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Design Research Gameplay.
A Technocultural Approach to Design Research through Game-forms and Play.

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Esame finale anno 2025


Activist Games


Advergames


Alternate Reality Games (ARG)


Art Games

Alma Mater Studiorum - University of Bologna
PhD in Architecture and Design Cultures
37th cycle
Final Exam: 2025


Applied Games


Art Mods


Avant garde Games


Conceptual Video Games


Critical Games


Citizen Science Games


Crowd Science Games


Deep Games


Demakes


Documentary Games


Ectogames


Educational Games


Epistemic Games


Exergames


Existential Games


Fictional Games

Design Research Gameplay

A Technocultural Approach to Design Research through Game-forms and Play.


Funware


Game Essay


Games for Change


Game Mods


Game Poems

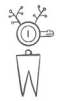

Game Science


Games with a Purpose (GWAPs)


Knowledge Games


Machinima


Newsgames


Non-Games


Open-Ended Video Games


Pervasive Games


Professional Role Playing Games


Queer Games


Remakes


Repurposed Games


Sandbox Games


Serious Games


Serious Toys


Slow Games


Slow Serious Games


Smart Toys


Social Participation Games


Suggestive Media


Tactical Games

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SSD: ICAR 13 – Disegno Industriale


Tactical Media


Toy Games


Walking Simulators


Wandering Games

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Abstract

This thesis aims to contribute to the understanding of video games from the perspectives of Design Cultures and Sciences. The purpose is to bridge design research with research on video games through their respective languages, practices, and theoretical-interpretative models.

The analyzed problematic field is that of video games as artifacts in which it is possible to observe the convergence of an advanced industrial productive system, the modes of production, exchange, and consumption of digital capitalism, and the expressive and communicative forms of contemporary technoculture. In other words, I look at video games as a paradigmatic form of commodity, the *Game Form*, which characterizes the artifacts of contemporary digital society from the perspective of the disciplinary field of Design. I also describe the *game-exchange* as the emerging model of value exchange that defines the power relationships between producers and consumers.

Therefore, in the first part of the thesis, I investigate the problematic field according to three layers of analysis: productive-economic, socio-political, and cultural. The analysis provides a phenomenological and critical account of the productive, power, and cultural dynamics that are mediated and amplified by the video game system.

In the second part of the thesis, I provide a classification of what I define *game-forms*, paradigmatic instantiations of the *Game Form* which articulate the double dimension of game as commodities and as epistemic artifacts. This classification is adopted to bridge the gap that emerges in the Italian academic context between the technical discipline of Game Design, the humanistic perspective of Game and Play Studies, and the field of Design.

In the last part of the thesis, I use the developed theoretical and practical frameworks to understand Design Research as a gameplay dynamic in which designers manipulate *game-forms*, apply and experiment on and through game technologies, and, more broadly, develop a playful/gameful approach towards building design knowledge. *Design Gameplay* is therefore defined as the dynamic creative negotiation among subjectivities, material and immaterial networks and practices, and scientific and non-scientific modes of inquiry for the generation of design knowledge through the experimental affordances of video games.

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Thank you, Nicoletta, for being my safe place in the universe.

1. Designing in the Ludic Century

1.1. Let's Play Design

Let's play a game. Let's pretend you are a designer – which is most likely the case if you are reading this. Let's pretend that you are asked to design concepts for a modular furniture system for astronauts living in an orbiting outer space module. Let's also assume that you don't have a specialized background education in aerospace engineering and design. How would you approach such a design challenge?

Before delving into user research, interviews, technical specifications, requirements, and benchmarks, you would probably feel the need to familiarize yourself with the design scenario. It is indeed quite unlikely that you have personally experienced a flight through outer space. Or did you, actually? Your memory goes to that time you were tracing an ancient civilization in a strange solar system. Or maybe you remember when an ordinary maintenance activity in an orbiting mining ship became a survival adventure. You may start wondering how the building structures of that densely populated settlement you once visited were designed. How was your spacesuit? What kind of tools did you use? What kind of task were you doing? How did you move through low-gravity environments? Did you ever go to sleep?

You clearly know that most of the things you saw and experienced while playing cannot be built with current technology. Some of them will indeed never be built because they would require some actual magic! As a designer, however, you may start noticing some clever engineering solutions, interfaces, counterintuitive relationships between parts, the emergence of patterns, behaviors, and aesthetic and formal qualities.

You were not physically there, but you experienced what if may feel like living in an unfamiliar outer space environment. You used and interacted with designed artifacts, and if we continue in this make-believe game, you might have developed some design knowledge that you could later put into practice as you keep working on this design assignment.

As designers, we are required to adopt others' perspectives to better understand the design scenarios, and to discover problems and needs that we will have to address through our practice. Some of these perspectives are hardly accessible, while others require a more-than-human point of view. We rely on several tools to do so, such as: data, interviews, industrial reports, observation, user research. Design fiction argues that we can develop design knowledge also through diegetic prototypes and narrative media (Celi & Formia, 2015). Video games are a form of interactive media that engages users on perceptive, cognitive, cultural, and emotional levels. As the make-believe game I just described suggests, games allow to expand the potential application of design fiction through interactivity (Coulton et al., 2016).

As designers we often need to design our own tools and methodologies. We do it in a technocultural landscape in which interactive digital technologies are distributed across the whole design, production, and consumption phases. Observing contemporary products and services, it is easy to recognize interaction modes, engagement patterns, and use experience that are closely related to that of digital games. We use *gamified* tools to perform *serious* tasks. Game companies, on the other hand, use analytical and quantitative methods to engineer *fun*. Gaming has become *serious*, whereas work, almost never, becomes *playful*. In the early 2000s, Gaver argued that computing was transferring the values of the workspace, from which it had emerged, into the other aspects of life. Consequently, he emphasized the need to design for humans as curious and playful beings—not solely driven by achievements and practical needs, but also by wonder and invention. (Gaver, 2002).

In the *Ludic Century* media and culture are increasingly systemic, modular and participatory (E. Zimmerman, 2014). As designers, specifically in the field of design research, I argue that we need to engage with and acknowledge the broader significance of games as dynamic systems of information and as cultural artifacts. With such intention in mind, this thesis aims to contribute to video game analysis from the perspectives of Design Cultures and Sciences.

In the research I identify video games as artifacts in which it is possible to observe the convergence of an advanced industrial productive system, the modes of production, exchange, and consumption of digital capitalism, and the expressive and communicative forms of contemporary technoculture. In other words, I investigate video games as the paradigmatic form of commodity in contemporary digital society from the perspective of the disciplinary field of design.

If the role of video games as "an organizing principle and a novel commodity form" (Jagoda, 2020, p. 31) has largely been acknowledged by the humanities and specifically by Game Studies, a deeper connection between industrial design and video game culture is still lacking, at least in the Italian context. The lack of such interconnections can be witnessed on the industrial level and in academic research. As of today, in fact, video game and design systems do not appear to be in communication due to the high level of specificity that characterizes video game production, and for the rapid evolution of Game Design and Game/Play Studies as sectorial areas which are often autonomous (in Italian universities) from the Scientific Disciplinary Field of Industrial Design.

Therefore, the thesis proposes an Advanced Design (Celaschi, 2010, 2015; Celi, 2015) situated research approach that aims to connect the design production system and that of video games through their respective languages, practices, and theoretical-interpretative models. By doing so, this research shares the vision of Malazita and O'Donnell, who call for a "deep synthesis of game design, cultural critique, and reflective design research practices" (Malazita & O'Donnell, 2023, p. 6).

The research questions are:

RQ1: How do video games situate in the contemporary market-exchange system of digital and data capitalism?

RQ2: How does a designer *design* when video games define the characteristics of contemporary commodity form?

RQ3: How can video games generate knowledge in design research and practice?

RQ4: What possible role can designers have in the regional game industry?

I will present my responses to these questions throughout the following chapters. In the next section, I outline the structure of the thesis and the key arguments.

1.2. Thesis Structure and Chapters Overview

This section provides a synthetic overview of the chapters' content, emphasizing the logical and methodological connections that tie together the research process.

The first part of the thesis - Chapter 2 - serves to establish the theoretical grounding of the research. I start by introducing Advanced Design as the academic and research from which this doctoral research has developed, and I put it in relation with other methodological and research frameworks characteristic of Design Research. I then propose the *Game Form* and the *game-exchange* concepts to understand video games from the perspective of the Design discipline.

