

# A Typology of Museum Games: Towards a Museum Game Design Toolkit

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As museums continue to innovate and find new ways of engaging visitors, the use of games has emerged as a tool for engagement, education, and entertainment. But while the collection and curation of games are now well within the remit and expertise of museums, many museums are also creating playful game-like experiences that evade definition, and sometimes challenge visitors' expectations by not conforming to shared understandings of what a game is. This paper presents a tentative typology of games in museums, drawn from research into the use of games in Australian museums. Through an analysis of six case studies, we have constructed a framework for museums and game designers to support the development and integration of games in museums.

CCS Concepts: • **Human-centered computing** → **HCI theory, concepts and models**; • **Applied computing** → *Computer games*.

Additional Key Words and Phrases: Museum games, games studies, case studies, typology

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## 1 Introduction

Defining "games" has long been the subject of debate among both theorists and designers [4, 26]. While games themselves are not inherently complex, they seem somewhat impervious to definition in part because they are closely entwined with play - an activity so ubiquitous to the human experience that it also resists precise definition. The field of games studies intersects with multiple disciplines, each of which approaches the task of definition from its own philosophical perspective. Additionally, the need for a clear definition varies across different contexts: industry professionals, researchers, and everyday players each require a definition that serves their specific purposes. This complexity is further compounded by the fact that definitions, whether real or nominal [3] are seldom resilient to change, and there is a persistent yet problematic tendency to seek totality—to fully capture every dimension of a complex phenomenon within a single, all-encompassing expression. However, games cannot and should not be forced into a mutually exclusive, collectively exhaustive framework. The definition of a game is inherently bound to cultural and contextual factors—the audience, the definition, and the reason it is being offered matter greatly. The utility of any definition is thus context-dependent.

This definitional ambiguity becomes more pronounced when games are situated within specific contexts, such as museums, where they intersect with educational, cultural, and curatorial objectives. The study of museum games is

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particularly important for two reasons. Firstly, as museum games represent an emerging and distinct class of games, it is useful to establish a shared understanding of what they are. Secondly, when a museum invites a visitor to play a game, it is important that the museum's expression of a game aligns with the visitor's expectations of what constitutes a game. This alignment is necessary to ensure that the game serves its intended purpose and provides an engaging and meaningful experience. Unlike serious games [1], which integrate the enjoyable aspects of games to serve educational or training purposes, museum games occupy a more complex space. While some may share similarities with serious games in their educational intent, museum games may also be purely entertaining, or provide a meaningful or emotional experience for the visitor.

This paper does not seek to construct a new and all-encompassing definition of games, nor of museum games. Rather, we seek to contribute to an understanding of the different facets of museum games through the presentation of a tentative typology drawn from our research with Australian institutions. Our study examines the various ways that games intersect with museums, and from a preliminary analysis of six case studies, we have constructed a typology of five expressions of games in the museum context. We explore how they are understood, discussed, designed, and implemented, and received. This typology not only enhances our understanding of games in museums but will serve as a foundation for developing a toolkit to aid museum professionals in their use of games. Museum games present unique challenges and opportunities in terms of interaction design, user engagement, and the blending of digital and physical experiences. By examining how visitors interact with games and how they influence engagement, this research contributes to broader discussions in HCI about the role of context in shaping user experiences and the potential for games to serve as tools for engagement in diverse settings.

## 2 Related Work

### 2.1 The Game Definition

Huizinga [14], Caillois [9], and Suits [27] are traditionally the first three names to appear when discussing the definition of a game. Many others have put forward theories over the years, with scholars and designers needing to review an ever-expanding selection of foundational texts. More recent and comprehensive work by Salen and Zimmerman [23], Stenros [26], and Arjoranta [4] synthesises many of the existing definitions and examines when and why a definition is even required [3].

Salen and Zimmerman's [23] comparative analysis of game definitions reveals the core issues at play (see 1). Particularly the multifaceted nature of the term "game," which can refer to the artifact, the system, or the act of play, and the many other qualifiers that are placed around the definition to clarify the role games fill in a socio-cultural context.

