game design, health, social sciences, and the humanities, to ensure a broad and representative understanding of the gaming ecosystem. The following databases were used to identify relevant literature: PubMed, SciELO, ACM Digital Library, Google Scholar and SpringerLink.

Demographic terms such as 'children', 'adolescents', 'kids' and 'teens' were combined with keywords including 'opportunities', 'risks' and 'harm' as well as with terms

associated with the gaming ecosystem, such as 'gaming', 'games', 'video games' and 'gaming adjacent platforms'.

The review encompassed peer-reviewed articles, conference papers, book chapters, alongside reports and policy documents. It is important to note that much of the literature cited does not explicitly use the terms 'opportunities' or 'harms', but was considered relevant where it aligned with definitions proposed by Livingstone and Stoilova[15] for opportunities and risks, for example: civic participation as an opportunity; violence as a risk associated with the content in games.

The child protection regulatory frameworks of both Brazil and the UK were also reviewed.

Interviews

Qualitative research was conducted. Thirty professionals (15 from Brazil and 15 from the UK) participated in semi-structured interviews (see Table 1). The participants were recruited via LinkedIn or email and interviewed in person or online using a semi-structured script.[16]

The participants were required to have worked in the games and/or child and/or adolescent protection for more than five years, with direct or indirect experience of working with children. In addition, they had to be professionals from the games ecosystem in the fields of health, education or child rights protection, or be associated with industry or academia specialising in digital games. The selection criteria were based on participants' expertise in the subject and their role within the digital gaming ecosystem and/or in the protection of children.

Ethics

The project was submitted to Plataforma Brasil and to the Research Ethics Committee of the Pontifical Catholic University of São Paulo (PUC-SP) and received approval number 7.195.851. All procedures complied with the ethical standards established by Resolution No. 466/2012 of the Brazilian National Health Council (Conselho Nacional de Saúde).

The interviews covered gaming opportunities, risks, harms and actor roles. Audio recordings were securely stored and uploaded to a protected folder provided by the London School of Economics and Political Science's (LSE) OneDrive. Transcripts were produced through LGPD-compliant automated transcription services. Personally identifiable data (e.g., consent forms) were stored separately from research data.

[15] Livingstone & Stoilova (2021).
[16] See Appendix

Table 1: The participants

Participant	Gender	Country	Role in the ecosystem
1	F	BR	Psychologist specialising in child sexual exploitation and abuse
2	M	BR	Games market researcher
3	M	BR	Director of an NGO focused on accessibility
4	M	BR	Entrepreneur in game and gamification consulting
5	F	BR	Paediatrician
6	F	BR	Researcher and developer
7	M	BR	Professor and psychologist, basic education
8	F	BR	Teacher, basic education
9	F	BR	Developer and academic
10	F	BR	Children's games developer
11	F	BR	Developer of educational games and academic
12	F	BR	Lawyer specialising in children's rights, NGO
13	F	BR	Entrepreneur in a Trust and Safety company
14	F	BR	Representative of a gaming association
15	M	BR	Psychologist, child specialist from an NGO
16	F	UK	Lawyer, child specialist from an NGO
17	F	UK	Psychologist, child specialist from an NGO
18	M	UK	Researcher and academic
19	M	UK	Trust and Safety professional in the industry
20	M	UK	Child specialist from an NGO
21	M	UK	Trust and Safety professional in government
22	M	UK	Academic and researcher
23	F	UK	Academic and developer
24	F	UK	Teacher, basic education
25	F	UK	Representative of a gaming association
26	F	UK	Researcher and academic
27	M	UK	Influencer on video games and accessibility
28	M	UK	Government
29	F	UK	Entrepreneur in a Trust and Safety company
30	F	UK	Researcher and academic

Analysis

Content and thematic analysis were employed to organise and analyse the qualitative material collected through interviews and documentary sources. Content analysis was

based on systematic, intersubjectively validated, and transparent procedures to create valid inferences about specific verbal, visual, or written content, seeking to describe, quantify, or interpret a phenomenon in terms of its meanings, intentions, consequences, or contexts.[17] This approach enabled the systematic identification of recurrent themes, categories and patterns, providing a structured overview of the opportunities, risks and harms associated with digital gaming. By coding and grouping the data, content analysis ensured that the findings were not only descriptive but also comparable across contexts, thereby supporting the development of a comprehensive framework for understanding children's experiences within the gaming ecosystem.

The findings consider both data collected from the literature and from interviews.[18] In each section, following the presentation of participants' views and the key themes emerging from their accounts, the relevant literature is introduced to contextualise and deepen the understanding of the issues they raise. This approach connects the empirical findings with existing research and theoretical perspectives, allowing for a more comprehensive interpretation of the topics discussed.

[17] Sampaio & Lycarião (2025).
[18] See Appendix

3. THE DIGITAL GAMING ECOSYSTEM

Understanding the digital gaming ecosystem is important for identifying who holds responsibility for mitigating risks and enhancing opportunities for children. This section maps the core elements of this ecosystem.

Children's digital play is shaped by multiple and interacting dimensions.[19] Colvert's *kaleidoscope of play* model enables a systemic analysis of how structural, social and individual factors interact with play. It frames the play experience as being shaped by three main dimensions – places, people and products – which are analysed at three different levels of influence: micro, meso and macro.

- **Places**: refers to the physical and social spaces where play takes place. At the micro level, the child's immediate surroundings are considered, such as their bedroom, school playground or backyard. At the meso level, the influence of local social and cultural contexts determines which digital gaming is encouraged or limited in different communities. The macro level is needed to understand the impact of national and global geography on the availability and regulation of play spaces shapes the digital gaming experience.

- **People**: concerns the individual and collective interactions that shape children's play experiences. At the micro level, this analysis focuses on the child's subjective identities, interpretations and experiences when playing. At the meso level, social relationships and interactions are considered, such as friendships, family dynamics and peer influences on the way children play. At the macro level, the impact of public and private sector policies and practices on the structuring of childhood and leisure is considered, including regulations on screen time and educational guidelines.

- **Products**: involve the toys, digital gaming and technologies that structure play. At the micro level, the emphasis is on the design of artefacts, such as the mechanics of a game or the functionality of a physical toy. At the meso level, connectivity and transmission are analysed, such as the influence of social networks, online games and platforms that enable new forms of interaction and entertainment. At the macro level, commercial aspects are considered, such as marketing, distribution and data systems, which determine which play products are accessible and popular in different contexts.

Children not only participate in spontaneous play but are also impacted by elements such as the spaces available to them, their interpersonal relationships and the cultural

[19] Colvert (2021).

and technological products with which they interact. Play is connected to public policies, educational practices and market trends that shape their play opportunities.

This model is particularly relevant for understanding the impact of digital gaming on play. It allows us to analyse how play is transformed in different contexts and scales, from the child's individual experience to wider social and economic influences.

In this work, we will use the kaleidoscope model to look at the beneficial possibilities of play (the opportunities) and the potentially harmful possibilities (the risks).

Product: Digital games

Digital games are highly diverse and can be classified in multiple ways. The following definitions (Table 1) illustrate different game formats and their varied potential for risks and opportunities, rather than offering an exhaustive typology. Digital gaming may be categorised by type of gaming device (Table 2), mode (Table 3) and genre (Table 4). Games are played on a wide range of devices, each possessing distinct features and functionalities.

Table 2: Types of digital gaming devices

Mobile devices	Devices focused on mobility, enabling play anywhere, e.g., iPhone 15 Pro, Samsung Galaxy S25, iPad Pro
Consoles	Stationary devices designed for high-performance gaming on TVs or monitors, often offering exclusive games and media features, e.g., PlayStation®5 (Sony), Xbox Series X/S
Portable consoles	Handheld consoles with built-in screens, combining mobility with dedicated gaming experiences. Some also support docking to TVs, e.g., Nintendo Switch OLED, Steam Deck, Asus ROG Ally, Lenovo Legion Go
Personal computers (PCs)	Desktops and laptops used for gaming. Some models are specifically optimised for gaming performance, e.g., Alienware Aurora R16, Razer Blade 18, custom-built gaming PCs

Source: The author

These devices can be operated using a variety of peripherals, such as joysticks, keyboards, mice, touchscreens, virtual reality (VR) headsets, sensory gloves, steering wheels, motion controllers, dance mats, cameras, microphones, musical instruments (e.g., guitar and drum simulators) and even imitation weapons. Interaction can also take place using motion sensors.

Digital gaming can also be categorised according to the number of players.

Table 3: Game mode by number of players

Single player	Intended for a single player, in which the experience is realised in solitude
Local multiplayer	Multiple players share the same device in the same physical space
Online multiplayer	Participation of multiple players online, interacting in a shared virtual environment regardless of geographic location

Source: Fortim (2020)

Games can serve different purposes depending on their design and goals. Entertainment games prioritise enjoyment, while serious games combine play with learning or practical outcomes.

Table 4: Digital gaming by purpose

Entertainment games	
Commercial games (AAA)	Developed by large studios with substantial budgets; widely known and generate high revenue
Indie games	Created by small developers without major funding; known for creativity and innovation
Advergames	Free-to-play games used as advertising tools to promote products, brands, ideas or concepts
Serious games	
Educational games	Focus on academic content and skill development; applied in formal or informal educational contexts
Health games	Support prevention, treatment or therapeutic processes in healthcare settings
Training and selection games	Used in corporate or organisational environments for employee training or recruitment
Impact games	Address social issues, aiming to raise awareness and encourage reflection among players

Source: Fortim (2020)

Entertainment games can be divided into various genres (from adventure and puzzle to horror and shooter formats), with content tailored to different age groups and audiences. However, the classification of game genres is controversial and lacks consensus.[20] It includes a great variety of genres and sub-genres, reflecting the diversity and complexity of gaming experiences.

This diversity influences both the opportunities and risks involved, as well as appropriate prevention strategies. For instance, horror and shooter games may be inappropriate for children; free mobile games often include unsuitable adverts; and multiplayer games introduce risks through online interactions.

Many digital games function not only as products but as services – known as Games as a Service (GaaS). These games are continuously updated, designed to provide long-term engagement through new content and events, as seen in titles such as League of

[20] Clarke et al. (2017); Vargas-Iglesias (2020).

Legends, Counter-Strike. This model extends a game's lifecycle by providing additional content post-launch.[21] Some digital games are configured as metaverses – immersive, expansive virtual environments that enable extensive interaction, creation, and socialisation (such as Roblox and Fortnite).[22] In this sense, these digital games are not just products or services, but also spaces for play. They can expand their content post-launch, incorporating live events, seasonal content and monetisation strategies that may influence children's engagement patterns.

In gaming, the product extends beyond the game itself to include licensed products, merchandise and related content. Merchandise refers to products derived from a franchise, aimed at promotion, expansion or monetisation of its popularity. This includes physical items, such as clothing, accessories, action figures, and art books, as well as digital goods like skins and exclusive in-game content.[23]

Digital games often extend into transmedia franchises, with their stories, characters and visual styles crossing into films, series, books, animation and comics. Many digital games inspire cultural products such as films and novels, while existing media also serve as sources for game adaptations, for example, the game Arcane is an animated series set in the universe of League of Legends, exploring the origins of its characters. Related products – such as toys, collectables, and artwork – may be officially licensed or fan-created, including fan art, fan fiction, and more. These artefacts help reinforce and reproduce group culture and identity among players.[24]

Place: Digital gaming environment

Children's play spans interconnected physical and digital spaces beyond the game itself. These include real-world settings (such as homes, schools, and public places) and device-based interfaces (including smartphones, tablets, consoles, and computers). Gaming occurs in various physical environments, including classrooms, homes, community centres, and public spaces, and these spatial contexts influence how children engage with play. Gaming in these settings may occur in solitude, supported by virtual interactions, or in the company of family members, friends and relatives.

The digital game and the gaming environment can also be considered as virtual spaces as they provide structured virtual environments where players interact, explore and engage in social, creative or competitive activities. These environments are not merely backdrops for gameplay; they are dynamic, rule-governed worlds that can be navigated, inhabited and shaped by player action.

Several games are shaped as metaverses, and are immersive, interactive virtual spaces where players not only consume content but also engage and co-create (like Minecraft). These environments facilitate role-play, collaboration and user-generated content.

[21] He (2021).
[22] Jo et al. (2024).
[23] [23] Marchand & Hennig-Thurau (2013).
[24] Sakuda (2020).

Some virtual worlds let users design, publish, and monetise digital games (like Roblox), while others organise in-game concerts and themed events (Fortnite has hosted virtual concerts by major artists, such as Travis Scott and Ariana Grande). Such models blur the boundaries between digital games, social networks and creative platforms, underlining their role as complex digital ecosystems.[25]

In these environments, digital gaming serves not only as entertainment but also as a social space where individuals form communities and collective identities. Due to their global scope and diversity, gaming environments are constantly evolving, functioning as vibrant social spaces.[26]

Place is not only the physical space (e.g., the living room), but also the network of infrastructures, the platforms that make play possible (meso level in the kaleidoscope of play). Game studios, publishers and distributors function as gateways, determining how and where games can be accessed. While many rely on major marketplaces, some studios and publishers also provide standalone applications, allowing games to be downloaded directly from the studio or publisher's website.

Table 5: Digital gaming environment

Actors	Examples of digital places
Game studios' websites and applications	Activision Blizzard (activisionblizzard.com), Epic Games (epicgames.com); Mojang Studios/Microsoft (minecraft.net, microsoft.com),; Riot Games (riotgames.com),Tennis Clash.
Game publishers' websites and applications	Electronic Arts (FIFA/EA Sports FC), Nintendo (Mario, Pokémon), Sony Interactive Entertainment (God of War, The Last of Us), Tencent Games (PUBG Mobile, Honor of Kings)
Games markets	Steam (Valve), Epic Games Store (PC digital marketplace), Apple App Store (iOS), Google Play (Android), Nintendo eShop (Switch), PlayStation Network (PS4/PS5), Xbox Store (Microsoft – consoles and PC), GOG.com (CD Projekt – DRM-free), itch.io (indie games, mods, browser), Kongregate (browser), Friv (browser games).
Live streaming platforms	Twitch, Facebook Gaming, TikTok Live, YouTube Gaming
Video platforms	Netflix, Vimeo, YouTube
Gaming forums and messaging platforms	Discord, Reddit, Steam Community, 4chan, IGN Boards
Game publications, review sites and user-generated mod servers	Metacritic, Game Informer, Nexus Mods, PC Gamer
eSports teams and tournament organisers	Team Liquid, Loud (Brazil), Tencent eSports, Ubisoft eSports, ESL
Hardware manufacturers	Nvidia (GeForce RTX), AMD (Ryzen, Radeon), Sony (PlayStation), Microsoft (Xbox), Nintendo (Switch)
Games events	Brasil Game Show (BGS), Gamescom, Tokyo Game Show, TwitchCon, BlizzCon (Blizzard)

Source: Author, based on Lamphere-Englund & White (2023)

[25] Jo et al. (2024).
[26] Lamphere-Englund & White (2023).

Table 5 presents an overview of the main actors and corresponding examples of digital environments within the gaming ecosystem. It highlights the diversity of spaces where game-related activities take place — from developers' and publishers' websites to distribution markets, live streaming platforms, online communities, and major gaming events.

Table 6: Digital gaming adjacent platforms

Platform type and description	Primary function	Features	User interaction	Moderation level	Examples
Live streaming platform	Performance and community interaction	Live broadcasts, public and private chat, channel-based communities	Viewers engage with streamers and each other in real time	Moderate to high (streamer and platform controls)	Twitch
Messaging and voice platform	Communication and community management	Invitation-only servers, text/voice channels, bots and moderators	Members communicate within closed or semi-public communities	Moderate (server-based moderation and automated bots)	Discord
Game modification platforms	Game modification and personalisation	User-created mods for gameplay, aesthetics and mechanics	Modders and players customise and share content	Low (mod platforms often community-moderated)	Nexus Mods, Steam Workshop
Official forums	Structured discussion and support boards hosted by game publishers or developers	Official announcements, FAQs, technical support	Users participate in structured, topic-based discussions	High (platform and community-led moderation)	Ubisoft forums, Blizzard forums
Forum-based platforms	Community-driven information sharing	Subreddit structure, voting system, varied content	Users share, vote and comment on diverse topics	Moderate (community rules and Reddit system administrator)	Reddit
Chans	Anonymous, unmoderated discussion	Ephemeral posts, no user accounts, minimal moderation	Users post and respond without identity constraints	Low to none (high anonymity, little oversight)	4chan
Video-sharing platform	Content creation and dissemination	Recorded videos, clips, gameplay highlights	Users view, comment and subscribe	Moderate (platform controls and reporting)	YouTube

Source: Author

Depending on the game, players often use digital gaming-adjacent platforms such as messaging services, streaming sites, mod servers and forums. These services are not digital gaming themselves, but rather enhance gameplay and are part of the broader

virtual landscape and environments that support play by facilitating communication, content sharing, and community building. The digital gaming adjacent platforms support social, educational, competitive and entertainment purposes, broadening the gaming experience. They enable varied interactions, such as voice chat and forums. Notable examples include Twitch for live broadcasts and Discord for community communication. Some games do not require these spaces and instead have built-in chat features, for example, while others rely heavily on these platforms. Some authors also refer to these as meta-gaming ecosystems.

Hardware manufacturers provide the technological infrastructure that underpins these experiences, while gaming events offer physical and hybrid spaces where communities gather. Taken together, these actors do not merely supply games; they also constitute the virtual environments in which play occurs.

Together, these physical and digital places provide the contexts in which gaming occurs, structuring access, shaping interactions and influencing the kinds of opportunities children may enjoy as well as the risks they may face.