In Chapter 2, I introduce my argument about the concept of *Game Form*. The *Game Form* is defined as the paradigmatic form of commodities in the contemporary digital product-service system. Video games are indeed understood are the most representative materialization of contemporary commodities: they are dynamic, dematerialized, and generative (Giaccardi, 2019; Redström & Wiltse, 2019). They materializes the assemblages of networked technologies, actors, social structures, practices, and relationships that generate the experience of play (Taylor, 2009).

In such a system, the *game-exchange* emerges as the characteristic negotiation model that modulates power relationships between production and consumption. As it will be argued in the chapter, the *game-exchange* is a form of value transfer in which players exchange pleasure, enjoyment, sense of achievement, and instant gratification for their time and data. In contemporary digital capitalism, the *game-exchange* combines with the other forms of value exchange (market, gift, barter). It leverages on the strong capability of games of engaging and retaining players.

The second part of the thesis presents three interlocking analytical layers that problematize productive, political and cultural aspects of video games. The concept of *Game Form* and *game-exchange* indeed emerge from the phenomenological and socio-cultural analysis that I present in Chapters 3, 4, and 5. I use these three maps to argue for the central role of video games in the contemporary discourse on product and service design, which is necessarily tied to the problematization of socio-cultural and productive aspects of video games. In addition to being widely consumed as product-services in the contemporary market system, video games, gamification, and game design strategies are deeply integrated into various other product and service sectors. Therefore, it emerges as essential for designers to develop a deeper understanding of the multi-layered aspect of video games.

In Chapter 3 I develop a map of the industrial geography of video game production, contextualizing the Emilia-Romagna game

1 https://www.bbc.com/news/uk-scotland-tayside-central-38506322

sector within the Italian, European and global context. The regional-scale analysis provides a comparison with the Scottish game industry and specifically with the Dundee game cluster. Such comparison moves from the recognition of the strategic role played by local cultural creative industries, and from the observation of the demographic similarities between Emilia-Romagna and Scotland. While both industries emerged around the 1980s, the Scottish game sector has grown to become one the most relevant in Europe thanks to successful productions and deep connections with academic institutions. Indeed, as the local game industry grew, in 1997 Abertay University became the first academic institution worldwide to provide a video game design curriculum[1]. On the other hand, despite being home to the first Italian video game company, *Simulmondo*, the evolution of the game sector in Emilia-Romagna did not witness the same organic and sustained growth. Despite being relevant on a national scale, the Emilia-Romagna game Industry has not yet managed to structure itself and scale internationally. To develop such an analysis, I present the insights collected during my visiting research period at Abertay University in Dundee, Scotland. Therefore, Chapter 3 investigates which roles product and service designers can have in the development process of the regional game industry. It is argued that designers can act as mediators to foster synergic collaboration with the local cultural and creative industries and other established productive and research sectors.

I follow the analysis of the video game system by describing "the social relations, particularly the power relations, that mutually constitute the production, distribution, and consumption of resources" (Mosco, 1996/2009, p. 24). That is to say, the political economy of play. I present this analysis in Chapter 4. According to sociologist Vincent Mosco, such power relations shape the socio-economic structures between producers and consumers of mass media. To analyze such complex network of relationships, I propose an interpretative model that provide a framing for a some of the most representative materializations of such power dynamics. The model borrows the concepts of *ludus* and *paidia* from the classic literature on play (Caillois, 1958/2001), and intersects them with *finance* and *labor* as two characteristic modes of value production in the contemporary capitalist system.

Thereafter, the analysis focuses on the role of video games in the contemporary technocultural context. Chapter 5 starts by framing technoculture as the socio-technical construct that defines the contemporary artistic and expressive forms emerging from digital and networked technologies. The chapter identifies practices and strategies using video games as an expressive medium, situating them in the institutionalization process that established them as artistic and cultural artifacts.

These three layers of analysis – productive/economic, social/political, and artistic/cultural – describe the complex and evolving tension that animates the video game system.

In the third part of the thesis – Chapter 6, 7, and 8 – I develop the mapping and analytical work of the previous part into practical and experimental applications.

In Chapter 6 I argue that the *Game Form* is characterized by the contemporary coexistence of two dimensions: the consumption dimension, as an industrial commodity (Chapters 3, 4), and the epistemic dimension, as a tool for inquiry and creative production (Chapter 5). Therefore, through a semi-systematic literature review, in Chapter 6 I provide a classification of the *game-forms*. I define *game-forms* as specific instantiations of the

Game Form, which articulate the relationship between the consumption and epistemic dimensions of video game artifacts. *Game-forms* are games which primary engagement is not that of entertainment. I review the *game-forms* that have been described in literature and observed in practice. I also review a number of analytical frameworks, conceptual tools, practices, methodologies, and approaches related to games and play that are described by the scientific literature. I have developed such classification as an aid to bridge the gap between the technical discipline of game design, the humanistic perspective of game and play studies, and the field of design and, more specifically, that of design research. The reviewed items demonstrate the nuanced and multilayered variety of *game-forms* and the diversity of research applications fields.

In Chapter 7, the *game-form* classification is supported by a theoretical-interpretative model that extends Felix Schniz's understanding of video games as *objets ambigues* (Schniz, 2020) into the field of design research. The concept of *objet ambigu* allows us to synthesize in the creative potential of video games both the formal, critical, and analytical perspectives that the different disciplines have projected on game artifacts. Starting from the concept of video games as *objet ambigues*, I propose a theoretical framework that understands design research as a dynamic *Gameplay* in which designers manipulate *game-forms*, apply and experiment *on* and *through* game technologies, and, more broadly, develop a playful/gameful approach towards building design knowledge. I therefore define *Design Gameplay* as the dynamic creative negotiation among subjectivities, material and immaterial networks and practices, and scientific and non-scientific modes of inquiry for the generation of design knowledge through the experimental affordances of video games.

In Chapter 8, I exemplify the *Design Gameplay* research dynamic through the description and analysis of the experimentations that I have developed during the three years of the doctoral research.

In the conclusions (Chapter 9), I use both toth the theoretical and practice-based findings to highlight how *Design Gameplay* embraces the creative potential that emerges from the engagement of designers with the game medium, fostering the generation of design knowledge.

The Appendix provides complementary material that expands on a selection of practical experiences and theoretical research.

World Map

PRESS START

Hypothesis and Thesis Structure

1. Designing in the Ludic Century

1.1 Let's Play Design

This section introduces the initial hypothesis and the research questions investigated in the research.

1.2 Thesis Structure and Chapters Overview

This section provides a synthetic overview of the chapters' content, emphasizing the logical and methodological connections that tie together the research process.

1.3 General Methodology and Limits of the Research

This section describes the adopted methodology and the limits of the research presented in this chapter.

FRAMING

Situating Video Games in the Contemporary Product-Service-System

2. Game Form and Game Exchange

2.1 Introduction

2.2 Advance Design Research

The Advanced Design Approach is introduced as the overall research context from which this thesis has been developed.

2.3 Video Games as the Contemporary Commodity Form

The section argues that video games are the paradigmatic form of contemporary commodities and, therefore, designers need to develop conceptual framings and new design research epistemic practices.

2.4 The contempo□rary form of commodities

The section frames the characteristics of video games in the context of the contemporary product-service system.

2.5 The contemporary forms of consumption

The section describes the transfer of models and patterns of exchange and consumption between game and product-service artifacts.

2.6 The need for a shared design space

The paragraph argues that a deeper connection between game and design research in needed to address contemporary and future transformations in the product-service system and to integrate game production with the whole system of Creative and Cultural Industries.

STATE OF THE ART

A Review of Game Forms

6. Game-forms

6.1 Introduction

6.2 Methodology and limits

This section describes the adopted methodology and the limits of the research presented in this chapter.

6.3 Game-forms

In this section I define the concept of game-forms

6.4 Items Char□acterization

The section describes how reviewed items are classified and organized. There identified categories are: game-forms (54 items), analytical frameworks (14), conceptual tools (4), practices (7), game design strategies, approaches and methodologies (7).

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CONTRIBUTION

Situating Video Games in Advanced Design Research

7. Design Research Gameplay

7.1 Introduction

7.2 Video Game as *objet ambigu*

The paragraph explores the meaning and the opportunities that derive from the understanding of video games as *objet ambigu*. It extends such understanding from philosophical analysis towards design research.

7.3 Game-forms as *objets ambigues*

The paragraph analyses the game-forms reviewed in Chapter 5 in terms of objets ambigues. It highlights the potentials of adopting of adopting game-forms in design research.