Stenros [26] highlights how these definitions can serve as an ontological foundation for games studies, and raises ten points of interest that frame the contested elements within game definitions: rules, purpose and function, artefact or activity, separate yet connected, the role of the player, (un)productive, competition and conflict, goals and end conditions, construction of the category, and coherence [26]. These ten themes indicate contested points of interest for game definitions and game studies and the necessity for scholars to clarify their own positions on these fundamental questions.

Wittgenstein's [29] concept of language games is frequently invoked in these discussions, particularly by Arjoranta [3], as a way to address the challenges of game definition. Wittgenstein suggests that the act of defining games might be less about pinpointing a rigid definition and more about recognizing the family resemblances [29] between different forms of play. This perspective shifts the focus from trying to define games in absolute terms to understanding them as

a category with fluid boundaries. Such an approach is particularly useful in game studies, where strict definitions can often hinder rather than help scholarly discourse. Suits [27] also warns against declaring games as indefinable, arguing that while Wittgenstein’s insights are valuable, they should not lead to a resignation that defining games is a futile effort. Instead, the aim should be to develop definitions that are both functional and adaptable to different contexts.

Elements of a game definition	Parlett	Abt	Huizinga	Caillois	Suits	Crawford	Costikyan	Avedon   Sutton-Smith
Proceeds according to rules that limit players	√	√	√	√	√	√		√
Conflict or contest	√					√		√
Goal-oriented/outcome-oriented	√	√			√		√	√
Activity, process, or event		√			√			√
Involves decision-making		√				√	√	
Not serious and absorbing			√					
Never associated with material gain			√	√				
Artificial/Safe/Outside ordinary life			√	√		√		
Creates special social groups			√					
Voluntary				√	√			√
Uncertain				√				
Make-believe/Representational				√		√		
Inefficient					√			
System of parts/Resources and tokens						√	√	
A form of art							√	

Fig. 1. Salen & Zimmerman’s comparison table of game definitions from Rules of Play: Game Design Fundamentals

## 2.2 Museum Games

Museums have been experimenting with games and play for the visitor experience for many years at this point [6, 7]. There has also been plentiful discussion on how to exhibit games in museums [18, 21] and a more emerging body

of work that considers the experience of games in museums [12, 20, 22]. However, few scholars discuss the theory of game design for museums. There are many papers on the design and development of museum games that discuss and document in-depth the design process [2, 16, 17], but few discuss theory at the same level that we find for game design [15, 23, 25]. David Schaller's [24] theory of extrinsic and intrinsic gameplay for museum game design is a notable exception. Extrinsic gameplay separates gameplay and content, and functions as a container for museum content. Intrinsic gameplay marries gameplay and content. Inherent attributes of the game objects (e.g. the content) are integrated into the gameplay, requiring the player to pay attention to those attributes in order to make thoughtful choices throughout the game. The benefits of extrinsic gameplay are evidently that these games are easier to design and can be re-purposed with new content either as exhibitions change over or across different museums. However, this separation can theoretically lead to lower levels of engagement. Critically, the success of either approach depends not solely on the level of integration but on the quality of the game design itself. A well-designed extrinsic game can be just as effective in achieving its goals as an intrinsic one, depending on the context and objectives of the museum.

### 3 Method

To understand the different approaches to using games in museums, we selected five Australian museums as case studies. Ethics approval for the study was obtained from The University of Melbourne ID 25943. Data was also drawn from prior work by the authors with a sixth Australian museum. A case study approach was used with the aim of generating a variety of rich contextual and situated data about real-world phenomena [30]. We sought to develop a typology of museum games by examining the design intent, characteristics, and implementation strategies of games across several museums. Games were identified through inductive coding of data collected from site visits, gameplay, and design materials and activities, and clarified through semi-structured interviews with museum staff across different areas - curatorial, education, exhibition design, programming and leadership - as well as game designers who had worked with museums. While future work will engage in a cross-case thematic analysis of these interview transcripts, this short paper concerns only the identification and categorisation of the way games were being deployed at these museums [11, 13]. The findings presented here lay the groundwork for a more comprehensive analysis that will uncover further detail and expand the discussion of museums' engagement with games.