People: Actors

The digital gaming ecosystem is complex and multifaceted, involving a wide range of actors across various sectors, which in different ways impact the opportunities and risks associated with digital games. Actors can be classified into some macro categories:

- **Children**: At the centre of the ecosystem are children, whose gaming behaviours are shaped by a desire for fun and wellbeing, peer influence and digital literacy.
- **Families**: It is up to families to set boundaries, mitigate risks and facilitate healthy engagement. Parental involvement in digital gaming includes not only technical supervision (e.g., activating parental controls) but also emotional support and dialogue about opportunities and risks in gaming environments.
- **Educational community**: Schools and educators serve as intermediaries in promoting critical thinking, digital literacy and ethical reflection about gaming. Their responsibilities may extend beyond the classroom, encompassing the inclusion of games in pedagogical strategies, the discussion of social issues embedded in game narratives and the integration of media education into the curriculum.
- **Games industry**: The process of making and distributing games deserves special attention, as it relies on a complex value chain[27] that defines development, technological infrastructure and distribution. The sector encompasses a wide range of actors, including game developers, publishers,

[27] Sakuda (2014)

distributors, and providers of development tools (such as game engines)[28]. It also involves hardware manufacturers, payment services, advertising networks, cybersecurity firms and suppliers of merchandise. In addition, the ecosystem extends to investors, licensors, major app stores operated by Big Tech companies, developers of serious games and modding communities, including mod servers. Collectively, these actors shape design choices, monetisation models, moderation practices and the integration of Safety by Design principles. While developers focus on design, publishers and distributors manage commercialisation and market reach, and publishers often assume responsibilities for such payments. Development support services – from engines like Unity and Unreal Engine to outsourced localisation, payment and advertising solutions – further sustain production, especially for small studios. Larger companies tend to integrate these functions in-house, whereas smaller studios often rely on outsourcing. This chain has direct implications for the protection of children and must therefore be considered in its entirety.

- **Digital gaming adjacent platforms**: A constellation of adjacent digital platforms – such as live streaming services (e.g., Twitch), communication platforms (e.g., Discord), video-sharing sites (e.g., YouTube) and user-generated content hubs – may shape children's social experiences and their exposure to risks. These platforms enable direct contact between children and others, including adults.

- **Influencers and content creators**: Influencers and streamers have considerable influence on children's and youth culture and consumption habits. These actors often act as role models, shaping norms, tastes and behaviours. Their responsibilities include avoiding the promotion of harmful content or exploitative practices, ensuring ethical advertising and fostering inclusive communities.

- **eSports sector**: The eSports environment has greater appeal for older teenagers aged 12-17, but younger children are also occasionally exposed to this content. Comprising professional athletes, tournament organisers, leagues, sponsors and marketing agencies, the eSports sector represents the professionalisation of play. While eSports offer opportunities for engagement and career development, they also present risks related to commercial exploitation, excessive competitiveness and exclusion. Ethical standards must be established for conduct, diversity and protection of minors in these environments.

- **Knowledge and training institutions**: This group includes academic researchers, vocational courses and professional training organisations. These actors contribute to the development of evidence-based policies, foster debate on game ethics and support capacity-building for caregivers

[28] A game engine is a software framework primarily designed for video game development, which may include specialized software libraries and packages, such as level editors.

and professionals.

- **Public sector and regulators**: Governments, regulatory bodies and public institutions are responsible for developing legislation, enforcing compliance and promoting public awareness. Their actions span content classification, data protection, advertising regulation, digital education policy and support services for affected families. Effective governance requires coordination across ministries and regulatory domains.
- **Civil society and non-governmental organisations (NGOs)**: NGOs advocate for children's rights in the digital environment, support families and mediate between state, market and community actors. They often provide frontline services, raise awareness of online harms and work to ensure the inclusivity of vulnerable groups within the gaming ecosystem.
- **Health and care services**: Health professionals and care institutions are essential in identifying, treating and supporting children affected by gaming-related issues, including excessive use, addiction and exposure to trauma or exploitation. Their involvement includes direct care, preventive education and interdisciplinary collaboration with other sectors.

The ecosystem is characterised by a considerable number of entities that vary significantly in terms of size, power, reach and function. Power within the digital gaming ecosystem is largely concentrated among a few dominant industry actors and government agencies, whereas families, educators, and civil society organisations play a more limited role in protecting children. A systemic and equitable approach – anchored in shared responsibility and multi-actor governance – is essential for fostering an ethical, inclusive and protective digital environment for children.

4. THE DIGITAL GAMING ECOSYSTEMS IN BRAZIL AND THE UK

Brazil's digital gaming ecosystem

According to the *ICT Kids Online 2025* survey,[29] online gaming remains a central component of digital engagement among children. In 2025, 70% of internet users aged 9 -17 reported playing games online. This was the most common online activity among children aged 9-10 (81%), surpassing even watching videos or listening to music. The proportion remained high across other age groups: 71% among those aged 11-12, 76% for 13-14 and 63% among adolescents aged 15-17. Gaming, therefore, acts as a gateway to participation in the digital environment, particularly for younger users.

While mobile phones are the primary device for internet access (used by 96% of participants), consoles also represent a significant medium, especially among higher-income groups – 45% of children in social class AB access the internet via gaming consoles compared to just 9% in class DE[30]. Another finding from the research indicates that 52% of children have watched someone playing video games, with 71% of boys and 33% of girls reporting having done so.

Data from the 2025 edition of *Pesquisa Game Brasil*[31] also reports high engagement of children with digital games. In this study, among 0-14-year-olds, 53.6% are regular consumers of digital games, with smartphones being the most commonly used device (42.7%), followed by computers (38.3%) and consoles (21.8%). This indicates that mobile gaming is at the core of younger users' early digital experiences. Children and young adults ages 15-29 demonstrate even greater involvement, with 62.5% reporting frequent gameplay. In this cohort, smartphones also dominate (61.3%), followed by consoles (52.3%) and computers (23.9%). The prominence of smartphones, particularly among younger and lower-income users, further highlights the accessibility and ubiquity of mobile applications.

Brazil's regulatory framework governing digital gaming is multifaceted and has evolved in recent years. The sector has been regulated through a combination of general legal

[29] Núcleo de Informação e Coordenação do Ponto BR (2025).
[30] In Brazil, the population is often divided into five socioeconomic classes labelled A to E, based on the Critério Brasil developed by the Brazilian Association of Research Companies (ABEP). Class A includes upper-middle or upper class; class B represent the affluent middle class; class C covers a broad range of lower-middle to emerging working-class families; class D corresponds to the working poor, and class E represents the most economically vulnerable groups, both of which might be compared to precarious working class or underclass.
[31] Sioux Group et al. (2025).

instruments addressing consumer rights, data protection, children's rights and internet governance.

The Child and Adolescent Statute (Estatuto da Criança e do Adolescente, ECA, Law No. 8.069/1990[32]) guarantees children's rights to privacy, dignity and access to information, and serves as a foundation for interpreting their rights in digital spaces. This law, aimed at industry, requires the classification of digital gaming by age appropriateness (Classificação Indicativa, ClassInd).[33] Additionally, the National Council for the Rights of the Child and Adolescent (Conselho Nacional dos Direitos da Criança e do Adolescente, CONANDA) Resolution No. 245/2024[34] emphasises the ethical, inclusive and safe use of digital technologies, and promotes shared responsibility among the state, families, businesses and civil society.

Privacy and data protection are governed by the General Data Protection Law (Lei Geral de Proteção de Dados, LGPD, Law No. 13.709/2018),[35] requiring parental consent for processing children's data. The Internet Bill of Rights (Marco Civil da Internet, Law No. 12.965/2014)[36] guarantees digital rights such as net neutrality and platform responsibility. The Consumer Protection Code (Código de defesa do consumidor) (Law No. 8.078/1990)[37] ensures that consumers – especially children and adolescents – are protected from misleading advertising, unfair terms of service and predatory monetisation practices. Advertising practices are monitored by the Advertising Self-Regulation Council (Conselho Nacional de Auto-Regulamentação Publicitária, CONAR), with particular attention to child-targeted promotions.

The Legal Framework for Games (Marco Legal dos Games, Law No. 14.852/2024) formally recognises gaming as a cultural, educational and economic activity in its own right.[38] It also introduces protections for children and adolescents within the digital gaming environment. It requires that the design, development, management and operation of digital gaming accessible to minors be guided by the principle of the best interests of the child, in accordance with existing legal frameworks. Developers are obliged to adopt appropriate and proportionate measures to mitigate any risks to the rights of children and adolescents that may stem from the conception or use of digital gaming.

Law No. 15.211, of 17 September 2025 (previous Bill No. 2628/2022),[39] proposes enhanced protective measures for children and adolescents in digital environments. Provisions include default implementation of strict data collection settings on digital platforms; mandatory provision of simple and effective parental control tools for child-directed services; and child-targeted advertising and the establishment of reporting mechanisms to enable the removal of content that violates children's rights. It also

[32] Brasil (1990a).
[33] The Brazilian rating system is currently under review.
[34] Brasil (2024b).
[35] Brasil (2018).
[36] Brasil (2014).
[37] Brasil (1990b).
[38] Brasil (2024a).
[39] Brasil (2025).

seeks to ban loot boxes[40] in digital games aimed at or accessed by children, in order to protect them from gambling-like practices. Other regulations aimed at protecting children in the virtual environment are currently under consideration.[41]

The UK's digital gaming ecosystem

Recent data indicate that video gaming is a widespread activity among UK youth. According to UK regulator Ofcom's 2025 report, 60% of children aged 3-17 engage in online gaming, an increase from 57% in 2022. Notably, 79% of 16- to 17-year-olds reported playing games online, with higher participation rates observed among boys (71%) than girls (58%). Over half of children play games online, increasing to three-quarters once they reach 10-12 years old. Gaming continues to hold a significant place in children's lives, with 9 in 10 (89%) children playing digital games on some sort of device: game consoles (56%), mobile phones (45%) and tablets (43%) are the most common.[42]

The regulation of digital gaming in the UK is shaped by a mix of statutory law, age classification systems, consumer protection policies and industry self-regulation. At the centre of the current framework is the Online Safety Act 2023,[43] which places a statutory duty of care on technology companies, including game platforms and developers, to protect users – particularly children – from harmful content and behaviours. It requires platforms to introduce robust measures such as age verification and content moderation, with Ofcom responsible for enforcement. However, the Act's scope is limited to platforms that enable user-generated content and public interaction, meaning that many video games without significant user-to-user functionalities fall outside its remit.

These principles complement the ICO's (Information Commissioner's Office) Age-Appropriate Design Code ('Children's Code'),[44] which governs data practices and children's privacy under the UK General Data Protection Regulation (GDPR) and the Data Protection Act 2018.[45] It mandates a Privacy by Design approach, requiring that the best interests of the child are a primary consideration in the design and development of any online service, including video games that process their personal data.

Content classification is a component of regulation. The Pan-European Game Information (PEGI)[46] is the system of industry self-regulation. The Games Rating Authority is responsible for classifying video games using the PEGI system. The BBFC (British Board of Film Classification) retains responsibility for classifying video games

[40] Loot boxes are gambling-like products inside video games that can be bought with real-world money to obtain random rewards (Xiao, 2025).
[41] Following the social mobilisation sparked by an influencer's complaint, 35 new bills were introduced while 75 others on the same subject had already been left stalled in the Chamber of Deputies (Núcleo de Informação e Coordenação do Ponto BR (2025).
[42] Ofcom (2025).
[43] DSIT (2023).
[44] ICO (2020).
[45] Data Protection Act 2018.
[46] PEGI (2025).

where the content is graphic and sexually explicit, if they are intended for UK release on physical formats, such as discs or cartridges. The BBFC may issue a special 'Restricted 18' rating, meaning that these games can only be supplied in licensed sex shops in the UK.[47]

For video games supplied on physical media (such as discs and cartridges), the PEGI ratings are legally enforceable under the Video Recordings Act 2010.[48] It is a criminal offence for a retailer to sell a game with one of these ratings to a person below the specified age. However, for games that are downloaded or accessed digitally, PEGI ratings remain advisory. But with the introduction of the Online Safety Act, a digital platform that allows a 15-year-old to download the PEGI 18-rated game is now subject to a continuous set of legal duties.

The UK's Competition and Markets Authority (CMA) launched a consumer law investigation over concerns that its online gaming subscription services might breach consumer protection law. The CMA examined whether auto-renewal practices were fair and transparent, including whether customers were clearly informed about roll-over contracts, regularly reminded before payments were taken and given simple ways to cancel or obtain refunds.[49]

The Committee of Advertising Practice (CAP) and the Broadcast Committee of Advertising Practice (BCAP) have issued guidance on in-game purchase advertising, which requires transparency over costs, clarity in the use of virtual currencies and safeguards against misleading or pressurising practices such as loot boxes or countdown timers.[50] The Advertising Standards Authority (ASA), the UK's independent regulator of advertising, applies CAP and BCAP to marketing for video games across all media.[51]

Loot boxes remain a point of concern. While not currently subject to direct statutory regulation, the UK games industry, through Ukie (UK Interactive Entertainment) has introduced its industry principles on paid loot boxes.[52] Despite this, games identified as non-compliant remained in stores for many months after the implementation period.[53] This led to criticism and prompted an assessment, which showed that most companies were not in compliance with the legislation.[54]

Some loot box mechanisms resemble gambling, particularly where monetary value and chance are combined. The UK Gambling Commission has determined that only loot boxes that provide prizes that can be sold to other players for real-world money (a process known as 'cashing out') constitute gambling under existing law, so a gambling

[47] PEGI (2025).
[48] Video Recordings Act 2010.
[49] CMA (2019).
[50] ASA (2021).
[51] ASA (2021).
[52] Ukie (2023).
[53] 5Rights Foundation (2025).
[54] Xiao & Lund (2025).

license is required. The Gambling Commission's 2017 position paper confirmed that betting on eSports falls under the Gambling Act 2005.[55]

In conclusion

Both Brazil and the UK recognise the importance of digital gaming in children's lives and have established regulatory frameworks that combine child protection, consumer rights, and industry oversight, although with different emphases. While Brazil highlights inclusivity and accessibility in a rapidly expanding mobile-first ecosystem, the UK's system reflects a more mature regulatory environment with statutory duties on platforms and consumer protection mechanisms. The findings will illustrate the opportunities and risks participants identified in the Brazilian and UK digital gaming ecosystems.

[55] Gambling Act 2005.

5. FINDINGS

The following sections outline the opportunities, risks and harms identified in the study. Some of these are specific to the digital games context, while others are also found across different digital environments, such as social media platforms. All opportunities and risks reported by the participants are included, regardless of their frequency or perceived severity. The findings that showed similarities across both countries are presented in the following sections, whereas the divergences are discussed in the comparative analysis between Brazil and the UK.

Opportunities

Digital gaming is often seen as a mere distraction or even harmful to children, meaning its potential benefits and opportunities are often underestimated.

Opportunities are activities promoting socialisation, entertainment, learning, health and civic participation.[56] Opportunities in the digital environment refer to children's ability to use digital media in ways that support their everyday lives; they differ from benefits, which are the positive and often measurable impacts already realised. These include, for instance, support for formal and informal learning, the strengthening of friendships and belonging, the development of cognitive and socioemotional competences, civic and political participation, physical and mental wellbeing, and resilience in the face of risks. However, these are intertwined with potential harms such as exclusion, exposure to harmful content or discriminatory practices.[57]

The participants identified a broad spectrum of opportunities that digital gaming environments may offer to children. These span several domains of child development and digital engagement, encompassing emotional, cognitive, social, educational, civic and health-related dimensions. The categories listed in Table 7 reflect the multidimensional nature of these experiences, highlighting the potential of digital gaming to support learning, creativity, emotional expression, social interaction and active citizenship among young users.

Most opportunities identified align with findings in the literature, although the participants differ on how these translate into benefits. We develop these further below.

[56] Livingstone & Stoilova (2021).
[57] Third (2016).

Table 7: Opportunities identified by participants in Brazil and the UK

Civic and political participation	
Citizenship	Ability to participate safely, responsibly and effectively in the digital environment
Civic participation	Engagement and reflection on social and political issues through digital gaming (use and development)
Youth protagonism	Space for expression and the creation of personal narratives that can be shared with others; giving young people a voice by building digital games; empowerment
Cognitive socioemotional competences	
Cognitive skills	Development of reasoning, problem-solving and strategy through challenging play
Critical skills	Learning to analyse and make decisions in diverse scenarios
Emotional skills	Exploration of emotions; emotional strengthening
Relaxation	Digital gaming as a form of distraction and emotional regulation
Resilience	Learning to win and lose; patience; overcoming challenges
Self-expression	Exploring personality and imagination in a safe space through diverse genres
Entertainment and wellbeing	
Creativity	Creating own worlds, stimulating creativity and experimentation
Imagination	Access to imaginary worlds and sharing interactive stories
Play/fun	Space for fun and stress relief through safe experimentation, similar to traditional play
Wellbeing	Depends on time and type of use
Inclusion	
Electronic sports (eSports)	School eSports promote inclusion and values, and offer scholarships
Experimentation	Safe space to test behaviours and explore identities, especially for LGBTQIA+ youth
Inclusion	Inclusive spaces for disabled and neurodivergent players, with better accessibility
Intergenerational relations	Strengthening family ties and creating shared experiences
Learning	
Employability and career	Developing transferable skills and promoting STEM and adaptive abilities
Game development	Creating digital games helps in exploring social issues and fosters creativity, e.g., in game jams
Learning	Developing social, technological and practical skills for real-life and citizenship; language learning
Technical skills	Development of literacy and transferable skills
Uses in education	Supporting school learning and engagement; fostering game creation and discussion; development of digital games
Health	
Health uses	Digital gaming as a complementary tool in treatment and rehabilitation, including hospital use; use in long-term hospitalisation
Socialisation	
Collaboration	Encouraging teamwork and shared values through collaborative gameplay
Empathy	Experiencing different perspectives through digital gaming, broadening empathy
Emotional support	Creating welcoming spaces and meaningful emotional connections
Family relationships	Connecting distant relatives and strengthening bonds
Gamer identity	Connecting with people who share interests; consumption and shared narratives strengthen the gamer identity
Intimacy	Creating bonds and emotional exchanges through digital gaming
Social skills	Collaboration and teamwork
Socialisation	Forming friendships and strengthening social ties and belonging through play

Source: Author

Civic and political participation

A smaller number of participants referred to civic opportunities, particularly in relation to political participation. Participant 9 argued that creating games was among the most powerful means of fostering children's agency. While commercial and indie games are significant, the opportunity to craft narratives and tell personal stories appears to have a greater impact on mobilisation. Transforming ideas into interactive experiences offers a deeper level of engagement and reflection. According to the participants, in creating games, children moved beyond being mere consumers, becoming the authors of their own stories and sharing their experiences, challenges and achievements with the gaming world. Game creation thus serves not only as a means of communication but also in leaving a legacy and raising awareness of diverse life perspectives.