7.5 Design Research Gameplay

The paragraph proposes to understand contemporary design research in terms of gameplay. Design Gameplay is an analytical and applicative dynamic open methodology in which gam□e forms enable models of inquiry that allows both exploratory and targeted modes research.

8. Practice-Based Case Studies

8.1 Introduction

8.2 Discussion

The section presents the application of the Design Research Gameplay through an overall discussion of the case studies that have been developed over the research period.

8.3 Case Studies

Each case study is synthetically presented. In-depth analysis are provided in the Appendix.

CONCLUSIONS

Final considerations and future developements

9. Conclusions

9.1 Conclusions

9.2 Future Development

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Three maps to describe the Video Game Product-Service-System's industrial, political-economic, and cultural layers.

3. A Map of the Global and local video game industry: Analyzing the Global and Local Dynamics of Video Game Production

3.1 Introduction

3.2 Chapter's Methodology and limits

3.3 Video games as advanced industrial artifacts

This section compares the video game industry to other CCI and technological sectors to describe its different production scales and the relationships across industries.

3.4 Industry evolution: infrastructural requirements and challenges

The section describes the condition and the challenges that intervein in the development of a national video game industry.

3.5 The Video Game Industry in Italy: origins and the current state

This section focuses on the evolution of the video game industry in Italy and its current state, presenting data from industry reports and qualitative information derived from interviews.

3.6 The case of Emilia-Romagna region in Italy

The section analyzes the video game industry of the Emilia-Romagna region as a significant case study both for its historical and contemporary role.

3.7 Scottish Video Game Industry: Dundee and Abertay University

This section gives a short overview of the Scottish game industry, and in particular about the city of Dundee and its central role in game production and education. This specific case study is based on the insights gathered during my research period spent at Abertay University in Dundee.

3.8 A Design(er) Perspective on Italian Game Industry and Academic Education in Games

Perspectives on the possible future of design profession in the local and global game industry.

4. A Map of the Political Economy of Play: Investigating the Power Relations of Digital Play

4.1 Introduction: The overlapping spheres of digital play and digital economy

4.2 Chapter's Methodology and limits

4.3 The Political Economy of Play

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4.4 Gamification: The Gamified Digital Society

This section introduces the concept of gamification through a literature review that critically situates gamification within the contemporary forms of digital, platform and data capitalism.

4.5 Applied Games: players at work

The section discusses the emergence of applied games and their major field of application. It aims to problematize the exploitation of game-like simulation for critical applicative scenarios and the convergence of working and gaming interfaces in contemporary post-industrial economy.

4.6 Building a map of the intersections between play and economy

The section proposes a framework for the analysis of the phenomena that materialize the intersections between play and games with labor and finance. The map aims to describe how gameful and playful systems are coopted by the power structures of contemporary capitalism and, at the same time, ludic artifacts are permeated by financial and labor-related dynamics.

4.7 Emerging phenomena, trajectories and future perspectives

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5. A Map of the Video Game Medium in Contemporary Technoculture: Exploring Video Games as Technocultural Artifacts

5.1 Introduction

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5.3 Defining Technoculture

The section introduces the concept of technoculture as the socio-technical construct that is representative of the contemporary cultural expressions by means of networked and digital technologies.

5.4 The Emergence of Video Games as a Cultural Form

The section discusses the evolution of the game medium and its emergence in contemporary creative and cultural industries.

5.5 Video Games in Contemporary Arts: Clusters of Practice and Creative Strategies

The paragraph develops a schematization system to map the artistic practices and the creative strategies that adopt video games as their primary expressive medium.

5.6 A focus on In-Game Photography

The sectionanalyzes in-game photography as a novel and paradigmatical artistic practice in which multiple creative strategies are adopted and combined.

5.7 Notes on Machinimas

A brief discussion on the origins and contemporary artistic trajectories.

APPENDIX

Additinal research work, case studies, analysis, inteviews, publications, and reports.

APPX.1. A brief Overview of the Global Game Industry

APPX.2. Playful Prototyping in Speculative Design Practices

APPX.3. Polaroids from Space

APPX.4. Bestiary: Infographic Design as Worldbuilding

APPX.5. Ruins

APPX.6. (De)Colonizing Outer Space. Speculative Frontiers of Outer Space Exploration in Video Games

APPX.7. Heritage Documentation in Digital Built Environments through In-Game Photogrammetry: A Preliminary Case Study

APPX.8. Interviews

1.3. General Methodology and Limits of the Research

This section describes the adopted methodology and the limits of the research presented in this thesis.

The research moves from the assigned topic of the impact of digital technologies on production, distribution, and consumption of commodities. This topic has been interpreted to propose a situated understanding of contemporary commodities in todays' technocultural landscape. As it emerged during the initial definition of the problematic field, looking at video games from the perspective of product and service design research offers promising insights to understand and design contemporary artifacts.

Therefore, I started the research by a review of the academic literature on games and play. From this analysis, I identified three layers of investigation that were relevant for the problematic field of the research, and that described video games according to their geography of production, economic and political systems, and cultural expressions. For each of these layers of analysis I developed a specific research methodology that is described in the beginning of each chapter (cf. Ch.3, 4, 5). This part of the research largely builds on the research developed in the field of game and play studies. It gets further insights from field interviews to professionals and scholars to acquire direct data.

In order to develop and apply the theoretical framework emerging from the literature analysis, I adopted approaches and methods of research *through* design (R*t*D) (Giaccardi, 2019; Stappers & Giaccardi, 2017; J. Zimmerman et al., 2007). This practice-base part of the research aimed at testing both theoretical and practical assumptions. It also offered the opportunity to experiment with digital game making tools, expanding my material understanding of video game prototyping and production.

Despite extensive efforts to comprehensively review the academic literature on games and play, certain aspects are inevitably overlooked, particularly given that my educational background did not include literacy in this topic. Indeed, the lack of systematic integration of game- and play-related education across design cultures academic curricula (at least in the Italian context), is one of the aspects that this thesis aims to address. Technical limitations are also acknowledged. With no previous knowledge in programming and video game development, and with limited opportunities to cooperate on technical execution, some R*t*D applications were in some part restricted. However, this limitation consequently brought elements of reflection to the discussion to the research.

Chapter Bibliography

Caillois, R. (2001). *Man, play, and games* (M. Barash, Trans.). University of Illinois Press. (Original work published 1958)

Celaschi, F. (2010). Le culture del prodotto. In *AdvanceDesign. Visioni, percorsi e strumenti per predisporsi all'innovazione continua* (pp. 13–23). McGraw-Hill.

Celaschi, F. (2015). AdvanceDesign Points of View. In M. Celi (Ed.), *Advanced Design Cultures: Long-Term Perspective and Continuous Innovation* (pp. 3–17). Springer International Publishing. https://doi.org/10.1007/978-3-319-08602-6_1

Celi, M. (Ed.). (2015). *Advanced Design Cultures*. Springer. https://link.springer.com/book/10.1007/978-3-319-08602-6

Celi, M., & Formia, E. (2015). Advanced design practices for sharing futures: A focus on design fiction. *The Value of Design Research - 11th International European Academy of Design Conference*, 16. https://doi.org/10.7190/ead/2015/141

Coulton, P., Burnett, D., & Gradinar, A. (2016, June 27). *Games as Speculative Design: Allowing Players to Consider Alternate Presents and Plausible Futures*. https://doi.org/10.21606/drs.2016.15

Gaver, W. (2002). Designing for Homo Ludens. *I3 Magazine*, *12*, 9–11.

Giaccardi, E. (2019). *Histories and Futures of Research through Design: From Prototypes to Connected Things*. *13*(3).

Jagoda, P. (2020). *Experimental Games: Critique, Play, and Design in the Age of Gamification*. University of Chicago Press. https://doi.org/10.7208/chicago/9780226630038.001.0001

Malazita, J., & O'Donnell, C. (2023). Introduction: Toward Critical Game Design. *Design Issues*, *39*(1), 4–13. https://doi.org/10.1162/desi_e_00702

Mosco, V. (2009). *The political economy of communication* (2. ed., reprinted). SAGE Publ. (Original work published 1996)

Redström, J., & Wiltse, H. (2019). *Changing things: The future of objects in a digital world*. Bloomsbury Visual Arts.

Schniz, F. (2020). *Genre und Videospiel: Einführung in eine unmögliche Taxonomie*. Springer VS.