#### 3.1 Case Selection

Australian museums were selected for this study based on their use of games or game-like initiatives. The selection criteria included:

- (1) Diversity of museums: we sought cases that were representative of museums of different sizes and focuses (arts, design, science, history). We want our findings to be broadly applicable to museums.
- (2) Diversity of games: we chose museums that had varied uses of games or game-like activities. We purposefully did not limit the definition of a game before selection to include a broad variety and stay open to cases where the museums had been vaguer in their labelling.

The interviews clarified that the games were of a significant type and recurred across institutions, and other uses of games that were more idiosyncratic have not been reported on here. These criteria yielded cases at the following institutions:

**Science Gallery Melbourne (SGM)** (<https://melbourne.sciencegallery.com/>) is concerned with the intersection of art and science and science communication through creative means. SGM has a particular focus on engaging young

people through school programs and integration with courses at the University of Melbourne. Science Gallery has several game-like initiatives in these programs, including a game-show module, and *Mission Control*, a workshop that was developed with industry partners and uses roleplaying and Lego to engage young people in the space industry. The gallery has also developed a mobile game called *Re:collect* with a student group.

**The Australian Centre for the Moving Image (ACMI)** (<https://www.acmi.net.au/>) in Melbourne is the museum of screen culture, encompassing film, television, video games, and other digital media. Given their focus on the research, collection, and exhibition of video games, ACMI has a unique position when discussing games. Much of ACMI's programming engages with video games, including workshops teaching animation and character design and at-home modules analysing games. ACMI also supports creative residencies for game developers and curates exhibitions such as *Honk!*, an exhibition on *Untitled Goose Game*, showcasing the game's creative development through displays of previously unseen concept art, sketches and design material as well as playable versions of the game from its early development.

**The Australian National Maritime Museum** (<https://www.sea.museum/>) in Sydney is Australia's only national museum situated outside of Canberra. It focuses on naval history, immigration, ocean exploration, and indigenous seafaring traditions, and has one of the largest floating historical vessel collections in the world. As a national museum, the Maritime has a remit to reach audiences across Australia and as such, runs a series of travelling exhibitions and online programs. The museum commissioned a series of three video games to fulfil this remit: *The Voyage* in 2015, *Cook's Voyages* in 2020, and *Wreck Seeker* in 2021, primarily for use in Australian classrooms.

**The Hellenic Museum** (<https://www.hellenic.org.au/>) in Melbourne celebrates Greek culture and history. It caters to both the Greek diaspora community and a contemporary Australian audience. Its collections contain both ancient artefacts and contemporary art. The museum's regular programming includes workshops, tours, lectures, cinema screenings, and other events. In the last few years, they have also run several game events including ancient boardgames, a megagame, the tabletop roleplaying game Dungeons & Dragons (D&D), and most recently a live-action roleplay (LARP).

**The Museum of Discovery (MOD.)** (<https://mod.org.au/>) in Adelaide is a "futuristic museum". Much like SGM, MOD. targets a younger demographic, exploring how research shapes our understanding of the world and informs the future. MOD.'s exhibitions often include mobile games and playable interactives, some of which are available online. The museum is unique in applying game design principles to its exhibition design, using concepts like Bartle's [5] taxonomy of player types to augment existing visitor engagement strategies and tailor experiences to different audience segments.

**The Powerhouse Museum** (<https://powerhouse.com.au/>) is the largest museum group in Australia. Spread across four locations in Sydney, the Powerhouse Museum focuses on the intersection of science, technology, design, and innovation. The Powerhouse has established a strong relationship with the Australian gaming community through its curatorial programs and games editions of the Powerhouse Late program, which in 2022 and 2023 featured a series of gaming events, including demos of video games, tabletop roleplaying games, and talks by industry professionals. The Powerhouse also supports the Australian games industry through creative residencies for game studios and participates in a joint initiative with ACMI and the National Film and Sound Archive to collect Australian video games.