> ***One story that touched me was that of a girl who was losing her sight and wanted to create a game to tell her own story. This shows how empowering games can be, allowing them to express their worldviews and realities. (participant 9)***

Participant 6 argued that indie games may foster meaningful discussions, as they can address a wide variety of issues in a more inclusive way. This finding aligns with earlier studies. For example, indie games can work with more inclusive themes that deal with social issues, such as decolonialism,[58] and themes related to the feminist movement,59 for example. Developing indie games can provide youth protagonism, offering a space for expression and creativity. More than simple entertainment, games become tools for telling stories, sharing experiences and even claiming identity.

Cognitive and socioemotional competences

The participants identified a wide range of social-emotional skills and competences that children may develop through gaming. Skills such as problem-solving, strategic thinking, organisation and visual attention, among others, were mentioned.

This observation is supported by existing research on gaming. These skills develop according to the different types of games played and the various forms of interaction involved. For example, digital gaming can stimulate cognitive abilities such as reasoning, problem-solving and strategic thinking, contributing to cognitive development;[60] strategy games support time management and organisational skills;[61] action video games can enhance visual attention skills for children to performance levels that are only reached at later age;[62] spatial thinking skills developed in digital gaming are often comparable to formal training; fantasy role-playing games may require strategic planning and problem-solving skills; and shooting games demand quick reactions and

[58] Maia & Torres Silva (2023).
[59] Harvey & Fisher (2013).
[60] Dale et al. (2020).
[61] Reynaldo et al. (2021).
[62] Dye & Bavelier (2010).

the capabilities to adapt strategies in real time. However, these abilities may be limited in transferability, as not all skills apply directly to real-world contexts.[63]

An opportunity highlighted by the participants was the potential for self-expression. This may take place within games or on associated platforms, contributing to identity development, particularly during adolescence. This finding echoes previous research. Platforms linked to digital gaming contribute to fostering self-expression and identity formation. They enable the creation and maintenance of both existing and new relationships through features such as text chat and video calls, thereby enhancing social proximity and interaction among users.[64] Games may contribute to processes of identity formation by enabling children to encounter diverse and culturally relevant representations.[65]

> ***Video games offer unsupervised play spaces where children can experiment with social behaviours – some problematic, but many pro-social. They also allow young people to explore different identities and participate in subcultures, in a similar way to previous generations, who gathered in physical spaces to connect and experiment with different personas, such as being goth or emo. (participant 23)***

Overall, digital gaming was associated by the participants with the development of a set of cognitive and emotional competences. Games were also described as spaces for the exploration and strengthening of emotions, offering opportunities for relaxation, distraction and emotional regulation. In addition, the participants noted that gaming may foster resilience, as children and young people learned to cope with winning and losing, practising patience and overcoming challenges.

Entertainment and wellbeing

The participants also recognised the potential of digital play to promote children's playfulness, enjoyment and overall wellbeing. This observation parallels earlier research, which states that play is particularly valuable as it provides one of the few contexts in which children may make decisions and exercise control – even in the presence of adults – thereby supporting autonomy and agency when appropriately designed.[66]

One of the participants strongly emphasised that games were one of the few spaces of play not supervised by adults, which is why they were so important for children:

[63] Markey et al. (2020).
[64] Nunes & Fortim (2025).
[65] Livingstone & Pothong (2021).
[66] UNICEF (2024).

> ***Different children, of course, take advantage of opportunities in different ways, according to their identities, their social contexts and their geographical locations. But for me, the most obvious answer is that it provides opportunities to play. And by that, I mean play for play's sake, something that we know from research is extremely important for children's physical, social and cognitive development, as well as contributing to their wellbeing. (participant 18)***

A core aspect of digital gaming is its entertainment value, which is associated with wellbeing.[67] Wellbeing, however, depends on factors such as play duration, game type and social interaction, as the nature of children's online activities is more significant for their wellbeing than the amount of time spent online.[68] A UNICEF study identified eight aspects of wellbeing supported by digital play: competence (problem-solving), emotional regulation (stress relief), self-actualisation (purpose), empowerment (autonomy), social connection (belonging), creativity (exploration), safety (protection) and inclusion (access for all).[69]

Children's creativity was also valued by the participants, especially in open-world games, where it is possible to create. This observation parallels earlier research. Open-ended designs play an important role in fostering children's sense of autonomy, as they provide the freedom to modify rules and features or to create content such as skins and mods.[70] For instance, a previous study indicates that fantasy role-playing video games foster creativity.[71]

Another point raised by the participants concerns the potential of digital gaming to foster children's autonomy and emotional expression. This reflects patterns identified in previous studies. Digital gaming can promote agency, emotional expression, social bonds, creativity and personal identity. However, these outcomes depend on specific design features. For example, autonomy may be supported by allowing players to make meaningful choices and develop their own strategies, while creativity may be encouraged through problem-solving and opportunities to create characters or narratives.[72] Digital games may offer strong emotional engagement, providing children with spaces to explore and experience a spectrum of feelings through play.

Participant 18 stressed the importance of having some unsupervised space where children may experiment with different behaviours without facing immediate social sanctions. Such environments enable the exploration of both problematic behaviours – balanced by later guidance and discussions about risks, benefits and positive social interactions, as well as exposure to various subcultures.

Participant 20 compared this to outdoor play in the past, noting that such play has become increasingly regulated and monitored, limiting children's spontaneity and

[67] UNICEF (2024).
[68] UNICEF (2024).
[69] UNICEF (2024).
[70] 5Rights Foundation (2024).
[71] Martín et al. (2025).
[72] UNICEF (2024).

access to public spaces. In contrast, games can offer a more open and safe environment for exploration, self-expression and engagement, with clear objectives and boundaries - especially when children are excluded from public spaces:

> ***I think video games offer young people a temporary reprieve from much greater societal issues. For instance, they provide an escape from the exclusion children face in public spaces, such as cities, towns, and commercialised areas like shopping malls, which have become increasingly hostile to them. In the UK, the defunding of youth centres and community spaces has further exacerbated this issue. (participant 17)***

This immersion in gaming is seen as an alternative in a world of shifting certainties and boundaries, especially when compared to more fragmented social environments like social media. It can provide children with structured yet free spaces for development and self-expression.

Inclusion

The participants noted that digital gaming could support social interaction for disabled and neurodivergent children. Although there is always a risk of exclusion, according to participant 3:

> ***Disabled people often end up isolating themselves because of a mix of high costs, poor accessibility and ongoing prejudice. Taking an adapted taxi, for example, can be really expensive, while others can rely on cheaper options. Many public spaces – cinemas, shops, concerts – still aren't properly accessible, so people just avoid them and miss out. And although prejudice has lessened, it still exists, making some prefer to stay home gaming rather than risk uncomfortable situations. That's why video games can be so valuable – they offer a safe, inclusive space where people can connect and socialise more freely. (participant 3)***

However, participant 3 stated that identity exposure might lead to discrimination, and limited leisure options might increase vulnerability to a gaming disorder. This observation is supported by existing research on gamers with disabilities.[73]

The participants also mentioned the importance of games for LGBTQIA+ communities, noting at the same time that getting in touch with others could be seen as an opportunity but also as a risk, as some gaming communities may also reinforce exclusion, echoing previous research on digital wellbeing.[74]

Learning

The participants pointed out that there might be opportunities both in formal and structured use, such as with educational games, and in the development of skills when

[73] Kuo et al. (2024).
[74] Zsila et al. (2024).

playing entertainment games. Their accounts correspond with previous findings in the field. Certain skills (cognitive, emotional, empathetic) can develop organically through play.[75] Incorporating digital games in teaching may improve engagement in education.[76] Examples such as Minecraft Education support learning through playful applications.[77]

However, the participants stressed that structured learning via educational games or guided programs only worked with adult mediation, which aligns with the literature.[78] Digital gaming has introduced new educational methods,[79] with some studies confirming their positive role in learning,[80] while others show that the use of games has little effect on learning.[81]

The participants noted that digital games could be integrated into education in a variety of ways. The three main approaches include using commercial games in teaching, using educational games and creating games. These approaches have also been discussed in previous research. Commercial games can help develop socioemotional and cognitive skills; educational games can make learning more interactive and engaging.[82] Many agreed that building skills like resilience and critical thinking was important to maximising benefits. However, using games as a standalone resource does not generate educational outcomes on its own. One participant observed that:

> ***There are many opportunities when offering digital gaming to children, but it is important to remember that they should be used as learning tools, not as magic solutions. It's not enough to put them in the classroom and hope that everything works out; they need to be integrated into the lesson. (participant 7)***

While some participants endorsed digital gaming in educational settings, others were sceptical. Participant 15 raised doubts about the existence of robust evidence demonstrating that digital games genuinely produce benefits in educational settings.

Health

Only a few participants mentioned health-related benefits. One participant emphasised the importance of digital games during children's hospitalisation, where access to other leisure opportunities was limited but games enabled them to remain connected with friends, while another participant highlighted the potential use of games as tools in child psychotherapy. This is consistent with studies that indicate that digital gaming may serve as a direct tool for emotional intervention and can help challenge social stereotypes surrounding mental illness.[83]

[75] Sauce et al. (2022); Scolari & Contreras-Espinosa (2019).
[76] Martinez et al. (2022); Zeng et al. (2020).
[77] Holik et al. (2024).
[78] Bacalja et al. (2024); Martinez et al. (2022).
[79] Ullah et al. (2022).
[80] Wang et al. (2022).
[81] Westera (2015).
[82] Martinez et al. (2022); Zeng et al. (2020).
[83] Bocci et al. (2023); Kowert et al. (2021).

Socialisation

Opportunities for socialisation remain an essential dimension of free play. Defined by children's agency, free play requires the possibility of social and peer interaction, as playing is often a way for children to stay connected.[84]

The participants pointed out that socialisation among children was an important benefit of games, and was the opportunity most cited by experts from both countries. This aligns with previous research. Multi-user gaming provides an opportunity for social interaction, making it possible to develop new friendships, and provides an opportunity to collaborate with others.[85] Games can also facilitate social connectedness when communication tools are embedded in gameplay. Pro-social and interpersonal games can be related to a greater sense of social satisfaction.[86] As a form of social networking, online games have become part of everyday life and have had a positive impact on entertainment,[87] helping players make new friendships[88] and connections, as well as develop a shared identity.

One of the participants pointed out that there was continuity between the interactions between adolescents at school and the interactions in games. For adolescents, social gaming offers two experiences that stand out in comparison to other forms of social media: customisability and the opportunity for shared activities. Through animation and graphics, these platforms allow players to personalise their digital profiles – such as avatars, character appearance and usernames – while also engaging in creative content construction and collective interaction.[89]

However, the participants varied in their views on the social value of digital gaming: some praised its role in fostering strong bonds (even within families), while others expressed concern that issues such as bullying and hate speech could undermine these benefits for vulnerable youth. One participant wondered:

> ***Is this gaming environment really the best form of socialisation for children? Is the benefit of the socialisation they're getting there greater than the burden of the bullying, harassment or hate speech they may be receiving? That's the question I ask myself. It's not so much about whether games offer opportunities for children, but whether these opportunities are greater than the problems of overusing screens or the content available in games. (participant 15)***

One of the participants also considered that the games were very different from each other, with some being better and others worse in terms of socialisation opportunities. They also mentioned that the use of communication platforms helped in forming these bonds. This aligns with previous research, which states that some opportunities emerge

[84] Livingstone & Pothong (2021).
[85] Gottfried & Sidoti (2024).
[86] Shoshani et al. (2021).
[87] Gao et al. (2022); Jensen & Bengtsson (2024).
[88] Gottfried & Sidoti (2024).
[89] Maheux et al. (2024).

not from digital games themselves, but from adjacent platforms. These services support social and behavioural interactions associated with gameplay. They foster community building, social engagement and interpersonal connection. Personal connections made through these services can also offer emotional support and raise awareness of issues such as mental health and wellbeing.[90]

Content, contact, conduct, contract and transversal opportunities

Table 8 presents a synthesis of opportunities identified through academic literature and participant analysis. Organised across four dimensions – content, contact, conduct, contract[91] – it illustrates how children engage with games as recipients, participants and actors, and the positive outcomes that may emerge from these interactions.

Table 8: Opportunities – literature review and the participants' considerations

Content (child as recipient)	Contact (child as participant)	Conduct (child as actor)	Contract (benefits by contracts)
Learning	Emotional support	Creativity	Monetisation of content created
Technical skills	Collaboration	Game development	Pro-players
Play/fun	Empathy	Experimentation	
Electronic sports	Social skills	Youth protagonism	
Employability and career	Intimacy	Self-expression	
Cognitive skills	Family relationships	Gamer identity	
Critical skills	Civic participation	Imagination/ user-generated content creation	
Uses in education	Citizenship	Wellbeing	
Health uses	Intergenerational relations	Emotional skills	
	Socialisation	Resilience	
	Inclusion	Relaxation	
Transversal: Wellbeing, fun, play, wellbeing, inclusion			

Opportunities related to content refer to the beneficial potential that a game's material can offer children. This highlights how digital gaming and online participation can foster learning, the acquisition of technical and cognitive skills and critical thinking. Children benefit when games are integrated into education, health and play, providing both fun and meaningful learning experiences.

Contact opportunities emerge through participation in communication. As social networking spaces, online games have become part of children's everyday lives, contributing positively to leisure and interaction. Online gaming can support

[90] de Wit et al. (2020).
[91] Staksrud et al. (2009).

collaboration, empathy and intimacy, strengthening peer and family connections. It can also foster civic participation and citizenship, enabling children to feel part of communities. These benefits are maximised when socialisation occurs in safe, inclusive and supportive environments. Although bullying and toxic behaviour pose risks, socialisation remains a central aspect of free play.

Conduct opportunities arise when children's active behaviour generates benefits, either by strengthening contact and content opportunities or by producing outcomes in their own right. Children develop creativity, resilience and identity by experimenting, expressing themselves and taking on roles in user-generated content or game development. Defined by child agency, free play requires the possibility of social and peer interaction, as children play in order to stay connected.

Contract opportunities are not limited to the absence of risks in contractual arrangements but also concern features that enable children to make informed choices in their relationships with digital service providers and other players. Contract opportunities may foster professional pathways, including careers in game development, streaming and eSports. Contractual opportunities emerge in monetisation, employability and the growth of eSports, where children may become pro-players or pursue careers in gaming.

Transversal opportunities – encompassing wellbeing, play, enjoyment and inclusion – extend across all four categories, underscoring that the positive outcomes of digital gaming derive not merely from access and participation, but also from establishing environments that actively promote child development.

However, these opportunities only become benefits when children are able to mobilise them effectively in their everyday lives, which depends on factors such as digital literacy, access, family support and cultural context.[92] Despite growing recognition of the importance of benefits, the recognition of risks in general by the participants was greater than the recognition of opportunities.

Digital gaming may offer opportunities for children across social, cognitive, educational, civic and health domains. The participants identified benefits that include strengthened peer and family relationships, collaboration, empathy and a sense of belonging; the development of problem-solving, strategic thinking and socioemotional competences; and avenues for creative self-expression, identity exploration and youth protagonism – particularly through user-generated content and game design. When purposefully integrated, games may support formal and informal learning, employability pathways (including eSports and creative industries) and targeted health uses (e.g., rehabilitation or therapeutic settings).

Comparing opportunities: Brazil and the UK

Participants from Brazil and the UK share several similarities and differences when it comes to opportunities provided by digital games. Participants from both countries

[92] Third (2016).

recognised the value of games in developing socioemotional, cognitive and technical skills. In both contexts, games were seen as capable of fostering creativity, collaboration and identity exploration, especially for LGBTQIA+ communities. Inclusion of disabled and neurodivergent youth was also cited.

However, their approaches reflect the differing socioeconomic and regulatory landscapes. In Brazil, opportunities are often limited by barriers such as unequal access to the internet, devices and educational resources. Game creation is seen as a form of youth empowerment, particularly in vulnerable communities, where games also serve as instruments for civic engagement and social critique. Social class and the type of internet access available to children and teenagers are perceived as significant factors in using games for learning, with some families and children placing greater value on it than others. One participant suggested that children from disadvantaged areas had fewer opportunities to study and therefore derived greater benefit from the educational opportunities games provided.

> ***Children from the periphery tend to use games for quick entertainment - but some use technology as a learning tool. At a talk in the periphery, several mums told me that their children learned English using apps and other games. In private schools, on the other hand, the conversations are more related to the fear that families have that their children will become addicted to technology, won't leave the house or won't eat properly. (participant 10)***

Other participants highlighted that indie games often presented more creative and positive Brazilian cultural representations. They suggested that such games could foster diversity and empathy, thereby contributing to a more inclusive and enriching experience. In this context, both the creation and experience of playing games with political themes were seen as forms of civic engagement. Developing games with such themes enables creators to share their worldviews and propose societal reflections. Simultaneously, playing games that explore social, historical or political issues offers players a chance to engage with and debate these topics.

> ***One of our colleagues discusses politics and games in a project she runs on the outskirts of town. Young people are starting to see games in a different light. (participant 8)***

The participants highlighted that games in Brazil could serve as a means of social advancement for vulnerable children in several ways: selling in-game items, earning money by improving other players' characters, pursuing careers as eSports athletes or streamers, and even developing games themselves. One participant viewed these activities as an opportunity, yet they also prompted reflections on issues related to child labour and the increasing precariousness of work.

Skills acquired through gaming – such as problem-solving, strategic thinking and collaboration – are transferable to various professions, particularly in technology, thus

demonstrating that games contribute not only to entertainment but also to professional development and labour market entry.

In the UK, the participants suggested that games should be viewed as platforms capable of fostering engagement and learning. They advocated for the need for regulation, education and awareness to ensure that the benefits and risks of gaming for children were understood and addressed.

> ***In global research, games are often seen as an important activity in what we call the ladder of opportunity. On the lower rungs of the ladder are accessible activities such as games, which more children participate in compared to higher-level activities such as civic engagement or content creation. This accessibility highlights the potential of games as an entry point for digital learning and engagement. However, in countries with expensive internet or inadequate devices, games remain out of reach for many children. (participant 26)***

Participant 30 argued that it was not enough to consider opportunities alone; discussions should focus on the values and principles that guide the design and regulation of games for children. The participant emphasised that instead of merely categorising risks and benefits, there should be a focus on creating equitable, transparent and ethical systems. Participant 30 also raised questions about how to ensure these technologies genuinely served children's best interests while mitigating potential harms.