Stappers, P. J., & Giaccardi, E. (2017). Research through Design. In M. Soegaard & R. Friis-Dam (Eds.), *The Encyclopedia of Human-Computer Interaction* (2nd ed., pp. 1–94). The Interaction Design Foundation. https://www.interaction-design.org/literature/book/the-encyclopedia-of-human-computer-interaction-2nd-ed/research-through-design

Taylor, T. L. (2009). The Assemblage of Play. *Games and Culture*, *4*(4), 331–339. https://doi.org/10.1177/1555412009343576

Zimmerman, E. (2014). Manifesto for a Ludic Century. In S. P. Walz & S. Deterding (Eds.), *The gameful world: Approaches, issues, applications* (pp. 19–22). MIT Press.

Zimmerman, J., Forlizzi, J., & Evenson, S. (2007). Research through design as a method for interaction design research in HCI. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 493–502. https://doi.org/10.1145/1240624.1240704

2. Game Form and Game Exchange

2.1. Introduction

This chapter introduces the phenomenological analysis and literature review presented in the following three chapters to argue for the central role of video games as complex product-service system, and as paradigmatic commodities in the digital and networked society. Moreover, this chapter serves as a theoretical hinge between the mapping and analytical section of the thesis (Chapters 3, 4, and 5) and the practical and experimental focus of the later sections (Chapters 6, 7, and 8).

To encapsulate the core argument of this chapter, I will discuss that:

- Today's commercial video games are complex product-services which production (cf. Ch. 3), distribution and consumption (cf. Ch. 4, 5) define a paradigmatic instantiation of the contemporary commodity form.

- As the paradigmatic commodity form of contemporary digital and networked society, video games represent, enable and propagate the transformations of the contemporary product-service systems; the novel models of consumption and their systems of values; and the economic, power, and creative relationships between producers, consumers, humans, and machines (cf. § 2.4).

- The knowledge hybridization and the development of cross-disciplinary methodologies between game and design research and practice is crucial for: 1) addressing contemporary and future design innovation challenges 2) understanding and responding to social and cultural challenges through critical design practice 3) contributing to the innovation of the video game medium and to the integration with the rest of the Creative and Cultural Industries system (cf. §2-6).

- In this context, game forms (cf. Ch. 6) have the potential to be adopted as current, flexible knowledge artifacts in research through design.

Before introducing the concepts of *Game Forms* and *Game Exchange*, in the next section I briefly outline the academic and research context from which this doctoral research has developed, and I put it in relation with other methodological and research frameworks of Design Research.

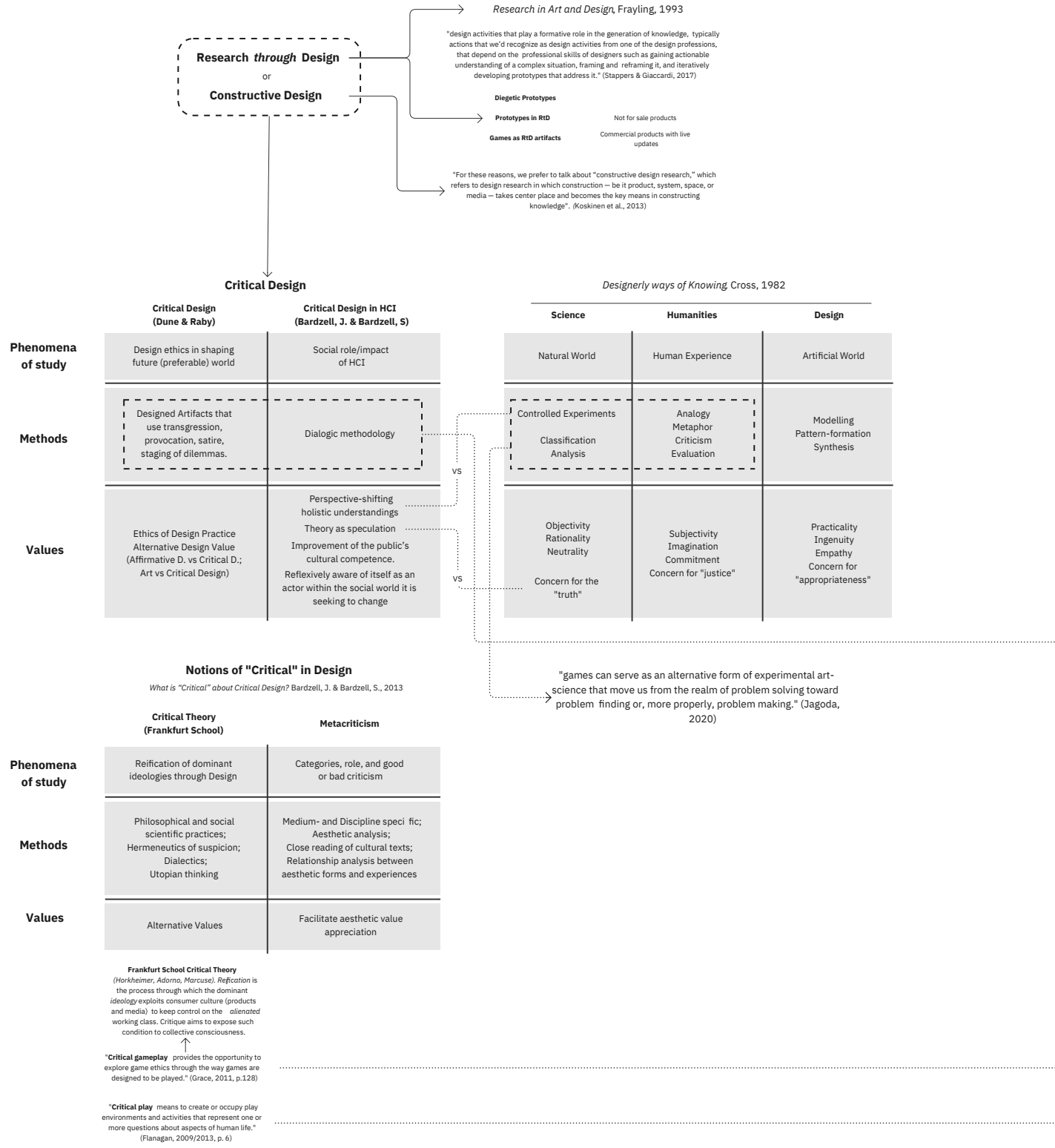


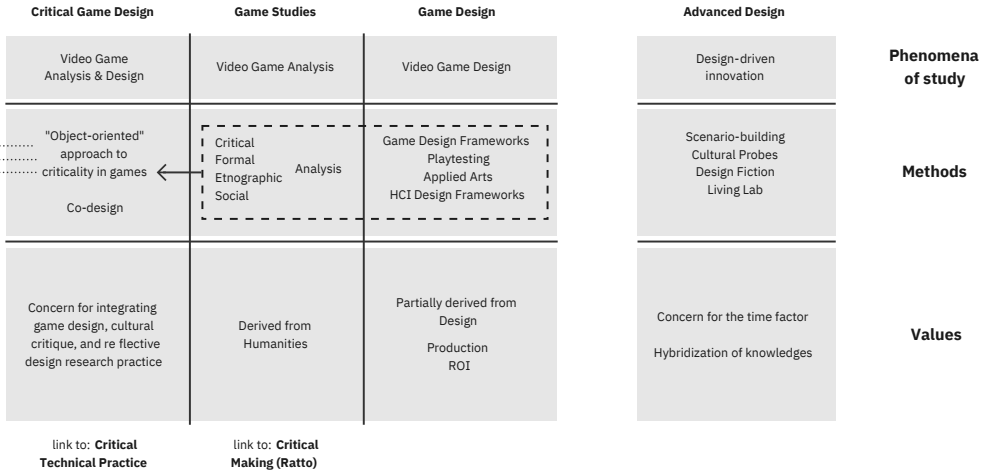
Fig. 2.1 - Design Research Teorethical Framework

2.2. Advanced Design Research

This research has been developed in the academic and research context of the *Advanced Design Unit*[1] (*ADU*) of the University of Bologna. Since its establishment in 2013 within the Department of Architecture, the *ADU* addresses research, didactics and dissemination of impacts on the territory according to the Advance Design-driven approach.

Advanced Design (*AD*) is a future-oriented approach that responds to the nonlinear complexity of the context in which contemporary product-service-system operates; to the acceleration of production and consumption models; to the multi and transdisciplinary set of knowledge that combine in product and services development processes; and to the urgency to consider and limit the environmental impacts of anthropic activity (Celaschi, 2015). The understanding of the evolutions of the commodity form is, therefore, at the center of *AD* research, since it entails and emerges from the negotiations among such many aspects (cf. §2.3).