Table 1. Typology

Typology	Definition
Museum-themed game	A game designed with the intent of engaging participants with the museum’s content, either with specific exhibited material or with exhibit themes. They do not intrinsically rely on the museum’s physical space, and so can be played either onsite or offsite.
Museum-wide game	A game designed with the intent to integrate the museum’s physical environment and content into the premise and gameplay. These games do not make sense outside of the specific museum they were designed for, and would require mechanical adaptation to be played elsewhere.
Game as exhibit	A game developed independently from the museum but acquired or exhibited by the museum. It can be showcased either in its original playable form or as part of a broader exhibition that examines the game’s design, cultural impact, or development process.
Playful non-game	An interactive, engaging experience that embodies elements of play but doesn’t necessarily meet the formal definition of a game. These experiences emphasise elements such as creativity, exploration, or storytelling rather than structured game mechanics.
Museum as game	An approach to exhibition design where the museum itself is treated as a game, by the application of game design principles to visitors or the experience design.

#### 4 Findings

We present here our typology of museum games. We are not seeking a typology of surface characteristics, but rather attempting to construct some fundamental types that probe the deeper relationship between the notion of a game and the institution of the museum. The definitions are provided in a table and expanded below with examples from our data.

**Museum-themed game:** the goal of the museum-themed game is to engage players with the museum’s domain, whether that involves the thematic focus of an exhibition, specific content, or the museum as an institution. *LORE*, the D&D game at the Hellenic Museum, incorporated items from the collection into the adventure, but rather than focusing solely on education, the goal was to spark curiosity. This category does not necessarily imply that the museum is responsible for the game’s creation. Several participants described the process of having a game developed externally based on a provided brief, with varying levels of involvement from museum staff. For example, the Maritime Museum’s video games were conceived by the museum but developed externally for educational use in classrooms. While these games are rooted in the museum’s content, they are not always designed to be played onsite — their significance lies in their connection to the museum. Another example of this is *The Ark*, a megagame the Powerhouse implemented as part of their Future Space Program, which was conducted offsite to engage students in the program’s themes and encourage interaction across the different participating schools.

**Museum-wide game:** by contrast to museum-themed games, museum-wide games rely on the physical space of the museum for gameplay. These games are designed to directly connect players with exhibition material, with the aim of deepening their interaction with the objects and curation. An example from our research is *Mysterion: Descent into Hades* at the Hellenic Museum, a LARP that drew on immersive theatre and escape room design. Players took on the role of initiates in a mystery cult based on the Elusinian Mysteries [28] that had taken up residents in the museum. Players were tasked with completing quests related to the mystery cult and the Greek gods. The solutions to these quests were embedded in various parts of the museum, requiring players to interact with exhibits to progress. Another example is

the mobile game *Re:collect* at SGM, which was designed for the *Sci-Fi: Mythologies Transformed* exhibition. This game requires players to engage directly with the artworks for gameplay. In both instances, the games are inherently tied to the museum environment and become unplayable if removed from this context.

**Game as exhibit:** this category refers to games that are created independently but acquired by a museum for collection and curation. The defining quality of the game as exhibit is in the curatorial decisions. *Untitled Goose Game*, which was developed by House House and later acquired by ACMI, the Powerhouse Museum, and the National Film and Sound Archive as part of a collaborative effort to collect and preserve Australian-made video games, is an example of this. While this acquisition reflects the broader efforts of museums to collect and conserve games as significant cultural artefacts, the curatorial decisions surrounding the collection and exhibition of such games are the critical aspect in this context, as they shape the visitor experience. The acquisition alone does not qualify as a distinct category within this typology; rather, it is the presentation of the game for visitor interaction that establishes it as significant. ACMI's forthcoming exhibition *Honk!* explores the making of *Untitled Goose Game*, offering multi-modal engagement through playable versions, interactive elements, and displays of game art. Similarly, the Powerhouse Museum's artistic residency program supported the development of *Queer Man Peering Into a Rockpool.jpg* by Fuzzy Ghost, which was subsequently featured in the *Absolutely Queer* exhibition in a playable form.