Despite these differences, both nations face the common challenge of balancing the educational, social and emotional opportunities of games with the risks of addiction, overconsumption and mental health concerns among vulnerable populations.

While gaming offers a variety of learning and social opportunities, the participants also identified important risks that need to be addressed.

Risks and harms

Children's experiences with the digital gaming ecosystem can vary greatly, as not all are exposed to the same opportunities and risks. Their experiences can vary according to many different variables.

The risks depend heavily on the specific environments and games in which children engage. This research addresses the gaming ecosystem as a whole, but a more granular understanding of different gaming environments is necessary to fully capture these variations. For example, mobile gaming environments differ significantly from console-based environments, resulting in distinct risk profiles. Different interfaces and marketing structures can also introduce risks, particularly through mechanisms that shape how children interact with games and with each other. Nevertheless, many children participate in a wide variety of games across the game environment, adding yet another layer of complexity to understanding their risk exposure.

This research has the limitation of not having identified the prevalence of exposure to risk. Some risks may occur frequently, while others may rarely be encountered. In the findings, all the risks highlighted by the participants or presented in the literature are listed, regardless of their frequency or severity. There is a relation between the prevalence of a risk factor and the degree of harm as subjectively perceived by the child.[93] Some risks are encountered more frequently (such as toxic behaviour), while others, maybe less frequent, are more severe (such as grooming and sexual exploitation).

Some risks may belong to several categories, depending on the child's position in the event. For example, toxic behaviour and cyberbullying may represent a risk of content (when the child is exposed to or engaged with such content), a risk of contact (being a victim of an adult) and a risk of conduct (being an aggressor, victim or witnessing aggression between peers).

Individual identities – such as being disabled or gender identity – may make contact risks higher, for example. The spaces where play occurs, whether in virtual worlds or in physical settings like bedrooms or public areas, further influence the nature of potential risks.

Although companies offer protective tools – age ratings, parental controls, AI and human moderation – surveys indicate that these are ineffective in fully mitigating the risks. Most parents do not use or are unaware of such tools, and many children report exposure to threats, insults and criminal behaviour in game chats.[94]

Three gaming risks dominate media discussions: violent content, addiction and loot boxes. Since the 1990s, digital gaming has been criticised for allegedly fostering aggression, desensitisation and a lack of empathy, especially in relation to school violence. Markey et al.[95] attribute these reactions to moral panic, driven by sensationalist media and weak evidence. Addiction is also a concern, especially after gaming disorder was officially classified as a mental health disorder in the 11th revision of the *International Classification of Diseases* (ICD-11) by the World Health Organisation (WHO).[96]

The inclusion of loot boxes in games has raised concerns about gambling mechanics in digital gaming, particularly prize randomisation, which may lead to addiction-like gambling.[97] Consequently, digital gaming has long had a negative public image.[98]

The CO:RE framework[99] defines risks as situations that could potentially harm children. A risk indicates a possible threat but doesn't always result in harm – actual negative outcomes; whether harm occurs or not depends on many factors.

[93] Livingstone et al. (2011).
[94] Curcio (2023).
[95] Markey et al. (2017).
[96] WHO, 2019
[97] King & Delfabbro (2020); Xiao (2021).
[98] Fortim et al. (2020).
[99] Livingstone & Stoilova (2021).

The CO:RE system categorises risks as follows:

- **Content risks**: Exposure to inappropriate material, such as violent or sexually explicit content.
- **Contact risks**: Harmful interactions, including grooming or exploitation by adults.
- **Conduct risks**: Harmful behaviours by children themselves, such as bullying or harassment, either as victims or perpetrators.
- **Contract risks**: Economic exploitation or the signing of digital agreements that children may not fully understand.

These risks are further grouped into thematic domains:

- **Aggression**: Exposure to violent content or behaviours.
- **Sexuality**: Encounters with sexual content or grooming, intentional or accidental.
- **Values**: Exposure to harmful stereotypes or ideologies that may affect beliefs and identity formation.

Transversal risks – such as excessive screen use or gaming addiction – can affect physical and mental wellbeing more broadly.

Transversal risks stand out as concerns, but the participants also raised other types of risk according to their area of expertise.

Content risks

Content in digital gaming can take multiple forms. It may include player choices, such as avatar customisation; verbal or written communication enabled by multiplayer functions; in-game actions; narrative elements; and visual components such as characters, imagery and environments.[100]

Table 9 presents the main content-related risks in digital gaming as perceived by participants from Brazil and the UK. These span a diverse set of concerns, from the presence of extreme violence and horror themes to the failure of age-appropriate classification and the sexualisation of characters. The participants also highlighted issues such as hate speech, limited diversity in character representation and the normalisation of inappropriate behaviour. Additional concerns included exposure to extremist ideologies, access by children to adult-rated games and problematic user-generated content or advertising.

[100] Saltman & Karhili (2024).

Table 9: Main content risks in the digital gaming ecosystem, as seen by participants in Brazil and the UK

Risk	Description
Extreme violence	Digital games with extreme violence, torture or murder
Terror and horror	Digital games with fear and psychological horror content
Indicative classification failures	Misapplied age rating; includes gambling or predatory monetisation
Sexual content	Digital games with pornographic content; digital games with sexual content; pornographic VR with gamification; streams with sexualised content; access to pornographic advertisements on gaming sites
Hate speech	Being exposed to misogynistic, racist, xenophobic or homophobic speech; can occur in digital games or digital game-adjacent platforms
Representation of the characters	Lack of diversity; reinforcing stereotypes; limited child representation
Normalisation of inappropriate behaviour	Content portraying crimes and violence as acceptable; piracy and cheating
Extremist content	Digital games promoting extremist ideologies or used for recruitment; recruitment at digital gaming adjacent platforms
Glorification of war	War games without a critical discussion of the consequences
Easy access to 18+ games	Children's access to adult games due to weak age checks; lack of age verification
Mods and customisations	Mods with violent or radical content
Advertising	Access to age-inappropriate advertising, such as gambling and alcohol
User-generated content	Inappropriate content or adult content mods managed by minors

Source: Author

The issue of inappropriate content across age groups was raised. The participants agreed that some digital games exposed children to problematic narratives and behaviours, such as violence and disregard for social norms. These can stem from in-game content, user-generated content or influencer conduct. Many titles aimed at adults include explicit violence, drugs and unethical behaviour. Some participants said that when accessed by younger children, such content may normalise violence and influence moral judgment. Grand Theft Auto (GTA), for example, enables virtual illegal activities, which may confuse younger children about real-world consequences.

> ***Where I work, one child wanted to hit another with a chair, imitating the candidate he had seen the day before [one politician actually hit another with a chair in a debate]. If he wanted to imitate him, why not the game? I wonder how they see the role models in these games. GTA I think is problematic for younger children. (participant 8)***

The participants' positions are in line with those of other authors in the literature. For younger children, the effects of violent content are greater; for older adolescents, the

concern revolves around interactions with other people. In the literature, the relationship between violent digital games and children's behaviour remains controversial. Critics claim that such digital gaming desensitises youth and fosters aggression.[101] Phenomena such as rage quit – strong emotional responses to in-game failure – fuel this debate.[102]

We do not know if violent games cause real-world aggression or if other factors are at play. The literature research findings are mixed: while some link violent games to higher youth aggression,[103] others indicate that children look to play video games to reduce stress, satisfy controlling needs, catharsis, to have fun and to calm down.[104]

Meta-analyses confirm that violent games affect cognition and aggression, although the effects are small and short-term compared to other risks, such as social context or mental health issues.[105] Violence is multifactorial and cannot be attributed to a single cause, as it involves complex interactions.[106]

There is insufficient evidence that violent digital gaming directly causes mass attacks. While some studies suggest they may influence aggressive thoughts, they are not determinative of extreme violence.[107] Although a direct causal link between the behaviour of playing games and violent attacks remains unproven, extremist recruitment via game chats and adjacent platforms presents a notable contact risk.[108]

However, verbal aggression and toxic behaviour are common in digital gaming chats and adjacent platforms, where hate speech and hostile behaviour are normalised, especially in online communities.[109] Children may be exposed to this content, even if they are neither perpetrators nor victims.

One participant noted that many digital games target adult audiences, making it unrealistic to adapt all content for children. He suggested that bigger companies should assume greater responsibility by implementing stronger age verification. Other participants believed that third-party companies should do this to be compliant with privacy regulations. In this regard, the discussion goes beyond determining whether games are designed for children to consider whether they are, in fact, likely to be used by them.

However, participant 10 noted that it was difficult for small developers to follow safety rules. The digital gaming industry is volatile, and it is often not possible to invest significant effort and money into a game when it is unclear whether it will be commercially successful. This is in line with research indicating that some safety norms are unfeasible for small businesses and should be managed by distributors and major

[101] Wei et al. (2022).
[102] Kahila et al. (2022).
[103] Olejarnik & Romano (2021); Wei et al. (2022).
[104] Liu & Agar (2023); Vilasís-Pamos & Pires (2022).
[105] Burkhardt & Lenhard (2022).
[106] Mathur (2019).
[107] Markey et al. (2020).
[108] Kou & Gui (2023).
[109] McInroy & Mishna (2017).

platforms. Smaller developers face challenges in meeting security and accessibility standards due to limited resources.[110] One participant who represents a developers' association pondered that game engines could offer more supportive tools to help ensure safer digital games for small developers.

Some participants referred specifically to game streaming, where there was a risk of encountering hateful content. This finding corresponds with the evidence presented in prior studies.[111] According to in-time audience trackers, more than 70% of the Twitch audience is attracted to game streams.[112] In 2021, a viewer survey showed that 28% of the Twitch audience were between the ages of 10 and 20.[113] While male streamers face criticism linked to gaming performance, harassment frequently targets women and minorities with misogynistic, racist and anti-LGBTQIA+ abuse, especially against streamers from these communities.[114] Among the common behaviours on Twitch is the use of raids, a feature originally designed for streamers to redirect their viewers to other livestreams when they end their broadcasts. However, this tool can also be used informally, when groups of viewers organise themselves on other platforms to invade certain game streaming and to harass others.[115]

Another concern raised by the participants was the presence of sexual and sexually violent content in games. Such content may range from implicit to explicit forms, for instance, hiring prostitutes in Grand Theft Auto or players requesting sexual simulations in Roblox. This observation builds on previous studies. Some titles are explicitly pornographic, with content focused primarily on sexual activity. While certain titles depict consensual sexual interactions, others portray sexual abuse or coercion, and in some cases even simulate rape or sexual assault.[116] Games with user-generated content, like Roblox, were noted to allow the creation of rooms containing sexual material.[117] However, one of the participants, a specialist in sexual violence, reported that specific codes were used to denote sexual activities. In Roblox (Brazil), for instance, the use of a hashtag (#) during interactions may indicate a sexual activity between characters.

The participants also warned about sexually explicit VR content, posing risks when children use the same devices as adults for gaming. Participant 29 cautioned that gamified pornographic content could be easily mistaken for regular games, thereby potentially exposing children to harmful experiences.

This contributes to a growing body of literature on sexual activities in games. Certain genres in games depicting coercive or non-consensual acts may raise concerns about potential negative impacts. However, empirical evidence on the effects of sexually explicit games remains limited. Some studies indicate that exposure to pornography

[110] Pothong & Livingstone (2025).
[111] Franqueira et al. (2022).
[112] TwitchTracker (accessed in 2025).
[113] Chiovato (2022).
[114] Carradore & Pirola (2024).
[115] Zsila et al. (2024).
[116] Noël et al. (2021).
[117] Chawki (2025).

and sexual material can be a risk factor for sexual aggression, with research linking such games to increased acceptance of sexual violence, potentially shaping decision-making and behavioural imitation. One explanation is that online pornography may contribute to the construction of sexual scripts that normalise violence.[118] However, empirical evidence on the effects of sexually explicit games remains limited, with other studies suggesting no relation between sexualised in-game content impacting player behaviour (hostility toward women) or body image satisfaction and wellbeing.[119] Still, findings are inconclusive, and more studies are needed to clarify its effects.[120]

Concerns regarding exposure to sexual content extend beyond the games themselves. The participants highlighted the existence of sexualised presentations and live streams produced by content creators, which may be unsuitable for younger audiences. This finding reflects patterns identified in previous studies, which state that on digital gaming-adjacent platforms, there are also transmissions of game lives made in a sexualised way;[121] this content may appear during a game stream, for example[122]. Although most digital gaming-adjacent platforms prohibit nudity, pornography or sexually explicit content, this type of material is easily accessible and, on many services, is actively targeted at children through content recommendation systems.[123] On Twitch, exposure to sexual content during game streaming is a concern, as it appears through images, videos, broadcasts, voice and chat.[124]

The participants expressed concerns about how age ratings were applied in practice. Participant 7 remarked that, although these systems existed, many families struggled to use them effectively. A UK participant noted frequent mistakes relating to in-store classifications that allowed children access to inappropriate content.

Although age-rating systems play an important role in protecting children from exposure to harmful or inappropriate content, this may not be sufficient. Regulatory bodies and classification boards often focus on themes such as sexual content and violence, as these are considered especially impactful on younger viewers. Digital games are subject to age-rating systems – for example, Brazil's Indicative Classification (ClassInd), PEGI in Europe, the Entertainment Software Rating Board (ESRB) in the US and the International Age Rating Coalition (IARC) globally. Within the kaleidoscope model, this corresponds to the interaction between the people's meso level and the product's macro level. However, these ratings are advisory rather than prohibitive, intended to help ensure age-appropriate access. Parents and caregivers can use them to make informed choices and support safer gaming practices, but just a few use them.

[118] Guggisberg (2020).
[119] Ferguson et al. (2022).
[120] Guggisberg (2020).
[121] In some live game streams on Twitch certain influencers combine gameplay content with sensual or sexual elements, including revealing clothing, dances, suggestive poses, flirtatious or double-entendre language, camera framing that emphasises certain body parts, and the creation of sexualised on-screen persona, during breaks in play.
[122] Ruberg (2021).
[123] Kidron et al. (2025).
[124] Ruberg (2021).

Participant 7 pointed out that in poorer communities in Brazil, many parents were unaware of the existence of digital gaming ratings. This demonstrates the need to adapt classification and education policies to different socioeconomic contexts.

Age-rating systems are also linked to the issue of parental controls, as they indicate which types of content are or are not suitable for children. The participants reported that few parents made effective use of these tools. This is in line with earlier research that affirms that the parental controls approach does not seem to be as effective as desired.[125]

This finding contributes to thinking about the limitations of current age-rating systems in the games ecosystem. Most ratings focus narrowly on the content of individual titles. According to the participants, since children don't just access games through official marketplaces but also via standalone apps, and are also on streaming platforms and community spaces, safeguarding cannot rely on content ratings alone.

Rethinking age-rating systems to reflect the full spectrum of risks present in the digital gaming environment is needed. A better understanding of the spaces (game environment) where children are navigating is needed, as there are many different gateways to content.

The participants also referred to the risks found in advertisements, especially in mobile games. This corresponds with previous findings on adverts and games. Adverts in mobile games pose risks regarding both content and compliance. A study of 25,000 Android apps found 1,289 policy violations, including inappropriate ads with sexual content, violence and gambling. Many of these apps targeted children. Even Google-certified SDKs, such as AdMob, were found distributing such content.[126]

Digital gaming adjacent platforms can also host inappropriate advertising and publicity, such as the promotion of electronic cigarettes on Twitch, particularly by gaming influencers[127]. The participants also expressed concern about inappropriate behaviour by influencers and content creators who target children. Participants 2 and 27 highlighted the strong influence of streamers and eSports athletes on children's gaming choices, a concern that is in line with the literature.[128] The participants argued that these figures should promote safety and act responsibly, given their idol status. However, many endorsed toxic behaviour, violent competitiveness and overconsumption, which may negatively affect young audiences. Many act as negative behavioural models, both within games and in other online spaces. These influencers often disregard their followers' ages when promoting several kinds of products (like vapes), [129] microtransactions in gaming or gambling.

Another concern raised was the representation of characters, particularly the use of stereotypes related to gender and race. This aligns with research demonstrating the

[125] Livingstone & Helsper (2008).
[126] Zhao et al. (2023).
[127] Vassey et al. (2023)
[128] Swerdfager et al. (2024).
[129] Vassey (2023)

persistence of such stereotypes in game characters.[130] One participant also highlighted the limited representation of children themselves:

> ***I conducted research about child characters. The vast majority of video games, even those with complex worlds bustling with human activity, have no children in them. Other findings included the rarity of female child characters being playable; they often play the role of the damsel in distress, just aged down. Black and Brown children were almost non-existent, and when they did appear, they were often subjected to horrific suffering and torment. Another pattern was the use of child characters' deaths as a plot. (participant 23)***

A concern from one of the participants was the integration of generative artificial intelligence (genAI) into game characters. GenAI can generate content and interactions that are inappropriate for children.[131]

Overall, the participants expressed recurring concerns about extreme violence, the sexualisation of characters and narratives, hate speech and the normalisation of inappropriate behaviour, such as crime, piracy or cheating. They also highlighted the persistence of gender and racial stereotypes and the limited representation of children in games, which contributes to reinforcing symbolic inequalities. In addition, they observed that streaming platforms and influencers amplify the spread of inappropriate content and promote excessive consumption practices. Other issues raised included inappropriate advertising, user-generated content and modifications (mods) that introduce violent, sexualised or extremist material into otherwise neutral gaming environments. Although there are risks, the content of some games can also offer opportunities, such as access to games with educational and other narratives.

Contact risks

Some activities can provide both opportunities and risks for children. For example, online communication between gamers, despite promoting positive contact, can also present risks of contact as well as risks of conduct and content. Children may interact with other players, who may be other young people, but also malicious adults.

Table 10 presents the main contact-related risks in digital gaming, as identified by participants in Brazil and the UK. These risks refer to the types of interactions players may experience within gaming environments, particularly those that expose children to harmful or exploitative social contact. Among the most concerning are hostile and toxic interactions, radicalisation efforts, sexual grooming and bullying.

[130] Polasek (2014).
[131] Fortim & Zandavalli (2025).