"What is needed, we argue, are epistemic practices, material interventions, and institutional and noninstitutional systems that work toward the **deep synthesis of game design, cultural critique, and reflective design research practices** ."
(Malazita & O'Donnell, 2023, p.6)



The scientific origins of *AD* are connected to the study of design-driven innovation processes which, due to the rapid transformations of the of the organizational, economic, social, and cultural contexts, are rapidly mutating (Celaschi, 2015). The ambiguity of the term *advanced* brings together two dimensions that coexist in the *AD* approach: the "tangible" nature of established and developed design specializations, and the "ethereal" one of "*movement forward*, *progress*, *anticipation* or *pre-vision*". (Celi, 2015, p. 25).

The focus on innovation processes that characterizes *AD* implies a further consideration of the initial exploratory phases of the design project. Such phase, the Fuzzy Front End of Innovation, originally described by Smith and Reinertsen (1998), is characterized by often chaotic experimental activities which are used to open questions and possible scenarios (Sanders & Stappers, 2008). Being situated in this undetermined investigation domain, *AD* tends to share more similarities with the area of design as creative expression, rather than technical and problem-solving design engineering (Deserti, 2015). In this sense, *game-forms,* that will be introduced and analyzed in Chapter 6, constitute flexible investigation tools that, alongside their epistemic potential, encourage creative expression and exploratory attitudes in the fuzzy phases of innovation, and, as I ague in this thesis, design research.

1 https://site.unibo.it/advanceddesignunit/it

The role of *Advanced Design* is, therefore, to mediate between the present time and the possible future, involving and engaging with people in processes of innovation and change (Celi & Formia, 2015). *AD* deals, indeed, with complex projects whose relation to the present is not always well defined. It therefore shares with anticipatory practices a dimension of uncertainty that determines the need to build original tools, models and processes to shape possible visions of the future. To envision such future dimension, designers use scenarios for exploring possible future challenges and raise new questions. *AD*, in particular, leverages on practices such as design fiction (Bleecker, 2009) and tools like diegetic prototypes (Kirby, 2010). Such strategies are adopted to unfold a shared space for the construction of plural visions of the future. In the context of design fiction and speculative design, *game-forms* and video games can be used as a novel medium to engage with the complex and wicked futures imagined in design speculation (Coulton et al., 2016). As it will be largely discussed thought this thesis, in contemporary technocultural society, the specificities of video games bear an "aesthetic potential which allows for speculation over the very structure of knowledge and contemporary technology" (Luersen & Paula, 2023). Video games offer a space for experiencing an alternative vision of the world and exploring the dynamics of alternative control and power structures[2].

Besides its capability to address social conflicts and issues through the materiality of design, design fiction is a design practice that can be adapted to support the development of new real-world technologies as well. The diegetic prototypes of design fiction conceptualize and enable reasoning about the impact and possible applications of new technologies (Bleecker, 2009). The artifacts of science fiction prototyping (Johnson, 2011) represent the design concept of the things that one day will be possible to build. Games artifacts materialize such prototypes situating them both as functional and interactive means, and as technocultural expression of the fictional world. Therefore, the interactivity of the game system can add a layer of agency to the dramatic level of design fictions (Calleo, 2025).

Effective speculative design needs to build "perceptual bridges" between the observer's reality and the speculative future (Auger, 2013). Auger suggests that such perceptual bridges can be inspired by different fields, such as psychology and comedy, that offer insights into the way the human mind works. In games, these perceptual bridges are constantly built through the complex combination of aesthetic, kinesthetic, and sensorial experiences of game feel (Swink, 2009). The sensation deriving from the feeling of directly and precisely controlling the avatar, from the physical interaction with the simulated world, and from the effects that polish and enhance the interactions, act on players' nonconscious cognition as affective experiences (Jagoda, 2020, p. 116), and constitute the medium-specific perceptual bridges to the speculation. This aspect is further discussed in the following paragraph.

Another link between *AD* and industrial and research field of video games is represented by the technological transfer opportunities that can be established (cf. Ch. 3). In design-driven innovation processes, in fact, it is possible to identify innovation transfer strategies that occur between very different sectors. This approach, called *Extreme Design*, is characteristic of *Advanced Design* (Celaschi, 2015). These strategies also include the transfer of technologies that, as they prove effective in the field for which they were developed, can be introduced and adapted in other contexts as well.

2 One of the analyzed game-forms that clearly show such potential is the fictional game. In their book on fictional games, Gualeni and Fassone (2022) explore the role of such fictional ludic artifacts that only exist in the diegesis of the narrative worlds. Fictional games lack complete game rules or can function only through technological or magical elements that make them impossible to play in the real world. It can be argued that fictional games act as forms of diegetic prototypes (Kirby, 2010), that are contextualized as real functioning (playable) artifacts within the narrative. They emerge as the materialization of social and cultural values or, by contrast, as ludic forms of reaction to the established dominant powers. In fact, fictional games can act as transformative tools, questioning the socio-political environment depicted in the fictional world and becoming utopian tools. They can transform, through the indeterminacy of game dynamics, dystopian narratives into acts of critique (Gualeni, 2021).

In technical and industrial fields, for example, game-tech is finding use in production process management, simulation, and collaborative design. Thanks to the development of workflows and integrations with CAD (Computer Aided Design) and BIM (Building Information Modeling) software, the use of game engines in professional architectural practice is spreading, making it possible to create visualizations with a high level of realism in significantly reduced time. In addition, by taking advantage of real-time rendering technologies, it is possible to develop new languages and formats for the representation of architectural designs and for spatial planning. The same technologies find use in the creation of control, management and planning systems, such as digital twins, which are employed on scales ranging from the industrial plant to the urban and territorial dimension. Another area of use relates to AR/VR (Augmented Reality/Virtual Reality) systems for managing remote collaboration tools that promise a contribution of innovation in co-design and management processes of complex projects in sectors such as, for example, the automotive industry. As is will be argued in Chapter 3, with the support of designers' mediation, the convergence of multidisciplinary skills and professionalism characteristic the video game industry makes it an important driver of innovation and development in other productive sectors as well.

To summarize, framing the commodity form problem through the concept of the *Game Form* means adopting an *AD* standpoint, since it entails both meanings of the term advanced: its specialized, developed, and sophisticated technological character, and the exploratory, speculative, and experimental attitude towards innovation. From such perspective, the definition of *game-forms* (cf. Ch. 6) allow to identify practical epistemic tools, design fiction artifacts, and Research *through* Design prototypes that enable research in the field of *AD* leveraging on games' affordances and creative potentials. In Chapter 7, I will describe how the integration of *game-forms* with epistemic practices derived from game cultures in design research define a dynamic research approach that I define *Design Gameplay*.

2.3. Video Games as contemporary commodity forms

In the next three chapters, I will use phenomenological accounts and theoretical contributions from literature to draw three conceptual maps that illustrate the salient aspects that characterize video game artifacts on three distinct analytical layers: industrial (cf. Ch.3.), political-economic (cf. Ch.4.), and cultural (cf. Ch.5.).

In Chapter 3, I discuss how the characteristics of national video game industries have evolved, embracing the local creative contexts, and exploiting the transformations introduced by the digital labor market. For the many aspects that are highlighted, video game production mirrors the models and dynamics of other industrial sectors. One example is the outsourcing of low-specialized tasks towards low-income countries which is common practice across several industrial sector. Moreover, working condition in the video game industry share similarities with the neoliberal models of labor exploitation of other creative industries. Such models leverage on workers' passion for video games to lower production cost. It can be also observed the emergence of novel models of value extraction in the game industries and progressively spreading towards other productive sectors. A paradigmatical example is the mingling between working and leisure activities, which brings neoliberal values into private dimension of personal life. Moreover, the decentra-

lization of labor activities, the challenges to emerge in a highly competitive market, and the need to continuously train highly specialized workers, are some of the aspects that combine in the framing of the contemporary video game industry.

In Chapter 4, I discus how the production, distribution and consumption of game and play technologies define complex power relationships between producers and consumers. Such relationships, I argue, materialize different modes of value extraction, production and consumptions that emerge from the combination of playful and gameful practices with financial speculation and physical and intellectual labor. Most often, such relationships exceed the space defined by the "magic circle", drawing a wide range of values, meanings, and extrinsic motivations into the play domain.