**Playful non-game:** the playful-non game is the most challenging to capture as it requires us to wade into the discussion of what makes a game. The example that prompted us to create this category is the *Quest* module at SGM, which is characterised as a roleplaying game. *Quest* is a semi-facilitated experience where students are invited to choose or are given a character from seven options. Each character has a different activity, all designed to engage students with the works in the gallery. However, drawing on Salen and Zimmerman's [23] definition and their presentation of previous definitions, and Stenros' [26] ten categories, the key element missing from *Quest* that would classify it as a game is conflict, which whether representational or mechanical, typically stems from the interaction with a system. It is worth clarifying that there are no inherent problems with offering non-game activities; however, describing an activity as a game when it does not express the characteristics of a game can lead to confusion or disappointment in visitors. Other examples of playful non-games that arose in our research include puzzles, VR experiences, and Lego.

**Museum as game:** our final category speaks to the application of game design to exhibition design. While more nebulous than the other categories, this type of museum game is exemplified by MOD's exhibitions, which often incorporate game design thinking to create interactive experiences. Many museums have a concept of visitor personas or motivation identities, but MOD's are inspired by Bartle's [5] player motivations as a means of conceptualising the different types of visitors and what they might need or want from an exhibition experience. Similarly, MOD. considers the flow and progression of an exhibition in a manner akin to how these elements are approached in game design, with the aim of creating an immersive visitor experience and rendering the museum as a metaphor of a game. This perspective is valuable as it highlights an opportunity for other museums to enhance visitor engagement by theorising the museum as a game.

## 5 Discussion

Our typology is not constructed around any one dimension of a museum game. As previously noted, games cannot be neatly sorted into a mutually exclusive, collectively exhaustive framework. Instead, we have focused on utility-oriented categories that represent the full range of examples found in our case studies. While alternative typologies could be developed, particularly those focusing on games specifically designed for museums, such approaches might overlook broader applications, such as the use of game design principles within museum settings or the integration of games

into exhibitions. The boundary between "game" and "non-game" remains complex and contested, and will invariably require further consideration. In considering the construction of our toolkit, it is worth examining other qualities of museum games that we identified from our data:

**Integration:** the level of integration between a game and the museum exists on a spectrum rather than within discrete categories. Schaller's [24] notion of intrinsic and extrinsic gameplay closely aligns with our museum-themed and museum-wide games. However, Schaller's binary distinction between whether mechanics are intrinsic to the museum content does not fully capture the nuances of these categories. The spectrum of integration speaks to the complexity of designing museum games and highlights the need for both adaptable and context-sensitive approaches.

**Location:** the intended location of play impacts the integration of museum content. Offsite games, often accessed via the internet, lend themselves to broader reach but reduced integration with the physical environment. This is not necessarily a drawback if the game targets audiences who cannot physically visit the museum, as seen with the Maritime Museum's games. Conversely, onsite games are not automatically more integrated. Our museum-wide category was named to suggest that these games are more complexly entwined with the museum spatially, particularly regarding embodied play.

**Goal:** the function of the museum game, whether for education, engagement, entertainment, exploration, or social interaction, shapes the visitor experience and should be key design consideration. For example, *Mysterion* was designed to achieve all these goals simultaneously. It had educational content, and was intended to entertain players, facilitate exploration of the museum, and encourage social interaction, all as explicit design considerations.