Table 10: Main contact risks in the digital gaming ecosystem, as seen by participants in Brazil and the UK

Risk	Description
Toxicity	Being the target of an adult in hostile environments on digital gaming and digital gaming adjacent platforms, with verbal aggression and disrespect, potentially including hate speech
Radicalisation	Being the target of an adult in extremist grooming in games and on digital gaming adjacent platforms
Grooming	Being the target of sexual grooming, sextortion in games and in digital gaming adjacent platforms
Bullying and cyberbullying	Being the target of adult ridicule based on game performance, experience level or lack of access to items or digital gaming
Server self-management	Poor moderation of interactions that allow adults to access children
Normalisation of inappropriate behaviour	Normalisation of offensive and intolerant behaviour within gaming communities
Sexual harassment	Being the target of an adult in interactions marked by misogyny, sexual harassment and abuse

Source: Author

The participants were concerned about intense verbal aggression online and the children being victims. Certain online game genres – particularly competitive first-person shooters and MOBAs (multiplayer online battle arenas), foster toxic and aggressive environments. These involve criticism, harassment, teasing, cheating, hate speech and discrimination.[132]

According to the participants, being the target of aggressive behaviour was identified as a frequent risk in certain types of games, especially for vulnerable children. This aligns with previous research, which affirms that aggressive behaviours in gaming often target vulnerable groups, although young males may also be affected.[133] Such hostility can spoil the experience, cause distress or lead victims to quit.[134] Vulnerable groups like women and LGBTQIA+ individuals may be constantly harassed and suffer disproportionate harm.[135]

Such hostility stems from perceptions of low skill, frustration over hacked accounts and lost progress. As participant 25 stated:

> ***Online spaces can often be dehumanising, with interactions that lack the empathy fostered by face-to-face communication. Exposure to toxic behaviour can lead children to normalise harmful patterns, which can affect their social and emotional development.***

[132] Gorwa & Thakur (2024).
[133] Kowert & Cook (2022).
[134] McInroy & Mishna (2017).
[135] Fortim (2020); Zsila et al. (2022).

These behaviours are frequent in chats of certain game types and also occur on digital gaming-adjacent platforms.[136]

Digital gaming has become conducive to cyberbullying.[137] According to the participants, games could also be used for cyberbullying that occurs in other spaces, such as at school. Participant 7 reported that one of the children they taught was in great distress because her game account had been stolen by a classmate, with the aim of bullying another girl in the same class. This is in line with earlier research.

Participant 6, in particular, raised concerns about games and the gaming environment that can facilitate ideological manipulation, radicalisation and extremist recruitment. This is supported by the literature,[138] as these platforms may be exploited by extremist groups targeting vulnerable youth to spread violent ideologies. Participant 6 highlighted that although it was a greater risk in adolescence, young children were already exposed to this type of risk. Although only a minority of gamers engage in such activities, this risk is more severe.

Gamer culture can sometimes normalise verbal aggression and intolerance,[139] extremist recruitment may occur via in-game chats or modifications conveying harmful messages, without the recruiter's initial intention being noticed.[140]

This can happen both within digital games and on digital gaming adjacent platforms, especially on Discord and Reddit, as these feature a lot of toxic behaviour and memes.[141] Memes featuring video game characters are used in the radicalisation process.[142] On Disboard (a website used to find Discord servers), tags like Roblox and Minecraft were found alongside Nazi, racist and homophobic labels. The average age of users in these spaces is 15.[143] Researchers identified servers using tags linked to white supremacist affiliations and discriminatory content based on race, gender and sexuality. Some servers associated queer identities with mental illness and included transphobic discourse.[144] Alignment with these discourses and agendas facilitates recruitment to extremist ideologies. Discord has also been identified by researchers as a socialising space for far-right groups, facilitating the formation of communities that cultivate hateful gaming memes and promote extremist ideological agendas.[145] Some cyberattacks and attacks on schools in Brazil have been associated with groups that participated in these ideologies.[146]

The participants expressed concern about influencers promoting this kind of content on video-sharing platforms and game streaming, and the lack of regulation of digital

[136] Gandolfi et al. (2022).
[137] McInroy & Mishna (2017).
[138] Deedman (2023); Wells et al. (2023).
[139] Kowert et al. (2022).
[140] Davey (2021).
[141] de Wit et al. (2020).
[142] Wells et al. (2023).
[143] Gallagher et al. (2021).
[144] Heslep & Berge (2021).
[145] Gallagher et al. (2021).
[146] Cara (2023),

gaming-adjacent platforms, which enables radicalisation. While it has positive potential, and may provide opportunities for socialisation, its social spaces are often toxic, with bullying, hate speech, verbal violence and abuse.[147]

> ***In five clicks, a 10-year-old boy manages to reach an extremist community, having left a gaming chat room. Extremist groups do well to convert the bonds created in games into hate movements, but I still see little conversion to causes more linked to human rights and democracy. (participant 6)***

The participants also expressed concern about children's access to malicious adults and adolescents. According to participant 1, predators generally made contact with children in the game, befriending them and offering gifts or other exchanges of favours and other benefits. Subsequently, they asked the child to move the communication to other spaces:

> ***Much of this grooming happens within the game and moves to other platforms. That's one of the main risks I see. Generally, the interaction starts within the game and then migrates to other platforms, such as WhatsApp, Discord, Telegram, Instagram. (participant 1)***

This is in line with the literature, which shows that grooming can begin via text messages, voice [148]or external platforms (like social media), allowing attackers to isolate and manipulate victims. In games like Minecraft and Roblox, isolated environments, mods, user-generated content or features like virtual gifts and personalised avatars can be used to deceive and build trust. According to participant 1, another form of grooming was asking the child to play games with explicit sexual content.

This finding echoes previous research. There is a risk of sexual harassment,[149] sexual grooming and sexual extortion,[150] which may occur in digital gaming and digital gaming-adjacent platforms.[151]

Child grooming involves gradually gaining a child's trust as a game friend to enable abuse. The process includes getting in touch with the child in a game, forming a bond, assessing risk, creating exclusivity (often taking children to other digital gaming adjacent platforms and media outlets) and building a fantasy for manipulation. The goal is to enable sexual contact, either online or in person.[152] Several grooming traits unique to gaming were identified. Predators exploited their status in a game to reach victims while avoiding overt coercion. Harassment was more frequent among young children, with

[147] van der Sanden et al. (2022).
[148] In digital games, players communicate through a range of features that enable both real-time and indirect interaction. These include text chat, which allows written communication in public or private channels; voice chat, used for instant coordination or social interaction; and quick chat or ping systems, which provide pre-set messages or signals for fast, non-verbal responses. Many games also incorporate emotes and gestures—such as dances, waves, or emojis—that convey emotion and foster social connection. Additionally, asynchronous messaging systems and in-game actions like trading, gifting, or collaborating on shared tasks serve as indirect forms of communication.
[149] Merry & Whitfield (2024); Tang et al. (2020).
[150] O'Brien & Li (2020).
[151] Merry & Whitfield (2024).
[152] Merry & Whitfield (2024).

predators preferring live tools like voice or video calls to avoid leaving evidence.[153] Other studies[154] identify four grooming-related risks – verbal-interactive, environmental-visual, behavioural-economic and cybersecurity – all of which can be exploited to target children on gaming and adjacent platforms. The mechanisms to curb these problems are not as effective as they should be, especially if the material is broadcast in real time.[155] Explicit content in digital gaming can desensitise children to sexual themes.[156]

Digital gaming adjacent platforms are an environment used by perpetrators for grooming because they have anonymity tools, facilitating first contacts. Through in-game experiences, digital gaming allows the perpetrator and victim to explore stages, overcome challenges and cultivate experiences together, creating their first bonds.[157]

There was a consensus among participants that protection and security were shared responsibilities between actors. Still, some participants pointed out that there was more focus on protecting victims than on holding perpetrators to account:

> ***In over-focusing on the child victims in games and not focusing on the adult perpetrators, we might end up again accidentally replicating the same kind of rhetoric of like when a woman gets raped, the response being, well, she should have learned self-defence classes, or she should have been taught not to wear a mini skirt. Censoring the victim in these discussions, I think, lets the perpetrator off the hook. (participant 23)***

This finding corresponds with the evidence presented in prior studies. To tackle these issues, gaming platforms have, for example, reporting systems, but they are often unclear and inefficient, discouraging children from reporting harassment.[158] Many feel that reporting is pointless, as civility policies are rarely enforced. Children struggle with understanding how to report, leading to underreporting. The participants recommended simplifying the process in a way that was age-appropriate for children and improving response systems.

As demonstrated by previous research, gender was an important variable, according to the participants, as there was constant harassment of girls. In addition to grooming, sexual harassment can take many forms, both in game chats and in digital gaming adjacent platforms. In a sample of adolescents, girls were more likely to be sexually harassed and to experience grooming/predatory behaviour and to have been targeted specifically because of their gender in metaverses, including games.[159] On digital gaming-adjacent platforms, for example, on Twitch, sexual harassment is more frequent towards female game streamers,[160] with women often objectified and sexualised.[161]

[153] Merry & Whitfield (2024).
[154] O'Brien & Li (2020).
[155] Gorwa & Thakur (2024).
[156] Drejer et al. (2024).
[157] Drejer et al. (2024).
[158] Kowert & Cook (2022).
[159] Hinduja & Patchin (2024)
[160] Todd & Melancon (2019).
[161] Ruberg et al. (2019).

Female streamers and eSports athletes report obscene comments, sexual demands and receipt of explicit images.[162]

Overall, the participants described contact-related risks in digital gaming as some of the most serious and complex challenges to children's online safety. They emphasised that social interaction in games, while central to play and community building, also exposed children to harmful forms of contact such as toxicity, bullying, harassment, grooming and radicalisation. Participants noted that competitive game environments often normalised verbal aggression, ridicule and discrimination, particularly against vulnerable groups such as women, LGBTQIA+ individuals and younger players. They also highlighted the role of digital gaming adjacent platforms (like Discord, Twitch and Reddit) as spaces where extremist groups and sexual predators exploited anonymity and weak moderation to approach and manipulate children. Grooming, for example, frequently begins within a game and migrates to other platforms through private messaging, with perpetrators using gifts, friendship or role-play to gain trust. The participants expressed concern that reporting systems were confusing and rarely effective, discouraging children from seeking help. Current safeguards focus excessively on protecting victims rather than addressing perpetrators' accountability; meaningful progress depends on clearer reporting mechanisms and stronger moderation.

Conduct risks

Children are not only victims but also engage in harmful online behaviour. Toxicity, cyberbullying, radicalisation and grooming also represent conduct risks when children are perpetrators of violence.

Table 11 outlines conduct risks associated with digital gaming, particularly as they relate to the safety and wellbeing of young players. Identified by the participants, these include multiple forms of harmful conduct – from toxicity and cyberbullying to more serious threats such as grooming, blackmail and sextortion. Table 11 also highlights risks involving digital security, such as game piracy, hacking and the disclosure of personal data.

Conduct risks were less frequently cited by the participants, who mostly highlighted bullying and toxic behaviour within digital gaming and digital gaming adjacent platforms.

The participants noted that in highly toxic gaming environments, children may become perpetrators of aggression and hate speech. They may engage in toxic behaviour, aiming to disrupt gameplay or harm others socially. While some actions interfere with game mechanics (e.g., cheating), others target players personally through abuse. Participant 6 observed that younger, more impulsive children were more frequently involved than older adolescents.

[162] Ngo et al. (2024); Uttarapong et al. (2021).

Table 11: Main conduct risks in the digital gaming ecosystem, as seen by participants in Brazil and the UK

Risk	Description
Toxicity	Being a perpetrator, victim or witness of peers in violence on hostile environments marked by verbal aggression and disrespect; may include hate speech
Bullying and cyberbullying	Being a perpetrator, victim or witness of peers' ridicule for performance or lack of items; school conflicts over digital gaming
Bypassing parental controls	Disabling or avoiding parental restrictions
Blackmail and sextortion	Exploiting vulnerabilities under threat of exposure
Game piracy and hacking	Illegal behaviour; exposure to cybersecurity problems
Virtual attacks	Coordinated online assaults, often using bots
Sharing personal data	Disclosing details such as a name or school
Grooming	Being a perpetrator, victim or witness of peers in sexual or extremist grooming

Source: Author

This finding reflects patterns identified in previous studies. Children generally engage in these behaviours in order to gain acceptance.[163] They may engage in cyberbullying, sending offensive messages, spreading rumours or other exclusionary practices. Boys are usually more likely to engage in cyberbullying than girls, and they experience it through digital gaming and text messages.[164] The bullying can involve crimes and illegal acts, such as asking for child sexual abuse material, doxxing, fraud, hate speech and harassment.[165] This can happen both in games and in digital gaming-adjacent platforms.

The participants stressed that bullying and cyberbullying were persistent issues that often extended beyond gaming into school social life:

> ***My son's school called all the parents in his class. They wanted to talk about bullying and Fortnite. Some children were bullying and discriminating against others because they didn't have access to the game, they didn't own consoles or computers, and they were also poor because they didn't have the money to buy skins and other items in the game. (participant 27)***

Another point raised as a concern by the participants was the involvement of children, especially older adolescents, in crimes such as child sexual abuse. Research shows that adolescents aged 12-17 can engage in grooming or sexual solicitation, being at the same time victims and perpetrators.[166] Some authors note that these risks extend

[163] Liu & Agur (2023).
[164] McInroy & Mishna (2017).
[165] Kilmer et al. (2024).
[166] Fletcher et al. (2025).

beyond voice chats to various game communication features in digital gaming-adjacent platforms.[167]

The participants also mentioned that some children were becoming active perpetrators of extremist behaviour. This corroborates previous studies on extremism. In online gaming platforms, chat forums and social media, minors have been observed engaging in hate speech, harassment and the dissemination of extremist propaganda.[168] These actions are frequently the result of sustained ideological grooming or desensitisation within peer networks.

Game piracy was also highlighted; the participants reported that many children hacked or modified games without fully understanding what they were doing. Practices included theft, fraud and forgery. Game piracy was viewed ambiguously, and in some respects, it was confused with game modification (modding) or the use of old games on emulators,[169] stated participant 27. This is in line with the literature, which says that many do not view it as theft but as normalised behaviour in gaming contexts.[170] Piracy is a common behavioural risk in gaming, associated with game modification, emulation and limited access.[171]

Participant 11 also had concerns about how children shared personal data on these games. Children may share personal information with strangers in online games as part of casual conversations, seeking friendship or approval, often without realising the potential risks. The informal and fast-paced nature of gaming environments can blur the boundaries between trusted peers and unknown players. In this environment, children may not be aware of the value of privacy, disclosing details like their real name, age, school or location.[172]

Children are not only victims but also active participants in harmful online conduct. Within digital gaming environments, they may engage in or be exposed to toxicity, bullying, radicalisation, grooming and other risks affecting their wellbeing and safety. The participants identified a range of conduct-related threats, from verbal aggression, hate speech and cyberbullying to more serious offences such as sextortion, hacking and data disclosure. While bullying and toxic behaviour were the most frequently cited issues, cases of grooming, extremist activity and piracy were also reported. Children's engagement in such conduct often stems from peer pressure and a desire for acceptance. Boys are more likely to participate in cyberbullying, which may spill over into school life and include criminal behaviour such as harassment, fraud or the exchange of child sexual abuse material. Adolescents may simultaneously be victims and perpetrators of sexual or ideological grooming. Moreover, children's limited

[167] Drejer et al. (2024).
[168] Hutchinson et al. (2025).
[169] A game emulator is a program that imitates the hardware of a console or system, allowing its games to be played on another device, such as a computer.
[170] Scaraboto et al. (2020).
[171] Marchand & Hennig-Thurau (2013).
[172] Livingstone et al. (2019).

awareness of privacy risks leads them to share personal information in gaming and related platforms, reinforcing their exposure to harm.

Contract risks

Contract risks refer to the unfair or unclear terms under which children engage with digital games and platforms. These include exploitative monetisation, hidden data collection and misleading advertising. Table 12 outlines the main contract-related risks in digital gaming, as seen by the participants, focusing on commercial practices and structural mechanisms that may exploit or disadvantage children**.** These risks extend beyond individual behaviour to include systemic issues such as opaque data collection, profiling, manipulative game design and predatory monetisation strategies. Categories addressed include excessive consumption pressure, misleading advertising, fraudulent transactions and the use of cryptocurrencies. Table 12 also highlights risks related to children's creative labour on gaming platforms, where their contributions may be undervalued or exploited.