In Chapter 4, I analyze video games as a particularly vibrant and experimental mode of expression through which contemporary technoculture is iteratively produced, re-produced, re-mediated and perpetuated. As the contemporary commodity form is defined by the coexistence and interdependence of product, service, and communication systems (the product-service system), video games are product-service artifacts which, at the same time, constitute the most representative and popular expressive medium of contemporary networked and digital society.

In the review, it emerges that the body of references and theoretical contributions that I have used through these chapters are predominantly coming from the different areas of game research. Such perspective situates video games as cultural, social, political and economic forms that "serve as an organizing principle and a novel commodity form" (Jagoda, 2020, p. 13). It also appears that in the field of design research, much fewer contributions give an account of games as the paradigmatic commodity form of contemporary digital society (cf. §2.6). Yet, the design of contemporary products and services mirrors the modalities of production, distribution, and consumption of video games. Moreover, as is discussed in the following section, contemporary industrial artifacts share numerous characteristics with game artifacts in virtue of their growing integration with networked and digital systems. Therefore, it becomes evident that there is an increasing need in design research to develop an integrated and critical understanding of the meaning and values that are build and perpetuated through game artifacts. This chapters aims to bridge the contributions presented in the previous chapters with the design approaches and knowledge that frame the contemporary form of commodities, and therefore video games, from the perspective of design research. That is to say, to frame the *Game Form* as the contemporary, paradigmatical instantiation of the commodity form.

2.4. The contemporary form of commodities

It is well understood that designers are aware of the transformations that contemporary products and services are undergoing due to the rapid and complex social, technological, productive, economic, and environmental changes. However, the role of video games in such context has not been systematically addressed in design research. To address this gap, this section discusses the various aspects that designers are confronted with when facing the commodity form problem in contemporary production-consumption system.

3 According to sociologist Igor Kopytoff: "From a cultural perspective, the production of commodities is also a cultural and cognitive process: commodities must be not only produced materially as things, but also culturally marked as being a certain kind of thing. Out of the total range of things available in a society, only some of them are considered appropriate for marking as commodities. Moreover, the same thing may be treated as a commodity at one time and not at another. And finally, the same thing may, at the same time, be seen as a commodity by one person and as something else by another. Such shifts and differences in whether and when a thing is a commodity reveal a moral economy that stands behind the objective economy of visible transactions." (Kopytoff, 1986, p. 64)

4 For Baudrillard (Baudrillard, 1981/1994, 1976/2020) the first order of Simulacra is that which characterize the historical period between the Renascence and the Industrial Revolution. The first order operates on the natural law of value: in an epoque characterized by social class differences, there are only few symbols with clear and well-defined meanings. To this first order of simulacra, founded on the images and which principle is the analogy, correspond the transcendent ideal of utopia. The distance between real and imaginary is at its maximum: "Stucco is the triumphant democracy of all artificial signs, the apotheosis of the theatre and fashion, revealing the unlimited potential of the new class, as soon as it was able to end the sign's exclusivity" (Baudrillard, 1976/2020, p. 63, translation from Italian). The second order of Simulacra emerge with the Industrial Revolution: with the new mass-produced objects there is no more counterfeiting and there is no analogy. There is a principle of undifferentiated equivalence among commodities which is no longer regulated by the natural law of value but by the market law of value. Science Fiction is the correspondent imaginary of this phase of the Simulacra. The distance between real and imaginary is reduced. Science Fiction is a multiplicative projection of serial production: "to the potentially infinite universe of production, science fiction adds the multiplications of its own possibilities" (Baudrillard, 1981/1994, p.122). The distance between

In general terms, designers manipulate and shape uniformed matter through the industrial production system. *Products* are result of this process. *Products*, per-se, are not in the exchange-system yet. The condition that transforms *products* into *commodities*, which can be distributed through a market-exchange system, is a time-varying condition dependent on economic, environmental and cultural influences[3] (Celaschi, 2000). The form of the commodity is thus undefined, but rather it emerges from a continuously evolving translation made by designers. Such translations interpret the complexity of a dynamic system of value production and exchange, and today is confronted with the need to urgently address the ecological and environmental responsibility of designers (Maldonado, 1991/2008).

In the contemporary social, economic, and environmental context, the form of the commodity changes and evolves rapidly, redefining its material and immaterial qualities and values. Since the industrial revolution, in fact, the capitalist system of production and consumption has generated, and continues to generate, a greater variety of objects. As Baudrillard writes, "in today's civilization there are more and more objects and fewer and fewer concepts to designate them" (Baudrillard, 1968/2014).

Today, designers are confronted with the process of progressive dematerialization of goods: a reality that is gradually dissolving into the dimension of information and simulacra[4] (Baudrillard, 1981/1994, 2009) (Fig. 2.2). Contemporary industrial products and services, articulate, intertwine and manifest not only personal and social needs, aspirations, identities and values. They are multidimensional components, integrated artifacts, information nodes: with the information technology revolution, the over production of tangible goods has been joined by the proliferation of a new kind of objects, *infomes*, *non-things* (Han, 2022), made available by digitalization. The *SPIME* model theorized by Sterling (Sterling, 2006), in which objects can be tracked in space and time at every moment of their life cycle thanks to cloud technology, is less and less a theoretical model and it is gradually becoming a reality made possible by the development to network, satellite, blockchain, and AI-based systems. As already noted by Baudrillard, "a genuine revolution has taken place on the everyday plane: "objects have now become more complex than human behaviour relative to them" (Baudrillard, 1968/2014, p. 23, translation from Italian). The catalysis of such technologies in the product-service systems, based on data networks and interfaces designed to give the perceptive illusion of non-mediation (Lombard & Ditton, 1997), have redefined our Newtonian understanding of reality, blurring the concepts of

real and imaginary implodes in the third order of simulacra. The imaginary of science fiction no longer exists. The market law of value is replaced by the structural law of value, serial production is outdated by modulation, series and models, the principle of equivalence by commutation, the real by the hyperreal: "The models no longer constitute either the transcendence or projection, they no longer constitute the imaginary in relation to the real, they are themselves an anticipation of the real" (Baudrillard, 1981/1994, p. 122).

I have designed and authored a dramatization of Baudrillard's Precession of Simulacra, using a video game engine. The objective of the project was that to experiment a production and analytical workflow that combined video game technologies, novel form of creative expression, and research dissemination. The resulting work has been selected and screened during 2023 Milan Machinima Festival and has been used as complementary material for the SID2023 conference presentation (cf. Ch.9 and Appendix)

Fig. 2.2 - The Presession of Simulacra according to Baudrillard.

Simulacra	Speculates on	Raw Material	Immaginary		Distance between Real-Immaginary
First Order: Counterfeiting From Renaissance to Industrial Revolution	**Natural** Law of Value	**Stucco Theatre**	**Utopia**	Transcendence	**Maximum:** a radically different universe.
Second Order: Production Industrial Era	**Market** Law of Value	**Series**	**Science-Fiction**	Projection	**Reduced:** huge projection but qualitatively similar from the real world of production. Hypostasis of the robot.
Third Order: Simulation Contemporary Era of Codex	**Structural** Law of Value	**Models**	[...] the good old immaginare of science ficiotn is dead and [...] **something else is in the process of emerging**	Implosion	**None:** models are themselves anticipation of the real. There is no fiction anymore.

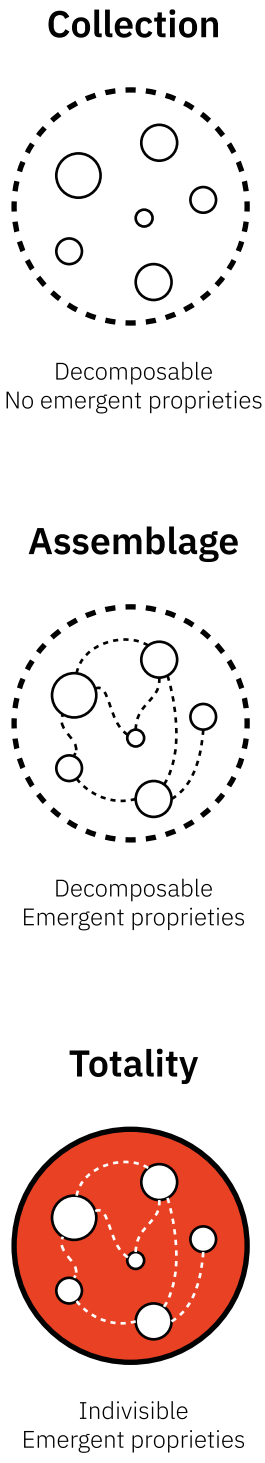


Fig. 2.3 - Differences between Collection, Assemblage, and Totality

online and *offline* in a different *onlife* experience (Floridi, 2014). The tangible space of physical reality and the immaterial informative dimension of data overlap in the *Overground Agorà* (Zannoni, 2018).