**Origin:** many of the games in our data were commissioned and built under museum guidance, however, a few were adaptations of existing games, modified for a specific experience the museum was trying to create. *The Ark*, the megagame used by the Powerhouse, was modified for the Future Space Program with guidance from Powerhouse staff. This represents a highly efficient way of using complex games for museum goals. This is not dissimilar to the modification of video games for exhibitions, and reflects the adaptive nature of games and the potential for collaborations between museums and game designers.

**Time:** the temporal dimension of museum games, whether as one-off events, tied to exhibitions, or designed for long-term engagement, also warrants consideration, as does the intended duration of play. Events like *The Ark* and *Mysterion* required significant resources and facilitation and must be played at a specific time for a fixed number of hours, while games tied to temporary exhibitions, such as *Re:collect* and MOD's playable interactives have more limited lifespans, and were designed to communicate their point within the first five minutes of play, though visitors often spent much longer playing them.

**Format and Gameplay:** this encompasses the platform of the museum game, including mobile, VR, console or computer games, and board games, but also gameplay mechanics such as puzzles, narrative, and roleplaying elements, which are sometimes bound to specific formats, and are often the foundation of rules and conflict [26]. The format of a game influences how it is experienced and perceived by visitors, while technological choices introduce specific challenges and costs but also offer benefits such as reach.

Attempting to create a typology that addresses every variation of each of these qualities proved too complex to be practical. While some categories are discrete, such as whether a game can be played offsite, others exist on a spectrum. The question of what constitutes a game within a museum context—and how these games differ from traditional games in both purpose and execution—remains central to our inquiry. While we have addressed several of Stenros' [26] themes, others require further exploration. A museum game must be understood as both artefact and activity. This duality is encapsulated in our games as exhibit category, where the artefact and the activity are simultaneously on

display, reflecting the complexity of this theme. The theme of separate yet connected can be linked directly to the conceptualisation of museums as liminal spaces [10]: the museum is in some way disconnected from daily life, and playing a game in a museum will enhance this. The role of the player is similarly complicated by the games as exhibit category, as while there is always a human element (usually a visitor), it is not always a player. The (un)productive aspect is challenged by the linking of museum games to serious games, which tend towards framing games as highly productive. While educational goals are often prioritised in museums, we assert that the emotional and experiential outcomes of games hold significant value for museums. The construction of the category and coherence themes are represented in our typology, which clarifies how games relate to the specific contexts in which they are situated. This relationship underscores the fundamental differences between museum games and regular games, emphasising how the former are deeply embedded in the educational, cultural, and experiential goals of the museum environment.

### 5.1 Limitations and Future Work

There are two uses of museum games that we did not feel constituted a type. While the first was represented in the data, it did not fit within the typology due to its limited applicability. The second did not justify its own category without further investigation. The first is ACMI's educational programs for games literacy. We excluded this because it is unique to ACMI, and while valuable, is not broadly applicable to other museums. However, we included the exhibition of games in our typology as MOD. has previously exhibited video games, and the Hellenic Museum has expressed interest in exhibiting games related to Greek mythology, suggesting that the collection and exhibition of video games is becoming more widespread. The second subject is virtual museums or museums that have been reconstructed within games like Minecraft [19]. The National Museum of Australia has a virtual world with a scavenger hunt, but we were unaware of this at the time of our data collection. This area is of interest because it is likely an extension of museum-themed video games, and raises questions about whether virtual environments have any superiority to other games. Further research is needed to understand their implications for museums.

The toolkit we propose is intended as a creativity support tool for museum professionals, aimed at facilitating the design of museum-situated or museum-wide games. The toolkit supports users to answer questions around format and gameplay elements, particularly in regards to the use of new media and advanced technologies, as these are often harder to access for smaller institutions. We also identified that additional support is needed to legitimise games in museums, particularly when facing budgetary constraints [8]. Further work would also seek to survey about the use of games more widely than the Australian context.