Such risks arise from structural imbalances between child users and digital service providers. Contract risks include concerns related to player privacy,[173] equipment security,[174] use of data,[175] predatory monetisation patterns[176] and practices that resemble gambling.[177]

According to the participants, children often shared personal data because of peer pressure or the desire to access exclusive content or social features. Many did not fully understand the risks involved or the permanence of digital footprints. This observation parallels earlier research. In some cases, game design subtly encourages data sharing through prompts, rewards or social interaction mechanics.[178]

Several participants highlighted loot boxes as a particular concern, which corresponds with the evidence presented in prior studies. Loot boxes offer random rewards for payment, mimicking gambling.[179] They can be bought with real or virtual currency, and outcomes are revealed only after purchase. Children's lower impulse control makes them especially vulnerable to overspending.[180] Harms associated with loot boxes, simulated gambling and in-game purchases include financial issues, gambling disorders, stress and impulsive behaviour[181]. Such exposure may normalise gambling and increase the risk of real-money gambling.[182] Research links loot boxes with problem gambling,

[173] Keser Berber & Atabey (2020); Krõger et al. (2023).
[174] Adonis & Vadlamudi (2022).
[175] Kröger et al. (2023).
[176] Petrovskaya & Zendle (2022).
[177] Uddin (2021).
[178] Alves & Grané (2024).
[179] Primi et al. (2022).
[180] Uddin (2021).
[181] Mills e al. (2024)
[182] Greer et al. (2022).

suggesting a 'dose-response' pattern driven by dopamine.[183] However, some argue that this correlation is weak and call for further research.[184]

Table 12: Main contract risks in the digital gaming ecosystem, as seen by participants in Brazil and the UK

Risk	Description
Data collection and use/profiling	Biometric and eye tracking; low understanding by children/parents; opaque policies; commercial data use; IP data from mods
Consumption	Pressure to consume digital items; pressure to consume merchandise; social exclusion; undue or unauthorised spending by the family
Cryptocurrencies	Use of cryptocurrencies and gambling on digital gaming; children lack understanding of how it works
Data sharing	Sharing credit card data
Manipulative design	Retention mechanisms make children spend more time on platforms
Donations to influencers	Undue or unauthorised spending by the family on influencers
Fraud and scams	Scams involving the sale of items, fraudulent exchanges and unauthorised purchases; account hijacking; data theft; fake profiles
Predatory monetisation	Naturalisation of data capitalism; gift cards and premium passes; difficulty understanding the real costs of items and services in digital gaming; inequality of access due to pay-to-win systems; difficulty separating the gaming experience from monetisation; exploitation of FOMO (fear of missing out) to stimulate spending; loot boxes; gambling and randomisation mechanisms involving financial transactions; grinding mechanics;[185] microtransactions; currencies hide the real costs of items and services; social pressure to spend for status in digital gaming; confusing purchasing system; lack of purchase returns; bundled sales; ease of purchase; use stopwatches for purchases; limited discounts; artificial scarcity; early access; match/battle passes;[186] pressure to buy DLCs[187]
Publicity, advertising and marketing	Advergames; access to advertisements for products; integration with social networks allows advertising directed at children (e.g., digital gaming on social networks); product placement in digital gaming; misleading adverts; playable adverts;[188] sales of products on gaming platforms; online brand environments; ultra-processed food, alcohol and gambling adverts; marketing to toddlers (aged 3–7)
Child labour	Adults look for children to develop low-cost digital games; lack of remuneration or low values for their creations on platforms; children have no copyright or ownership rights to their creations; precarious work

Source: Author

Participant 16 mentioned that many children may be attracted to gambling because it resembles video games. They are 'cute' and seem harmless. This is related to what scholars describe as the 'gamblification of gaming' – digital games adopting chance-

[183] Kidron et al. (2025).
[184] Spicer et al. (2022).
[185] Grinding refers to repeatedly performing the same actions in a game to gain experience, items or other rewards.
[186] Match/battle passes are seasonal reward systems in games where players unlock prizes by completing challenges or playing matches, often through a paid tier.
[187] DLCs (downloadable content) are additional game materials – such as new levels, characters or stories – released after the main game, usually available for purchase.
[188] Playable adverts are interactive game-style ads that let users try a short version of a game before downloading or buying it.

based features — and the 'gamification of gambling' – gambling adopting digital games' traits to avoid regulation.[189] Despite both falling under 'gaming', they remain distinct, with tensions due to gambling's stigma.[190]

Participant 20 argued that gambling and loot boxes were part of a broader issue: predatory monetisation. Certain monetisation models in games pose risks for children. This contributes to a growing body of literature on predatory monetisation. Many digital games exploit player vulnerabilities through manipulative, non-transparent systems.[191] The use of gaming currencies, for example, can obscure real costs and encourage continuous spending, often after players are financially and emotionally invested.[192] The use of unclear virtual currencies is also seen as predatory monetisation.[193] With the growth of online connectivity, many games have shifted into service-based models, characterised by continuous updates and the inclusion of microtransactions. Games as a Service (GaaS) encourage repeated spending on virtual goods, such as coins or cosmetic items.[194] While many children spend only modest amounts sporadically, a small percentage engage in high, regular spending, particularly in games with randomised monetisation.

Participant 20 also linked predatory monetisation to manipulative design – commonly referred to as dark patterns or deceptive design. This concern aligns with research showing that some digital games track player behaviour to adjust design and pricing, encouraging purchases, using tactics like artificial scarcity and dynamic pricing. Systems may analyse spending habits, funds and preferences to target vulnerable users. This raises concerns about limited consumer protections, particularly for minors and their guardians.[195] Randomised elements further align these designs with gambling mechanics.[196] Some authors identify six categories of manipulative strategies in digital gaming: temporal (time manipulation like grinding or forced waiting, repetitive in-game tasks to achieve objectives), monetary (pay-to-win, disguised costs), social (spam invites, pyramid schemes), concealed advertising, misleading advertising and inappropriate content.[197] All these are manipulative or developmentally unsuitable practices.[198]

Grinding was also criticised. While some players enjoy grinding for its sense of accomplishment, the participants argued that it can become tedious and mechanical, particularly when objectives seem designed to encourage spending on microtransactions to speed up advancement.

[189] Macey & Hamari (2024).
[190] von Meduna et al. (2020).
[191] King et al. (2019).
[192] Steinnes (2024).
[193] Ravna & Iversen (2024).
[194] King et al. (2019).
[195] Fitton et al. (2021).
[196] von Meduna et al. (2020).
[197] Fitton et al. (2021).
[198] Fitton et al. (2021).

> ***These design approaches often employ deceptive patterns that encourage grinding or spending money. The lack of clear interoperability complicates things further; for instance, players might have to buy multiple packs without knowing their true value, which adds to the pressure. This can result in inadvertent spending, creating tension within families. Children might hesitate to talk about these issues for fear of losing their gaming privileges, which can prevent them from discussing other risks they face, leading to a broader web of concerns. (participant 17)***

Several participants also raised concerns about the pressure to consume, which is present in many games. This aligns with a 2019 study, which found that 76% of 10- to 16-year-olds feel digital gaming pushes them to spend as much as possible.[199] Excessive gaming may be related to excessive consumption of games, leading to financial risks (overspending and debt).

Adjacent platforms like Twitch have adopted predatory monetisation features. Participant 28 highlighted concerns about children making donations during game streaming without their parents' awareness. These platforms can now include engagement strategies resembling loot boxes and limited ad control – users can disable third-party ads but not Amazon's.[200] Streamers may receive donations and link Amazon wish lists, while Amazon account holders gain platform privileges.

Gambling, in its various forms and models, was highlighted by the participants as a concern. Participant 23 was concerned about children who used items obtained in games to gamble, doing something known as 'skin gambling'.[201] This refers to using in-game cosmetic items (or 'skins') as a form of currency to bet or gamble on external websites or games of chance. The participant also mentioned the possibility of children engaging in betting within the eSports scene. Previous research shows that there are also links to risky behaviours such as eSports betting and gambling.[202]

One of the UK participants raised the issue of cryptocurrency games. Play-to-Earn (P2E) games are where players can earn real-money tokens or digital assets[203] by playing or achieving in-game goals. While offering benefits like asset ownership, they pose contract risks, including token inflation, early investor bias and exploitation in lower-income regions. This model may turn gaming into an extrinsically motivated activity, increasing risks of addiction and gambling-like behaviours.[204]

The development of games by children on games that allow user-generated content was seen by the participants both as an opportunity and as a contract risk. User-

[199] Kidron et al. (2025).
[200] Franqueira et al. (2022).
[201] A skin, also known as a cosmetic item, is a visual customisation in a game – such as clothing, colours or designs – that changes the appearance of a character, weapon or environment without directly affecting gameplay. Although skins are generally cosmetic, in some cases they may provide indirect advantages, such as better visibility, camouflage or social status within the game. Skins can also be used for skin gambling, where players bet or trade them as a form of currency.
[202] King et al. (2019).
[203] Digital assets are electronic items of value, such as cryptocurrencies, tokens or virtual goods, that can be owned, traded or sold online.
[204] Delfabbro et al. (2022).

generated content models – for instance, the game Roblox – incentivise children to create digital games that profit the platform without fair compensation or copyright protection.[205] One of the participants was concerned about the exploitation of child labour. Young creators invest time and creativity but receive minimal reward as the company retains most revenue. Lacking any ownership rights, their work is vulnerable to exploitation without the legal safeguards adults enjoy, raising ethical concerns about child labour in these virtual creative economies.[206]

Another point raised by the participants was the privacy and massive collection of children's data by gaming companies and digital gaming adjacent platforms. Digital gaming collects large volumes of sensitive data to build detailed user profiles and optimise engagement, increasing the risk of financial exploitation.[207] Data collected includes voice, appearance, location and social ties, as well as in-game behaviour. These allow an analysis of players' cognitive abilities and personality traits.[208] Data collection can be exploited commercially by companies, or it can be used to protect children. However, one of the participants highlighted the ambiguity surrounding the use of this data:

> ***When discussing privacy risks for children in games, the core issue is balancing privacy with safety. For example, detecting and responding to harm may require some form of privacy breach. While many agree with the need for child protection, there is hesitation to accept the idea of sacrificing privacy across the board. A balanced approach would involve breaching privacy only when there is a reasonable justification that a child is at risk. (participant 19)***

Regarding product marketing aimed at children, the participants highlighted the exploratory design of many mobile games, which is structured to expose young players to advertising and commercial messages. While these practices affect all players, younger children are particularly vulnerable due to their limited ability to discern and understand advertising strategies. Participant 30 raised concerns about playable advertisements ('playable' ads) in mobile games, which blur the line between gameplay and advertising, making it difficult for children to distinguish between the two, and leading them to install or purchase these games.[209]

The participants also noted that current advertising regulations do not adequately cover gaming platforms, especially in relation to their varied monetisation models and data collection practices. Sign-up processes for games are often complex and lack transparency, making it hard for children and families to fully comprehend the implications of sharing personal data.

In sum, the participants identified a wide range of risks linked to data practices, manipulative design, predatory monetisation and the commercial exploitation of

[205] Grimes et al. (2024).
[206] Grimes & Merriman (2020).
[207] King et al. (2019).
[208] Kidron et al. (2025).
[209] Greer et al. (2022).

children's creativity. These include opaque data collection, profiling and the use of biometric or behavioural tracking for commercial purposes. Predatory monetisation strategies – such as microtransactions, grinding and the use of virtual currencies – blur the distinction between play and payment, fostering excessive consumption. Other practices incentivise and normalise gambling-like behaviour (like loot boxes and skin gambling). Manipulative design patterns ('dark patterns') exploit children's impulsivity through mechanisms such as artificial scarcity, dynamic pricing and time-based constraints.

The participants also reported pressure to spend on items, donations to influencers and fraudulent schemes involving digital assets. Further risks arise from user-generated content games, where children's creative labour may be undervalued and rights to their work disregarded. Advertising and marketing practices, including advergames and playable ads, expose children to commercial messages they are ill-equipped to interpret.

Transversal risks

Transversal risks are those that affect multiple dimensions of children's lives, crossing physical, mental, social and cultural aspects in an interconnected way. Table 13 presents the main transversal risks associated with digital gaming and the gaming environment, as identified by the participants. These risks span physical, psychological and social dimensions, highlighting broader impacts on children's health and wellbeing. Main preoccupations include physical inactivity, mental health issues, addiction, sleep disturbances and increased irritability or aggression. A potential shift towards social isolation was also noted, as virtual interactions may begin to replace in-person connections in the lives of children.

Table 13: Main transversal risks in the digital gaming ecosystem, as seen by participants in Brazil and the UK

Risk	Description
Physical health problems	Problems with poor posture, lack of physical activity, development of obesity, myopia and eye problems
Mental health	Excessive use, poor self-regulation and harmful effects of toxic environments
Addiction to digital gaming	Internet gaming disorder, gambling disorder
Sleep problems	Sleep quality – problems such as insomnia and fatigue
Loneliness	Preference of virtual over face-to-face interactions
Irritability and aggression	Rage quit;[210] irritated or aggressive when they can't achieve objectives in the game or when they must stop gaming
Discrimination	Exclusion of women, xenophobia, prejudice against LGBTQIA+ community, racism

Source: Author

[210] Rage quit refers to when a player abruptly leaves a game out of anger or frustration, usually after losing or experiencing unfair gameplay.

In the field of mental health, disorders related to excessive use and addiction to digital gaming stood out for the participants. This was the only risk cited unanimously by all the participants consulted. Internet gaming disorder appears in the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-5)[211] as a condition for further study, while gaming disorder is classified in the ICD-11.[212] It involves recurrent gaming that harms daily functioning, such as neglecting hygiene, sleep, social life and responsibilities. Symptoms include increased gaming time and withdrawal when restricted.

This finding corresponds with the evidence presented in prior studies. Certain genres – role-playing games (RPGs), shooters, MOBAs, simulation and action – are more associated with addiction.[213] It's worth remembering that the issue of gaming addiction is one of the most studied risks, with a number of studies on children and adolescents.[214] In a longitudinal study, the authors stated that adolescent online gaming was a symptom of earlier, as well as a risk factor for current, mental health problems during adolescence.[215] Other authors, however, believe that there are several factors other than simply playing games that contribute to the development of mental health problems. Protective factors included parental knowledge and positive parenting, while poor parenting, familial disharmony and familial socioeconomic status with all their sub-themes represented risk factors for gaming disorder, for example.[216]

One of the participants, from the medical field, expressed concern about the impacts of excessive gaming on mental health:

> ***The problem is when children overdo it, when they are gaming too much, and can't do anything else in life. I always emphasise the importance of getting enough sleep, eating meals, playing sports away from the screen and socialising outside of the digital environment. It's all a question of balancing the opportunities offered by games with the physical and routine aspects. (participant 5)***

Internet gaming disorder differs from gambling disorder,[217] which involves betting and has long been recognised by both the ICD-11 and DSM-5. It is defined by persistent gambling despite serious consequences to health, relationships and studies.[218] Despite being defined as two different disorders, the points of contact between the video game and gambling industries raised concerns among the participants. The inclusion of gambling mechanisms in digital gaming can generate disorders similar to those of betting. The two disorders can occur together, and one can influence the other.[219]

[211] APA (2013).
[212] WHO (2019).
[213] Han et al. (2020).
[214] Nogueira et al (2019)
[215] Mestermann et al. (2025).
[216] Petrescu et al. (2025).
[217] APA (2013); WHO (2019).
[218] Moreira et al. (2023).
[219] Primi et al. (2022).

Participant 5, a paediatrician, was also worried about physical problems, such as poor posture, lack of physical activity, development of obesity, myopia and eye problems, especially for younger children. This partially diverges from prior research, as the effect on obesity is still under discussion. A significant link was found for adults but not for children or adolescents.[220] In a literature review, the authors indicated that some studies confirmed the association between gaming disorder and obesity, while others did not. Nevertheless, the studies pointed to increased rates of poor nutritional habits, irregular eating patterns and unhealthy weight control behaviours among children and adolescents diagnosed with gaming disorder.[221] Reduced sleep,[222] loneliness and irritability were also cited by participant 5, especially the phenomenon known as rage quit.[223]

Other participants also mentioned the possibility of children engaging in issues of discrimination and inequality, such as the exclusion of women, xenophobia and prejudice against the LGBTQIA+ community, themes that have already been addressed in the risks of contact and conduct.

Overall, the participants identified concerns such as physical inactivity, postural problems, obesity, sleep disturbances, irritability and social withdrawal. Mental health risks – particularly internet gaming disorder and gaming disorder – were unanimously cited, highlighting patterns of excessive play, loss of control and neglect of daily responsibilities. These conditions, recognised respectively in the DSM-5 and ICD-11, reflect how gaming may evolve from a leisure activity into a source of dependency. Links between gaming disorder and poor nutrition, sleep deprivation and aggression were noted, although evidence on obesity remains mixed. The participants also drew attention to the overlap between gaming and gambling, as predatory monetisation features may reinforce addictive behaviours. Social risks include loneliness, exclusion and discriminatory dynamics such as sexism, racism and prejudice against LGBTQIA+ players.

Comparison of risks: Brazil and the UK

Brazil and the UK face a range of similar risks associated with digital games, particularly regarding predatory monetisation, data privacy and inappropriate content. In both countries, children are frequently exposed to manipulative design features such as loot boxes and in-game currencies.

Toxicity and harassment are widespread in some online gaming environments in both contexts. Children often encounter gender-based and anti-LGBTQIA+ hostility and hate speech, particularly in real-time voice chats and digital game adjacent platforms, where racial and gendered abuse is normalised. Both countries report concerns over

[220] Marker et al. (2022).
[221] Che Mokhtar & McGee (2025).
[222] Kristensen et al. (2021).
[223] Kahila et al. (2022).

radicalisation and grooming through gaming and digital gaming adjacent platforms, with extremist content infiltrating children's communities. These contact risks are intensified by weak moderation on platforms and the ability of predators to migrate between platforms after bans.

However, contact risks are a greater concern in Brazil than in the UK, probably because of the exploitation and inequality to which children are subjected in vulnerable communities. In Brazil, children may be more exposed to grooming in digital games due to a combination of socioeconomic and structural factors. Online gaming is widespread among children, often without adequate parental supervision – either due to a lack of digital literacy or limited time and resources. For example, a large proportion of parents do not engage in internet mediation for their children in Brazil. Only 34% reported using technical tools such as site blocking or filtering, meaning that around 66% do not employ these measures. Similarly, just 32% restrict which applications can be downloaded and 32% limit contact via calls or messages, leaving over two-thirds of families without such controls.[224] Oversight of gaming platforms further hinders the identification and prevention of abusive interactions. The precarious conditions of some children also contribute to the acceptance of the financial return offered by predators.[225]

Contract risks were the most frequently cited concerns from the UK-based participants, particularly focusing on manipulative design and monetisation models. The participants discussed the pervasive influence of digital capitalism on gaming experiences, noting the challenge of separating gameplay from monetisation mechanisms like in-game purchases and advertisements. These practices have become normalised, with advertising exposure considered an accepted trade-off for free access to games. Marketing strategies targeting young children, such as YouTube videos promoting games, were also noted. The integration of games with social media platforms – including Snapchat, Instagram and TikTok – further enhances this exposure, expanding both the reach and monetisation of games. Aspects of ethical game design were also discussed.[226]

Contract risks were not mentioned much by the Brazilian participants, who were more worried about grooming and extremism. This difference is probably due to social inequalities. Another possible explanation for this discrepancy is the difference in the participants' literacy and knowledge about how the gaming environment works in general. In the UK, the discussion about manipulative design standards, predatory monetisation and the responsibility of platforms was more advanced than in Brazil, which contributes to greater attention to contractual risks in the debate.

Table 14 presents a synthesis of the literature review and participant considerations regarding online risks in digital gaming, structured according to the '4 Cs' framework – content, contact, conduct and contract – along with transversal risks.

[224] Núcleo de Informação e Coordenação do Ponto BR (2024).
[225] de Rodrigues & Melo (2025).
[226] Hodent et al. (2024).