According to Giaccardi, contemporary artifacts are unstable, probabilistic, and agentive (Giaccardi, 2019). While the Author does not reference to video games specifically, it is possible to extend these characteristics to digital games as well.

Contemporary artifacts are unstable: Redström and Wiltse describe contemporary "things" as *fluid assemblages* (2019, p.39). Drawing the concept of assemblage described by Gilles Deleuze and Félix Guattari (Deleuze & Guattari, 1980/2017) (Fig. 2.3), they observe how contemporary products, such as smartphones, are much more than the collection of their parts. In fact, emergent proprieties can only be observed in assemblages and not in collections. At the same time, totality cannot be taken apart, whereas in an assemblage the single components still retain their own identity. In smartphone, as the Authors argue, apps, hardware components, and network connectivity can be identified as independent components. However, the emergent proprieties are directly dependent on the interconnection between such individual parts. As the Authors point out, fluidity is an intrinsic propriety of assemblages. According to them, the use of the term fluid stresses how the speed factor has become a central aspect of contemporary products. As they highlight, the rate of transformation that social system and traditional products undergo is sensibly slower than the continuous "instantiation" of "computational networked machines".

Video games can be understood in terms of assemblage as well (Taylor, 2009). They are constituted by a number of components: polygonal meshes, image textures, skeletal rigs and animations, sound assets, non-diegetic interfaces, control and input systems, all tied together through code which define the way such elements interact among them and with users. As a matter of facts, the components that intervein in such assemblage are not only technological. As argued by Taylor, "[t]he notion of assemblage is one way to help us understand the range of actors (system, technologies, player, body, community, company, legal structures, etc.), concepts, practices, and relations that make up the play moment" (Taylor, 2009, p. 332).

The game's structure and affordances can allow the emergent proprieties to manifest. According to Juul (2022), video games can be loosely categorized in two large groups: games of progression and games of emergence. In progression games, players follow the narrative and gaming structure that designers have predefined. Branching narratives, which appears to give player the freedom of choice and agency within the game possibility space, are all predetermined in their evolution by game designers. Emergence, as argued by Juul, is "the primordial game structure, where a game is specified as a small number of rules that combine and yield large numbers of game variations, which the players then design strategies for dealing with" (2022, p. 323).

Redström and Wiltse argue that digital objects have defined a shift from *stable things* to *fluid assemblages*. The continuous software updates, which is normal practice for the video game industry, dynamically adapt the product using user's feedback and use data. Product performances can be software-locked and accessible through additional payment or subscriptions after initial purchase[5]. The emergent proprieties, and the continuous product transformations enabled by their digital and

networked modes of consumption, make the experience of consuming/using/playing different for everyone.

Contemporary artifacts are agentive: Data-enabled artifacts allow non-human agents actively participate in the collection of data (Giaccardi, 2017) and operate alongside humans in both co-creative, and productive processes. Autonomous agents already operate not only with humans, but also with other non-human agents. They perform automatic tasks (such as condition-based algorithmic operations) and make decisions on behalf of training data and probabilistic evaluations.

Game worlds, and persistent game worlds in particular, are populated by human and non-human agents who interact with each other. AI in games can offer both support and challenge to players. Whereases in the physical world AI agency working against humans is generally a threat (often at the center of dystopian sci-fi narratives), in video games it enables modes of interactions that stimulate creativity, strategic thinking and engaging challenges. The safe space of the virtual gaming environment is indeed a possible training ground for many risky and dangerous operations. It can also provide a simulation space where scenarios can be staged, and human behavioral models can be studied.

Contemporary artifacts are probabilistics: The unstable character of contemporary things, the agential qualities of data-enabled objects, the user-object relationship and that among objects themselves, make the designed artifacts "not the artifact in its actuality but in its *potential*" (Giaccardi, 2019, p.145). As it is discussed later in the thesis (cf. Ch.7), the potentiality of video games in the multiplicity of their *forms* (cf. Ch.6), and in the creative potential the enable on both a subjective and collective level, define a creative possibility space for design research.

Arguing that video games represent todays' characteristic commodity form, which I therefore call *Game Form*, means acknowledging that the dynamics of contemporary market-exchange system are paradigmatically represented by the productive, exchange and consumption dynamics that are negotiated and perpetuated through video games. For the scope of this thesis, it is functional to consider the *Game Form* constituted by the contemporary coexistence of two dimensions: the consumption dimension, as an industrial commodity (cf. Ch. 3, 4); the epistemic dimension, as tool for artistic inquiry and creative production (cf. Ch. 5). Indeed, the agential and probabilistic qualities of the *Game Form* enable users to engage with its possibility space (cf. Ch. 7) and to extend or repurpose its original use value. The relevance of such characteristic for the field of design research, indeed, is that the *Game Form* can be approached as an epistemic tool for developing design knowledge. Therefore, in Chapter 6, I define the *game-forms* as specific instantiations of the general concept of *Game Form*. The *game-forms* articulate the relationship between the consumption and epistemic dimension of video game artifacts. On a practical level, this means that commercial entertainment games can become design research artifacts, platforms for artistic expression, tools for critical reflection, simulation of training and educational environments. In reverse, video games that are designed as research *through* design artifacts can provide leisure and playful engagement. This dynamic modulation between consumption and knowledge generation depends on the use context and on the subjectivities who engage with the *Game Form*. This aspect is further expanded in Chapter 7 by introducing the concept of *objet ambigu* and the *Design Gamplay* approach to research. The

5 https://www.theverge.com/2024/5/5/24149447/tesla-model-y-software-locked-battery-capacity

next section describes the characteristic negotiation dynamics that modulates the relationships between production and consumption of contemporary commodities, the *Game Form*, according to an exchange model that I define the *game-exchange.*

2.5. The contemporary form of exchange and consumption

Production, exchange and consumption define the organizing principle in contemporary capitalist society. Diverse models of exchange define and articulate the relationships among people and social groups. Self-production, bartering, and gift-exchange (Mauss, 1924/2002) are at the origin of the relationships of interdependence among social groups from which modern economies have developed. For Baudrillard, political economy has described the consumption processes and dynamics through the analysis of the transmutation of *all values* in *economic exchange value* (Baudrillard, 1972/2012). However, according to Baudrillard, what political economy has not considered is the processes of transmutation of *economic exchange value* into *sign exchange value*. That is, consumption

> "considered as a system of sign exchange value: not consumption as traditional political economy defines it (reconversion of economic exchange value into use value, as a moment of the production cycle), but consumption considered as the conversion of economic exchange value into sign exchange value". (1972/2012, p. 99)

As for political economy, the theory of industrial design in based on the diversity between *use value* and *exchange value* (Perniola, 1980/2011). According to Perniola, however, at the end of the '50s, there is a transformation in the dialectics that contraposes *use value* against *artistic value*, usefulness against uselessness, art against industrial design, autonomy against heteronomy. With the emergence of Pop Art, Art projects its autonomy towards any object which is divested of its *use value* and transformed in a work of art: everything can become art. On the contrary, industrial design projects its heteronomy toward every object

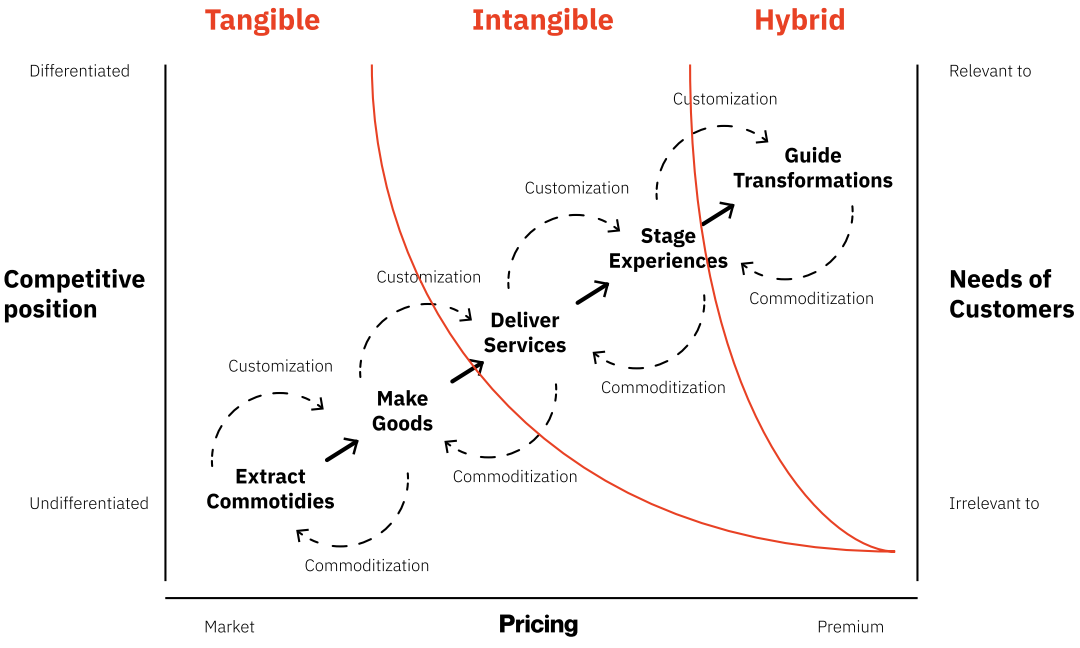


Fig. 2.4 - Elaboration of Pine and Gilmore (1999, 2013) description of customization and commoditization processes.