## 6 Conclusion

By developing a typology of museum games, our paper contributes to broader theoretical understandings of play and interaction. We have adopted a descriptivist and nominal approach to the definition of a museum game, in the hope of emphasising the cultural contexts at play in museum game design. Understanding how game design principles can be applied to museum contexts opens new avenues for research and practice within both museum studies and human-computer interaction, offering insights into how interactive design can transform traditional spaces, and framing future research on play in non-traditional contexts. Further work is needed to refine the definition of a museum game and to develop a comprehensive toolkit that can guide practitioners in the design and implementation of these games. By continuing to explore the intersections between games and museums, we can better understand their potential to enrich the museum experience.

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## References

- [1] Clark C. Abt. 1987. *Serious Games*. University Press of America.
- [2] Kaja Antle, Ben Horan, Michael Mortimer, Robert Leen, Marie Allaman, Pat Vickers-Rich, and Thomas Rich. 2018. Mixed Reality for Museum Experiences: A Co-Creative Tactile-immersive Virtual Coloring Serious Game. In *2018 3rd Digital Heritage International Congress (DigitalHERITAGE) held jointly with 2018 24th International Conference on Virtual Systems & Multimedia (VSMM 2018)*. 1–7. <https://doi.org/10.1109/DigitalHeritage.2018.8810060>
- [3] Jonne Arjoranta. 2014. Game Definitions: A Wittgensteinian Approach. *Game Studies* 14, 1 (Aug. 2014). <https://gamestudies.org/1401/articles/arjoranta>
- [4] Jonne Arjoranta. 2019. How to Define Games and Why We Need to. *The Computer Games Journal* 8, 3-4 (Dec. 2019), 109–120. <https://doi.org/10.1007/s40869-019-00080-6>
- [5] Richard A. Bartle. 1996. Hearts, Clubs, Diamonds, Spades: Players Who Suit MUDs. *MUD* (1996). <https://mud.co.uk/richard/hcds.htm>
- [6] Katy Beale (Ed.). 2011. *Museums at play: games, interaction and learning*. MuseumsEtc, Edinburgh. OCLC: ocn756202760.
- [7] Anton Berndt. 2011. Playing the Museum: towards a rationale for games in exhibition design. In *IE '10: Proceedings of the 7th Australasian Conference on Interactive Entertainment*. 1–3.
- [8] Sophia Booi. 2024. Narrative-Based Games for learning in GLAMS: Overcoming professional hesitations through an introductory guide. In *Proceedings of DiGRA Australia 2024*.
- [9] Roger Caillois. 2001. *Man, Play, and Games*. University of Illinois Press. Google-Books-ID: bDjOPsjzC4C.
- [10] Carol Duncan. 1995. *Civilising Rituals: Inside public art museums*. Routledge, London.
- [11] Kathleen M. Eisenhardt and Melissa E. Graebner. 2007. Theory Building From Cases: Opportunities And Challenges. *Academy of Management Journal* 50, 1 (Feb. 2007), 25–32. <https://doi.org/10.5465/amj.2007.24160888> Publisher: Academy of Management.
- [12] Erica Gangsei. 2012. SFMOMA's Art Game Laboratory: Real-Life Mad Science Experiments in Visitor Engagement. In *Museums and the Web 2012: Proceedings*. San Diego, CA, USA. [https://www.museumsandtheweb.com/mw2012/papers/sfmoma\\_s\\_art\\_game\\_laboratory\\_real\\_life\\_mad\\_sci.html](https://www.museumsandtheweb.com/mw2012/papers/sfmoma_s_art_game_laboratory_real_life_mad_sci.html)
- [13] Alexander L. George and Andrew Bennett. 2005. *Case Studies and Theory Development in the Social Sciences*. MIT Press.
- [14] Johan Huizinga. 2013. *Homo Ludens: a study of play-element in culture*. <http://site.ebrary.com/id/10843360> OCLC: 878148650.