Table 14: Literature review and the participants' considerations – content, contact, conduct, contract and transversal risks

	Content	Contact	Conduct	Contract
	Engaging with or being exposed to potentially harmful content	**Experiencing or being the target of harmful contact with an adult**	**Witnessing, participating in or being a victim of harmful contact between peers**	**Being exploited by potentially damaging contracts**
Aggression	Toxic behaviour (verbal aggression), violent content or bloody images, extremist content, horror content, normalisation of hatred and aggression, glorifying war, extremist modded content	Toxic behaviour (verbal harassment), hate speech	Bullying, hostile communication or hate speech (racism, homophobia, xenophobia, misogyny), hacking, cheating or exploiting, bypassing parental controls, extremist modded content, unethical game modification	Identity theft, fraud, phishing, scam, hacking, blackmail, security risks, data breaches, pirated games, fake accounts, account theft, data theft
Sexuality	Access to pornographic advertisements on gaming sites, pornographic games, digital gaming with sexual content (harmful or illegal), lives with sexualised content, sexual modded content	Sexual harassment, sexual grooming, harassment in VR, coercion for the production of child sexual abuse material	Toxic behaviour (verbal aggression against women and the LGBTQIA+ population), sexual harassment, sexual threats, sexual grooming, sexual modded content	Sexual extortion
Values	Access to communication platforms for gaming; access to community platforms and forums with inappropriate content, normalisation of hatred and the toxic environment; access to generative AI characters embedded in games; community forums, reinforcement of character stereotypes	Ideological manipulation, radicalisation and extremist recruitment, recruitment for attacks (and face-to-face), pressure to share personal data	Virtual or face-to-face attacks, participation in harmful communities, sharing personal data, reinforcement of gender stereotypes	Gambling mechanics, manipulative patterns, in-game advertising, financial scams, predatory monetisation, improper purchases, play to earn (cryptocurrencies), skin gambling, lack of copyright and remuneration for game creation, excessive consumption, fraud/scams, donations, excessive advertising, precarious work, grinding, gambling games with game items, loot boxes, exposure to fraudulent schemes associated with cryptocurrencies, lack of consumer protection, datafication, playable ads, manipulative design, pay to win
Transversal risks	**Violation of privacy:** Interpersonal, institutional or commercial; excessive data collection, profiling, collection of biometric data			
	Health: Physical health problems, sedentary lifestyle, excessive screen use, isolation, decreased sleep, difficulty self-regulating; excessive screen time **Aggressiveness:** Rage quit, irritability			
	Mental health: Internet gaming disorder (video games); gambling disorder (pathological gambling, betting)			
	Discrimination and inequality: Exclusion of women, xenophobia, LGBTQIA+, novice players, stereotyped representation of characters			

Source: Author

From opportunities to benefits, from risks to harms

Opportunities, risks and harms in digital games are relational, arising from the interaction between the child's agency and that of others operating within the people, products and places framework. Exposure to risks, as classified by CO:RE, does not necessarily lead to harm, since the likelihood, severity and nature of harm depend on a combination of individual risk and resilience factors.[227] Variables such as age, gender, digital skills, resilience, personality, socioeconomic background and family context can either increase or reduce children's vulnerability to online risks,[228] therefore, representing an intersection of factors from people's micro, meso and macro levels.

Online vulnerability often mirrors vulnerabilities already present offline. Children facing social disadvantages or experiencing risks in the real world are more prone to encountering digital risks. However, vulnerability does not automatically translate into greater exposure to risks, as the relationship between them is complex and context-dependent.[229]

The *ICT Households 2023*[230] survey employed a model adapted from Livingstone et al.[231] to illustrate how risks can transform into harm, and how opportunities can bring benefits, highlighting the role of individual, digital, social and national contexts in shaping children's digital experiences.

The individual context refers to the child's personal characteristics, including identity, resilience, vulnerabilities and physical and mental health. The social context includes family, peers, educators and community, all of whom play roles in mediating, supervising and guiding digital practices. The national context includes structural, economic, cultural and legal factors that determine access, regulation and online safety. The digital context involves access to and use of technology, digital skills and the specific characteristics of games and platforms. The dynamic interplay between these four contexts directly influences both the opportunities and risks to which children are exposed in online environments, at the micro, meso and macro levels.

The concept of risk pathways demonstrates that not all exposure to harmful content or interactions results in damage. Isolated exposure may cause minimal impact, whereas passive, cumulative exposure or active, prolonged engagement with harmful content can have more serious consequences. Protective factors, such as family support and personal resilience, are essential in preventing or reducing these harms.[232]

[227] Livingstone & Helsper (2013).
[228] Stoilova et al. (2021).
[229] Livingstone & Helsper (2010).
[230] Núcleo de Informação e Coordenação do Ponto BR (2023b).
[231] Livingstone et al. (2015).
[232] Bryce et al. (2023).

Applying this model to digital games, individual context variables include gender, age group, social class, ethnicity, digital skills, physical and mental health, personality traits, their level of engagement with games (low, moderate, high), in-game behaviour, player typology (main interests and gaming objectives) and leisure interests, which is related to the people dimension.

Also, the notion of evolving capacities, set out in Article 5 of the UNCRC,[233] recognises that children and adolescents acquire competences, maturity and understanding progressively as they grow. Maturation is neither linear nor identical for all: age, cultural context, life experience and social conditions influence how each child develops their capacities (e.g., the ability to understand information, think independently, assess risks and draw on a stable set of values).[234] As young people mature, their ability to navigate the opportunities and risks within gaming environments develops progressively.

The variables related to the digital context consider access to gaming devices and internet connectivity, as well as physical spaces for gaming (place dimension). In this case, digital skills refer to critical skills, informational skills and the specific skills required for gaming. The product design can differ significantly in terms of design features, such as storytelling, objectives, rewards, gameplay and the importance of social interaction, and these differences influence how games are used.

The variables of the digital context (the product dimension) are also associated with the affordances of different games. Different factors are relevant to children's gaming experience, from game genre to the presence or absence of manipulative design. For example, action games may enhance visual skills,[235] but this is also one of the genres most associated with gaming addiction.[236] The device used for playing and the type of monetisation are relevant when knowing that a large amount of the income from mobile games comes from app advertising.[237] The game being played alone or with others, if it uses chat communication or voice platforms, and whether it is a cooperative or competitive game, is another important factor due to the impact of socialisation and the risks of cyberbullying, for example.[238]

Some opportunities for children are shaped by game design. Age-appropriate products and services, aligned with children's developmental capacities and needs, may foster an intrinsic motivation to play while maintaining the freedom to start and stop at will. This freedom, however, is often undermined when games employ persuasive marketing techniques or manipulative design features that trigger emotional responses and hinder disengagement.[239]

[233] UN (1989)
[234] Lansdown (2005).
[235] Dye & Bavelier (2010).
[236] Han et al. (2020).
[237] Garbar (2025).
[238] McInroy & Mishna (2017).
[239] Kidron et al, (2025) (2023).

In the social context (the people dimension), the family plays an important role in determining access, supervision and perceptions of gaming. Educators help foster critical perspectives on game use, while peers significantly influence gaming habits, which can promote either responsible use or problematic behaviours, such as toxic interactions.

The national context involves structural factors that impact the relationship children have with digital games. Aspects such as the economy, inclusion and inequality influence access to consoles, PCs and high-quality internet. The provision and regulation of the gaming industry determine policies on age classification, online safety and child protection. Culture, media and societal values shape perceptions of gaming, influencing its social acceptance and the ways in which it is used for leisure, learning and interaction, potentially determining preferences for types of devices and games.

Outcomes are equally shaped by variables related to people, places and products. Design choices such as monetisation strategies, reward systems, levels of moderation and interface features can amplify or mitigate risks. Likewise, spaces – from highly moderated educational platforms to open multiplayer arenas – provide different affordances for safety, creativity or exploitation. These dimensions intersect: product design influences the dynamics of spaces, while both interact with children's social environment. It is in this interplay between people, products and places that risks may escalate into harms or opportunities may translate into meaningful benefits.

Although discussed separately, opportunities and risks are not binary outcomes of gaming. A digital gaming context should not be understood as leading exclusively to positive or negative consequences. Research consistently shows that the relationship between opportunity and benefit is neither automatic nor uniform. For instance, the same activity – such as gaming – can provide educational, social and emotional benefits for some children, while exposing others to risks depending on their circumstances.[240]

A single gaming environment, considering all three dimensions from the kaleidoscope framework (people, places and products) may present different opportunity and risk factors at the same time. The extent to which opportunities develop into benefits will depend on how children interact with these factors.[241]

As an example, boys who spend more than four hours playing games may display problematic communication behaviours and present low school performance at the same time as they may demonstrate improvements in English vocabulary. These same children might benefit from gaming in developing meaningful friendships, earning respect and reputation among other schoolmate players, but they may have difficulties communicating with girls.[242] This situation demonstrates that gaming is neither exclusively an opportunity nor solely a risk. Several games and situations in a game

[240] Third (2016).
[241] Third (2016).
[242] Yılmaz et al. (2018).

environment may generate both positive and negative outcomes, with certain factors evolving into benefits and others into harm for a specific child.

Risks and opportunities often arise from the same features. However, the presence of risk is neither an acceptable nor inevitable condition for opportunity. Well-designed systems can enable opportunities while preventing risks from materialising. There is also a positive correlation between risks and opportunities, meaning that efforts to increase opportunities may simultaneously heighten risks.[243] Likewise, initiatives aimed at minimising risks may inadvertently reduce children's chances of benefiting from internet use. In this way, children's experiences with digital games are shaped by a complex interaction between individual, social and structural factors. In order to foster a safe and meaningful space for children's play, it is essential to consider the people, places and product dimensions of the digital gaming environment, and to examine how their micro, meso and macro levels interact to shape gaming experiences and potential impacts. In this sense, benefits are contingent on the balance between exposure to risks, the resilience children develop and the enabling conditions that allow them to thrive.[244]

While the participants generally agreed that digital gaming offered both benefits and risks, they diverged on how these should be managed. For many, moderate play was regarded as essential to securing benefits, whereas excessive or unsupervised play was linked to challenges such as addiction, screen overuse and diminished offline interaction. A delicate balance exists between the perception of digital gaming as a transformative tool and the recognition of its associated risks. Overall, the participants considered gaming to have positive potential, but only when supported by mediation and clear boundaries.

[243] Livingstone & Helsper (2009).
[244] Third (2016).

6. Map of the actors' responsibilities

Protecting children in the digital gaming ecosystem requires a coordinated, multi-actor and cross-sector approach. As highlighted throughout this report, the complexity of gaming environments demands that responsibilities be shared across various sectors and stakeholder groups. Tables 15–17 present a structured mapping of actors' roles in risk mitigation at different systemic levels. The recommendations, grounded in empirical research and participant interviews, guide cross-sectoral efforts to promote safer, fairer and more inclusive experiences for children in digital play environments.

At the micro level, responsibilities fall primarily on those most directly engaged in children's day-to-day digital gaming practices: children themselves, peers (friends) and parents or caregivers. Table 15 emphasises the importance of ethical behaviour and digital literacy among children, while also outlining the responsibilities of parents or caregivers in supervision, communication and activating protective tools.

Table 15: Map of the actors' responsibilities – micro level

Actors	Risk mitigation actions
Children	• Engage in ethical, age-appropriate behaviour in digital games • Respect community guidelines and platform standards • Learn how to use blocking, reporting and moderation tools • Respect parental controls • Understand content creation rules and their implications
Peers (friends)	• Act as positive role models during gaming interactions • Encourage safe play and discourage harmful behaviour • Share digital safety practices with younger peers • Influence gaming culture positively within families and peer groups
Parents or caregivers	• Foster open dialogue about risks, benefits and healthy usage • Monitor and set limits on gaming, with active supervision • Use parental controls when appropriate, and respect age rating systems • Provide offline alternatives and shared family activities • Stay informed about the opportunities and risks in gaming environments • Engage extended family in digital gaming wellbeing
Children and adults responsible for mod servers	• Implement and enforce clear community moderation policies • Monitor user-generated content and communications for safety compliance • Adopt ethical design principles in the creation and distribution of mods • Collaborate with official platforms and gaming communities to align safety standards

Source: Author

The second mapping (Table 16) further develops the meso-level landscape by focusing on institutions and actors that mediate children's access to digital games through education, infrastructure and service provision. Table 16 articulates the role of schools,

advertising networks, security providers, vocational education and adjacent platforms. These actors are encouraged to integrate critical discussions of gaming into curricula, adopt transparent data practices, implement age verification and promote inclusive and ethical standards. Additional responsibilities are outlined for NGOs and health services to provide prevention, education and psychological support in response to risks such as addiction, grooming and social isolation. Academic researchers are called on to generate evidence to inform policy and empower parents, caregivers and educators.

Table 16: Map of the actors' responsibilities – meso level

Actors	Risk mitigation actions
Extended family	• Foster open dialogue about risks, benefits and healthy usage • Teach children about digital safety and appropriate behaviour • Reinforce healthy boundaries and shared digital practices • Actively supervise gameplay and online interactions • Support emotional wellbeing and peer influence dynamics • Stay informed about gaming environment, its opportunities and its risks
Influencers and content creators	• Promote responsible and inclusive messages, and positive role models • Avoid endorsing harmful behaviours or exploitative practices • Take responsibility for advertising • Take responsibility for sponsored content and its impact on children • Uphold ethical use of platforms, ensuring a healthy environment for children, regardless of the intended audience • Recognise cross-national audiences and adapt to global child protection norms
Educational community: schools and educators	• Integrate games into learning strategies • Address social issues in gaming through the curriculum • Incorporate digital gaming into media literacy education • Partner with parents, health professionals and NGOs in awareness campaigns
Community organisations	• Promote ethical reflection on digital behaviour • Provide safe spaces for discussion of gaming risks and opportunities
Game industry: ad networks and monetisation companies	• Ensure ethical placement and targeting of advertisements • Maintain transparency in data collection and use • Prevent manipulation through accurate advertising • Align practices with age ratings
Game industry: security, payment and cybersecurity companies	• Develop age-appropriate and data protection tools • Detect and mitigate grooming, radicalisation and illegal activities • Provide best practices for developers • Support safe in-game payment mechanisms
Game industry: adjacent platforms (forums, communication, UGC platforms)	• Empower Trust and Safety teams • Adopt tools to mitigate hate speech and harassment • Strengthen age verification and content moderation • Provide safe environments for streamers and users, including more effective reporting systems and transparency of complaints • Assess toxicity and produce transparency reports • Prevent toxic behaviour, grooming, child sexual abuse material • Prevent radicalisation and extremist recruitment • Apply Safety by Design principles • Ensure transparency in complaint handling • Manage communities and forums
eSports: eSports leagues,	• Establish codes of conduct for youth-inclusive competitions • Enforce policies against harassment and exploitation • Promote inclusive and respectful practices • Avoid exploitative hyper-competitiveness

tournaments and athletes	• Ban betting-related sponsorship targeting minors
Game industry: marketing agencies, eSports organisations and sponsors	• Comply with children's advertising and data protection laws • Design safe, educational campaigns in partnership with developers
Game industry: license companies and merchandise vendors	• Ensure that game-related products are age-appropriate and do not promote harmful stereotypes or behaviours • Comply with consumer protection and advertising regulations, particularly those concerning children • Avoid exploitative marketing practices, especially those that target minors or promote excessive consumption • Promote inclusive, educational and ethically produced merchandise that reflects positive values • Ensure that licensed products comply with ethical standards and children's rights
Knowledge and training institutions: courses and vocational training	• Include ethics in game design and development curricula • Critically examine predatory monetisation strategies • Promote ethical design standards • Train developers in Safety by Design principles • Conduct applied research on safety innovations • Inform evidence-based policy and professional training
Knowledge and training institutions: academic researchers	• Conduct research on children's use of gaming environments • Provide evidence-based recommendations for policy and education • Support digital education for caregivers and educators
Health system	• Support children facing gaming-related harm • Conduct public awareness campaigns on gaming risks that don't just involve violence and addiction • Provide psychological support • Provide family guidance and psychological care • Deliver campaigns beyond violence/addiction stereotypes (e.g., grooming, exploitation, loneliness) • Train professionals in opportunities and risks of digital play
Civil society and NGOs	• Advocate for ethical industry practices and informed regulation • Promote digital literacy and responsible gaming • Advocate for ethical industry practices • Monitor industry transparency • Promote digital literacy and rights awareness • Provide support to diversity groups
eSports: eSports athletes	• Act as role models for young players • Encourage positive conduct and awareness of safety in competitive settings

Source: Author

Table 1: Map of the actors' responsibilities – macro level

Actors	Responsibilities
Game industry: game development tools companies (e.g., engines, middleware, tool providers)	• Standardise abuse reporting systems • Apply Safety by Design from the ground up • Embed privacy and child safety features in SDKs245 • Provide parental controls • Provide privacy tools and secure data handling features • Embed parental controls, content filters and safety options in SDKs • Enable standardised abuse reporting, blocking harmful interactions, and real-time moderation tools • Apply Safety by Design principles • Ensure cross-platform interoperability of protection measures
Game industry: game developers and publishers (AAA and indies)	• Strengthen Trust and Safety teams • Adopt Safety by Design principles throughout development • Implement effective moderation systems and support safety staff • Avoid predatory monetisation and manipulative design practices • Prevent and limit toxic or abusive behaviour, sexual grooming, extremism and radicalisation • Identify and support users at risk • Collaborate across the ecosystem, including with researchers and NGOs • Provide user protection tools such as refunds, time limits and spending caps • Restrict gambling-like mechanics for minors • Reduce retention mechanics that foster dependency • Promote transparency in virtual currencies, loot boxes and reward systems • Measure and monitor the impact of toxicity • Invest in positive design and mechanics that foster healthy interactions, avoiding those that generate excessive conflict • Implement age-appropriate systems • Ensure inclusive design in terms of time, gender and culture • Support cross-platform safety coordination
Game industry: stores, distributors and retailers	• Develop, promote and enforce responsible sales and content policies for both companies and users • Ensure clear visibility of ratings • Ensure age-appropriate design and child-centred risk assessment (independently or in partnership with developers) • Strengthen protections against online harassment and hate speech • Align marketing practices with regulatory standards • Enforce strict safeguards for minors • Enhance curatorial practices for children's catalogues, particularly on mobile platforms
Game industry: hardware manufacturers	• Provide built-in parental controls • Integrate age verification in devices • Enable network-level content filters • Ensure compliance with child protection standards in consoles and devices
Adjacent platforms: streaming and video platforms	• Empower Trust and Safety teams • Equip content creators with safety and moderation tools • Establish clear guidelines for appropriate content and effective mechanisms to remove harmful material • Develop mechanisms to protect children, even if not the target audience • Regulate donations and monetisation involving minors • Regulate interaction between influencers and children to avoid exploitation • Implement Safety by Design principles across platform features

[245] SDKs (software development kits) are collections of tools, libraries and documentation that help developers create or integrate new features into software or digital platforms.

Public sector and regulators	• Enact legislation to safeguard children in gaming and uphold their rights • Review and modernise age rating systems to reflect online services, live operations and cross-media content • Regulate advertising, predatory monetisation and gambling-like mechanics • Demand transparency from the industry on content moderation and safety practices • Provide support services for children and families affected by gaming risks • Deliver public awareness campaigns and training for educators, health professionals, policymakers and caregivers • Foster cross-sector governance involving education, health, industry and NGOs • Support international cooperation for the governance of global platforms • Expand opportunities through inclusive eSports programmes, digital literacy in schools, cultural policies for games and the use of games as learning tools • Promote national support for independent developers and educational games • Provide offline leisure alternatives • Strengthen law enforcement capacity to investigate, prosecute and sanction online crimes involving children in gaming and gaming adjacent platforms • Establish specialised cybercrime units trained to deal with grooming, financial exploitation, child sexual abuse material and other online harms occurring through games and streaming platforms • Ensure effective cooperation between gaming companies, gaming adjacent platforms and law enforcement for timely reporting and removal of illegal content

Source: Author

At the macro level, systemic actors such as game developers, publishers, major distributors, retailers and government regulators hold significant power in shaping the digital gaming environment through developing and enacting policies. Table 17 outlines how these actors can mitigate structural risks through ethical game design, robust moderation, transparent monetisation and compliance with data and advertising standards. Developers are encouraged to avoid manipulative design, reduce exposure to toxic behaviour and engage in collaborative governance with other ecosystem actors. Public authorities are urged to implement cross-sector regulations, support families and embed digital gaming within wider child protection policies. This macro-level alignment is essential for addressing the broader conditions that enable or inhibit child safety and wellbeing in digital gaming.

7. Conclusions

The discussion about the opportunities and risks of digital games for children reveals a complex and multifaceted scenario. While games offer a space for socialisation, learning and the development of various skills – cognitive, emotional, social and technical – they also raise issues related to safety, mental and physical health, inclusion and predatory monetisation.

The impact of digital games on children depends on multiple factors, including the individual, social and digital context of the players. While some children are able to derive benefits from games solely through play, others need mediation to enhance learning and minimise risks. The risks identified extend beyond the content of the games and encompass structural issues such as toxic behaviour, grooming, financial exploitation, and a lack of transparency in data collection.

It is essential to note that many risks are not unique to the gaming ecosystem and are also found in other online environments, such as social media. However, some are specific to digital gaming, including live and fleeting interactions, immersive technologies and certain monetisation practices such as grinding. Features like matchmaking and randomised play increase both social opportunities and the potential for harm. Digital gaming adjacent platforms can add an additional layer of risk through

Regulation of the sector, although more advanced in countries such as the UK, still faces issues in Brazil, especially concerning age verification, data protection and oversight of predatory monetisation. Still, critical knowledge gaps remain. Further research is needed to explore how children experience gaming across socioeconomic, gender and cultural contexts; to evaluate the real-world impact of existing protective measures; how children change between platforms; and to understand how adjacent platforms mediate gaming-related risks.

To ensure a safer, fairer and more inclusive digital gaming ecosystem for children and adolescents, this report proposes the following based on the participants' insights and research findings:

Increasing opportunities: Public policy should encourage the development of educational games, serious games and independent (indie) productions, with adaptation to local cultural, linguistic and social contexts. Such measures might help to broaden the diversity of available titles, strengthen regional creative industries and ensure pedagogical and cultural relevance for different communities. This can be achieved through targeted funding schemes, fiscal incentives and partnerships between educational institutions, industry and government.

Shared responsibility: No single actor (industry, regulators or families) can ensure children's safety alone. A collaborative approach involving all actors is essential to protect children's rights while preserving the positive potential of digital play.

Safety throughout the gaming value chain: The gaming value chain describes the entire range of activities and actors necessary to create a product or service, from conception, through the different stages of production, to delivery to the final consumer. Child safety must be embedded at every stage of the gaming lifecycle. All actors in the gaming value chain – including game engines, developers, publishers, distributors, influencers, platforms and advertisers – must share responsibility for safeguarding young players.

Shared governance: Effective governance requires a multi-actor approach, involving industry, regulators, NGOs, educators, researchers and families. Power imbalances – where a few large companies dominate – must be addressed through collaborative governance, ensuring that opportunities and children's rights and wellbeing are prioritised over purely commercial interests. Children's voices and lived experiences should be included in the governance of digital gaming ecosystems.

Ethical design: Apply Safety by Design, Child Rights by Design and Playful by Design principles to place wellbeing, safety and inclusivity at the heart of game development. Design choices must avoid manipulative monetisation and manipulative patterns and instead foster positive social interaction, learning and creative exploration.

Improving age classification: Current age-rating systems are insufficient as they focus narrowly on content such as violence or sexual themes while ignoring emerging risks like manipulative monetisation, addiction risks and unsafe online interactions. The age-rating system needs to be rethought to include all dimensions of the '4 Cs' risk framework and other information necessary for parental decision-making and child protection.

8. RECOMMENDATIONS

This section explores the main insights for risk mitigation and the promotion of opportunities, as seen by the participants. The recommendations converge on a core principle: **child protection and empowerment must be embedded throughout the digital gaming ecosystem**, from design and governance to regulation and education. Achieving this requires **shared accountability**, **cross-platform coordination** and a **rights-based approach** that balances safety with the promotion of opportunities for play, creativity and learning. While everyone in the value chain has responsibility for safety (industry, regulations, families, children), games must be designed to the highest Safety by Design standards.

Governments and regulators

Support independent (indie) and educational game production

- Establish funding schemes and tax incentives for educational, serious and indie games that reflect local, cultural, linguistic and social contexts.
- Encourage the development of educational, serious and indie games adapted to local cultural, linguistic and social contexts.
- Foster public–private partnerships with educational institutions and creative industries to stimulate regional innovation ecosystems.
- Broaden the diversity of available titles and strengthen regional creative industries.
- Ensure pedagogical and cultural relevance for different communities.

Modernise age-rating and classification systems

- Expand criteria beyond content to include predatory monetisation, addictive design, unsafe interactions and chat features.
- Continuously evaluate and update the age-rating system to ensure it reflects the specific risks and features of games and gaming adjacent platforms.
- Require that age ratings incorporate the ‘4 Cs’ risk dimensions – content, contact, conduct and contract.

Develop evidence-based regulation

- Regulate the gaming environment based on empirical evidence, not moral panic, ensuring the continuous review of emerging risks.
- Involve children, educators, researchers and industry in consultation processes.
- Ensure cross-agency coordination between child protection, consumer rights and digital innovation bodies.
- Include children's voices in policymaking through structured and accessible participatory mechanisms such as school-based digital councils, online youth consultations and child participation in regulatory forums.

Enforce accountability for the gaming industry and adjacent platforms

- Extend regulation to social, streaming and chat platforms associated with gaming.
- Require child rights impact assessments (CRIAs) for games and gaming adjacent platforms.
- Require data transparency and cross-platform reporting mechanisms for harmful conduct.
- Bring forward a code of conduct that sets out minimum standards regarding the '4 Cs'. The IEEE 2089-2021 standard246 is an exemplar for such a standard.
- Prioritise projects that demonstrate ethical design, age-appropriate monetisation and child-centred content.
- Implement mandatory data protection impact assessments (DPIAs) specific to children's gaming data.
- Ensure that all digital platforms accessible to children meet accessibility standards, including screen reader compatibility, alternative input modes and neuroinclusive design.

Promote families' and children's digital literacy

- Create a National Gaming Literacy Programme for children that may allow discussion on opportunities and risks of games and gaming platforms.
- Create a National Gaming Literacy Programme for families, aimed at equipping parents, guardians and caregivers with the knowledge and skills to

[246] https://standards.ieee.org/ieee/2089/7633

understand, assess and develop strategies for guiding children's safe and ethical use of games and gaming platforms.

Law enforcement

- Strengthen law enforcement capacity to investigate, prosecute and sanction online crimes involving children in gaming and adjacent platforms.
- Establish specialised cybercrime units trained to deal with grooming, financial exploitation, sexual abuse material and other online harms occurring through games and streaming platforms.
- Ensure effective cooperation between gaming companies, adjacent platforms and law enforcement for timely reporting and removal of illegal content.

Gaming industry

Embed Safety by Design, Child Rights by Design and Playful by Design principles across the gaming value chain

- Integrate a child rights approach at every stage of the gaming lifecycle, from design and development to distribution, marketing and community management.
- Integrate safety, privacy and ethical considerations from the earliest stages of game development.
- Ensure age-appropriate affordances.
- Avoid manipulative or exploitative design patterns.
- Conduct child rights impact assessments (CRIAs) for new features and monetisation models.

Strengthen safety across the gaming value chain

- Require all actors – game engines, developers, publishers, distributors, influencers, platforms and advertisers – to share responsibility for protecting young players.
- Game engine providers should supply child safety toolkits for small and medium studios.
- Large companies should lead by example through transparent moderation systems and robust data protection.

Implement cross-platform moderation and reporting

- Establish shared registries of banned or harmful actors to prevent migration across platforms.
- Create and improve interoperable reporting tools enabling users to flag misconduct across games and communities.

Reform marketing and advertising practices

- Ban targeted advertising to underage users and prohibit playable or deceptive adverts.
- Require disclosure of sponsorships and influencer promotions aimed at children.
- Promote responsible branding and avoid marketing of alcohol, gambling or ultra-processed foods in gaming contexts.

Adopt inclusive and ethical design standards

- Use Playful by Design principles to ensure games are imaginative, inclusive and developmentally appropriate.
- Avoid fear of missing out (FOMO)-driven mechanics, artificial scarcity or confusing in-game currency systems.
- Apply Safety by Design, Child Rights by Design and Playful by Design principles to ensure wellbeing, safety and inclusivity.
- Avoid manipulative monetisation and deceptive design patterns.
- Encourage positive social interaction, learning and creativity within games.

Promote diversity and local content creation

- Encourage ethical monetisation practices and alternative revenue models that reduce dependency on microtransactions.

Build transparent and accessible parental tools

- Simplify parental control interfaces and provide clear risk information in plain language.
- Develop in-game prompts that help families manage screen time and spending time together.

Educational and research institutions

Integrate digital gaming into learning and civic education

- Use games to foster critical thinking, collaboration and empathy in formal and informal education.
- Train educators to use game-based learning methods effectively, with guidance on age suitability and risk management.
- Encourage the development of student-led game projects addressing civic, environmental or social themes.

Promote digital gaming literacy and child participation

- Implement curricula on media and game literacy focusing on ethics, monetisation awareness and online safety.
- Support children's participation in policy discussions, research and design workshops related to digital gaming.

For Universities and research institutions

- Implement debates and courses on ethical game design in educational and professional settings to promote responsible industry practices.
- Encourage cross-sector research on cross-platform risks, migration patterns and emerging technologies.
- Build international observatories for data sharing and monitoring of gaming-related harms and benefits.

Families and caregivers

Strengthen parental mediation through empowerment, not only restriction

- Promote co-play and dialogue instead of punitive or purely technical control.
- Provide accessible digital literacy programmes for parents or caregivers, especially those in low-income contexts.
- Encourage parents or caregivers to discuss game content, spending habits and online relationships with their children.

Use contextualised parental control tools

- Advocate for customisable controls adapted to children's developmental stages and literacy levels.
- Ensure clear information on game mechanics, in-app purchases and online risks.

Cross-sector actions

Adopt a cross-platform governance framework

- Create a multistakeholder oversight mechanism involving governments, industry and civil society.
- Promote shared responsibility for data protection, moderation and risk mitigation across all digital environments.
- Facilitate data-sharing agreements to prevent harmful users from reappearing under new identities.
- Promote collaboration among all actors – industry, regulators, families, educators and civil society – to ensure children's safety and rights.
- Recognise that no single actor can safeguard children alone; collective responsibility is essential.

Develop a global code of conduct for gaming safety

- Establish international standards for ethical design, transparency in monetisation and child participation in governance.
- Encourage alignment with UNICEF's child online protection principles and the OECD Recommendation on Children in the Digital Environment.[247]
- Establish multi-actor governance structures involving industry, regulators, NGOs, educators, researchers and families.
- Address power imbalances where a few large companies dominate the ecosystem.
- Prioritise children's rights, wellbeing and opportunities over commercial interests.
- Include children's voices and lived experiences in decision-making about gaming environments.

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Appendix: Interview method

Each interview lasted approximately one hour and followed a semi-structured questionnaire. Interviews were conducted in Portuguese and English. The interviews generated a dataset, reflecting similarities and differences in how the participants perceived the opportunities and risks of digital gaming, as well as the broader social conditions that shape children's experiences.

The analysis followed two complementary stages. First, the literature was examined. Second, the interview data were analysed to understand the factors shaping practices in the gaming ecosystem and how these can lead to opportunities or risks.

The interview transcripts were coded thematically in two cycles. In the first cycle, responses were systematically categorised according to the structure of the interview guide (opportunities, risks, vulnerabilities, institutional responsibilities and additional considerations). In the second cycle, opportunities and risks were coded according to the CO:RE framework. In the third cycle, themes raised by the participants that were not part of the original framework were added.

The coding framework organises data thematically and shows their relationship to the interview question structure. This method ensured a consistent and transparent process of interpretation, making it possible to compare findings across contexts and highlight convergences and divergences between Brazil and the UK.

Interview questions

1. What opportunities do you think games offer children and adolescents? (Opportunities are defined as activities that can generate socialisation, entertainment, learning, health, civic participation and citizenship.)

2. What do you think are the main risks for children and adolescents associated with online games? (Risks are defined as activities or experiences with harmful potential.)

3. Among the risks you listed, do you think there are differences between different children and adolescents? Which ones do you think might be more vulnerable to the risks you've listed?

4. What do you think different institutions (governments, schools, NGOs, families, the gaming industry, Big Tech companies, academia, etc.) can do to mitigate these risks?

5. Anything else you'd like to add?

Coding based on interview questions (first analysis cycle)

Table 18: Coding based on interview questions

Theme	Coded data content
Opportunities	Answers to question 1. Data content coded under this theme describes opportunities perceived in games for socialisation, entertainment, learning, health, civic participation and citizenship
Risks	Answers to question 2. Data content coded under this theme captures perceived risks in four categories: • Content risks – exposure to violent, sexualised, extremist, hateful or age-inappropriate material • Contact risks – risks of interaction with strangers, including grooming, sexual solicitation, harassment, bullying and exploitation • Conduct risks – risks related to children's own behaviour online, such as cyberbullying, toxic play, cheating and hate speech • Contract risks – risks arising from the commercial and financial aspects of games, including loot boxes, microtransactions, manipulative design, unfair contracts and overspending
Vulnerabilities	Answers to question 3. Data content under this theme describes differences between children and adolescents regarding their vulnerability to risks, including age, gender, socioeconomic background, digital skills and levels of maturity. Vulnerabilities relate to how these risks can turn into harm
Actors' roles	Answers to question 4. Data content coded under this theme captures what respondents think governments, schools, NGOs, families, the gaming industry and academia can do to mitigate risks, including regulation, digital literacy, parental mediation, ethical design and research/advocacy
Additional remarks	Answers to question 5. Data content coded under this theme records final considerations, including an emphasis on multistakeholder responsibility, the balance between risks and opportunities and the need for proactive policies

Thematic discussion by participants (second analysis cycle)

Theme 1 – Opportunities

Table 19: Opportunities

Themes	Brazil participants	UK participants
Civic participation	2	3
Cognitive socioemotional competences	7	6
Entertainment and wellbeing	9	8
Inclusion	5	6
Learning	8	7
Socialisation	10	9

Theme 2 – Risks

Table 20: Content risks

Themes	Brazil participants	UK participants
Extreme violence	1	2
Terror and horror	1	1
Indicative classification failures	3	2
Sexualisation	2	3
Hate speech	4	2
Representation of the characters	1	2

Table 21: Contact risks

Themes	Brazil participants	UK participants
Toxicity	4	3
Radicalisation	6	3
Grooming	7	3
Bullying and cyberbullying	5	5
Server self-management	1	0
Normalisation of inappropriate behaviour	4	2
Hate speech	5	3

Table 22: Conduct risks

Themes	Brazil participants	UK participants
Toxicity	4	3
Bullying and cyberbullying	3	5
Bypassing parental controls	1	1
Blackmail and sextortion	1	0
Game piracy and hacking	2	1
Virtual attacks	0	0
Sharing personal data	4	1
Grooming	5	4

Table 23: Contract risks

Themes	Brazil participants	UK participants
Data collection and use/profiling	4	6
Consumption	2	4
Cryptocurrencies	1	1
Data sharing	2	5
Manipulative design	3	7
Donations to influencers	0	2
Fraud and scams	4	1

Predatory monetisation	6	9
Publicity, advertising and marketing	3	5
Precarious work	1	2

Table 24: Transversal risks

Themes	Brazil participants	UK participants
Addiction to digital gaming	15	15
Discrimination	2	1
Irritability and aggression	1	3
Mental health	5	2
Physical health problems	2	1
Sleep problems	1	2
Social isolation	2	1

Theme 3 – Vulnerabilities that may turn risks to harm

Table 25: Vulnerabilities

Vulnerable groups	Brazil participants	UK participants
Younger children	8	5
Adolescents	4	4
Girls/young women	3	4
Children in socioeconomic disadvantage	8	3
Children with disabilities/ neurodivergence	3	2
Refugees/migrants	1	2
Insufficient parental mediation	5	3
Limited access to high-quality games	3	2

Theme 4 – Actors that should be involved in protecting children

Table 26: Actors in the ecosystem

Actors	Brazil participants	UK participants
Family/parents	10	9
School/educators	4	5
Government/policy	6	10
Industry/platforms	7	9
Civil society/NGOs	2	1
Peers/children	2	4

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