- [15] Petri Lankoski and Jussi Holopainen. 2017. *Game Design Research: An Introduction to Theory & Practice*. Carnegie Mellon University. <https://doi.org/10.1184/R1/6686750.v1>
- [16] Anders Sundnes Løvlie, Karin Ryding, Jocelyn Spence, Paulina Rajkowska, Annika Waern, Tim Wray, Steve Benford, William Preston, and Emily Clare-Thorn. 2021. Playing Games with Tito: Designing Hybrid Museum Experiences for Critical Play. *Journal on Computing and Cultural Heritage* 14, 2 (June 2021), 1–26. <https://doi.org/10.1145/3446620>
- [17] Vicky Manoli, Christos Sintoris, Nikoleta Yiannoutsou, and Nikolaos Avouris. 2015. Tagging Game: Learning about contemporary art through game play.
- [18] Michael McMaster. 2023. *Videogames and the Public Museum: Six months behind the scenes*. Ph.D. Dissertation. RMIT University, Melbourne, Australia.
- [19] Joe Miller. 2014. British Museum to be digitally recreated in Minecraft. *BBC News* (Sept. 2014). <https://www.bbc.com/news/technology-29281051>
- [20] Niklas Nylund. 2018. Constructing Digital Game Exhibitions: Objects, Experiences, and Context. *Arts* 7, 4 (Dec. 2018), 103. <https://doi.org/10.3390/arts7040103> Number: 4 Publisher: Multidisciplinary Digital Publishing Institute.
- [21] Maria Lujan Oulton. 2019. The nuances of video game curation. Lessons from Argentina. *Video Games and the Global South* (Jan. 2019). [https://www.academia.edu/39972887/The\\_nuances\\_of\\_video\\_game\\_curation\\_Lessons\\_from\\_Argentina](https://www.academia.edu/39972887/The_nuances_of_video_game_curation_Lessons_from_Argentina)
- [22] Leonie Rowan, G. Townend, Catherine Beavis, L. Kelly, and J. Fletcher. 2016. Museums, games, and historical imagination: student responses to a games-based experience at the Australian National Maritime Museum. (July 2016). [https://dro.deakin.edu.au/articles/journal\\_contribution/Museums\\_games\\_and\\_historical\\_imagination\\_student\\_responses\\_to\\_a\\_games-based\\_experience\\_at\\_the\\_Australian\\_National\\_Maritime\\_Museum/20869102/1](https://dro.deakin.edu.au/articles/journal_contribution/Museums_games_and_historical_imagination_student_responses_to_a_games-based_experience_at_the_Australian_National_Maritime_Museum/20869102/1) Publisher: Deakin University.
- [23] Katie Salen and Eric Zimmerman. 2004. *Rules of play: game design fundamentals*. The MIT Press, Cambridge, Mass. <https://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&db=nlabk&AN=2517892> OCLC: 1225199982.
- [24] David Schaller. 2014. Game mechanics and the museum: Designing simple gameplay around complex content. In *Proceedings of the MW2014: Museums and the Web*.
- [25] Nellie Seale, Wally Smith, and Melissa Rogerson. 2024. LORE-Drop: Museum Game Design. In *Proceedings of DiGRA Australia 2024*. Melbourne, Australia.

- [26] Jaakko Stenros. 2017. The Game Definition Game: A Review. *Games and Culture* 12, 6 (Sept. 2017), 499–520. <https://doi.org/10.1177/1555412016655679> Publisher: SAGE Publications.
- [27] Bernard Suits. 1978. *The grasshopper: games, life, and Utopia*. University of Toronto Press, Toronto ; Buffalo.
- [28] Yulia Ustinova. 2013. To Live in Joy and Die with Hope: Experiential Aspects of Ancient Greek Mystery Rites. *Bulletin of the Institute of Classical Studies* 56, 2 (2013), 105–123. <https://www.jstor.org/stable/44254135> Publisher: Wiley.
- [29] Ludwig Wittgenstein. 1958. *Philosophical Investigations* (2nd ed ed.). Blackwell, Oxford.
- [30] Robert K. Yin. 2009. *Case study research: design and methods* (4th ed ed.). Number v. 5 in Applied social research methods. Sage Publications, Los Angeles, Calif.