endowing it with *use value* (semiotic or informational design): everything can become useful. The fall of such dialectics and the commutability of contraposed terms is determined by the *structural revolution of value* in the era of simulation (Baudrillard, 1976/2020). For Baudrillard and Perniola, in the society of consumption, exchange happens between commodities with equivalent signs, through a social structure determined by a semiotic code. Beyond semiotic design and the industrial object scale, the sign invades the urban scale becoming architecture. The logic of communication systems becomes the (dis)organizer of the structure of contemporary cities (Venturi et al., 1972/2010). In this context, designers act as interpreters of contemporary material culture (Celaschi, 2008), working toward a synthesis of meanings and values, forms and functions, culture and market, in a process that generates new dialectics within the social relational space defined by exchange models.

In contemporary digital capitalist society, I argue that gamified applications and games are used to exchange pleasure, enjoyment, sense of achievement, instant gratification for users' time and data. I define this mode of exchange as the *game-exchange*. In the access economy (Rifkin, 2001), product and services are not only accessible via economic transaction. In fact, the access models that products and services of the experience and transformation economy offer, often leverages on, or are complemented by, exploitative strategies and mechanisms share similarities with the gift-exchange model. Users, more or less consciously, give away personal data, time, labor in change of access to the product of for social benefits deriving from participating in such system (as it will be discussed in Chapter 4). Free-to-play games (mobile games in particular) base their economic model on the extraction of value from both paying and non-paying players. As discussed in Chapter 4, the power dynamics that connect the actors of the video game production-consumption system are varied, and complex. As for video games, the *game-exchange* is a characteristic mode of relation in the contemporary exchange system that modulates the power dynamics that negotiates access to products and services. However, this mode differs from the gift exchange (Mauss, 1924/2002) since the obligation that the acts of giving, receiving (accepting), and reciprocating a gift (the access to free enjoyment) are hidden behind opaque business models of gamified applications: the rituality and the social bonds that are built through the gift exchange are instead replaced by checking the "Term & Conditions" checkbox.

Contemporary commodities underwent significant transformation, not only because of the expansion of meanings, and values embedded in products and services, but also because of consumer expectations and aspirational drive that guide consumption choices. From an economic point of view, Pine and Gilmore (1999, 2013) describe the process that progressively transforms *raw commodities* into *products*, and subsequently into *services*, *experiences* and, ultimately, into *transformation* (Fig. 2.4). Such process is driven by the production and network technologies of the industrial product-service system, that enables customization of goods on the basis of specific consumers' desires. The inverse process, the one that progressively removes custom properties from goods making them undifferentiated and appealing to a wider general audience, is defined commodification. Pine and Gilmore observe how consumers are willing to invest more resources into personalized and customize products, services and experiences. On the contrary, purchasing decision on undifferentiated goods are mainly cost-dependent. The ambition of the transformative economy is that to co-produce and customize, together with users, the product-service experience to such a

degree that consumers become enabled with a transformative potential. Such transformation should be able of involving both the cognitive and the physical sphere (Celaschi & Casoni, 2020). The network capabilities and the miniaturization of contemporary technologies allows to identify (induce) and predict consumers' needs and desires. Such aspect will be exemplified in Chapter 4 by discussing how gamification captures and replace users' values (C. T. Nguyen, 2020), working as persuasive procedural system that companies and organizations can exploit for driving consumers' intentions.

Looking at the customization-commodification diagram proposed by Pine and Gilmore, it is possible to identify the domains that characterize production and consumption. In this precession of value, raw and undifferentiated commodities are predominantly tangible artifacts: food, tools, fast-fashion, consumer electronics. When commercial products aim to deliver custom experiences, they often do so by leveraging on digital and data-enabled services. The *cloud* is their (conceptual) immaterial space of consumption. The digitalization of consumption (Lehdonvirta, 2012) describes the process that transforms the pattern of buying, selling, and consuming once that the consumer society (Baudrillard, 2002) and the information society (Castells & Himanen, 2002) interact. The emergence of such process can be observed starting from the peer-to-peer models of pirate distribution of the 1990s and gradually evolved through the development of Web 2.0 and the spread of crowdsourcing production models. More recently, the digitalization of consumption is further articulated by the development and diffusion of blockchain technologies. In this process, the items being produced and exchanged are no longer physical objects purchased via e-commerce, or *information goods*, such as music and films. They are indeed virtual artifacts that exist and can be used only in a virtual world. According to Lehdonvirta and Castronova, the motivations underlying behind the desirability of such items are the same whether they are physical, digital, or virtual. These reasons are *functional* (the item solves a problem), *hedonistic* (the item brings personal satisfaction in terms of pleasure or excitement) and *social* (the item is the symbol of the buyer belonging to a given social class) (Lehdonvirta & Castronova, 2014)[6].

In the last evolutionary step of the evolution of product-service system described by Pine and Gilmore, the ultimate value that the experience economy aims to generate, however, lays in an in-between space where physical and non-physical interactions have the potential to induce transformation in users. It can be argued, however, that such promise often fails to provide users with effective value. As it will be discussed in the next chapters, personal data collected through wearable devices, smartphones, social networks and gamified application (cf. Ch.4) are translated into products and services offers. The generated value is directly informed by and targeted toward the physical and cognitive dimension of the user. In a continuous loop of data generation and exploitation, the *quantified self* keeps generating data to measure and evaluate the impact and efficacy of such products according to new metrics that replace complex and subjective values for simpler and induced ones (C. Nguyen, 2018).

The access to services and the consumption of products has traditionally been mediated by a market-exchange system. The dominance of the market-exchange model as the primary relational system in contemporary post-industrial and consumer society, however, show all its criticalities when confronted with the scarcity of natural resources, their colonialist exploitation

6 For more on the evolution of digital retail systems, blockchain-based exchange models, see the contribution I have co-authored: Celaschi, F., Bonetti, F., Calleo, A., & Casoni, G. (2022). Human in digital: Mind and body grappling with project-making in a dematerialized world. In M. Zannoni & R. Montanari (Eds.), Human Body Interaction (pp. 137–158). BUP - Bologna University Press. https://buponline.com/prodotto/human-body-interaction/

and unjust distribution, the environmental challenges, and the fragility of economic and geopolitical systems. The overabundance and inequal access to commodities in the market system also results in a terminological problem for understanding and defining the contemporary sociocultural and economic asset. According to McKenzie Wark, indeed, the need to mediate between an economic system simultaneously based on the scarcity (and thus on the desirability of a commodity) and on the excess and continuous production of information has resulted in a new model of production that can no longer be called capitalism (Wark, 2021). Moreover, the crisis of the market-exchange model happens in conjunction with a deep technological transformation which significantly impacts the product-service system. In such context, the *game-exchange* enter the relational space between production and consumption. It encapsulates social bonding modes characteristics of gift- and barter-exchange using play as a mean of engagement. Most often, it does so through technological and networked systems that are allow value extraction from the receiving part under the form of time and personal data. This informational value is transferred again in the market-exchange-system as a commodity and as raw material from which fabricating newer personalized product and services.

Designers are often participating to strategic and design decisions that define the role of consumers in the market-exchange system. For example, gamification is often adopted in the user experience design as a way to engage and retain users (cf. §4.4). As it will be discussed in Chapter 4, in the contemporary product-service-system the spheres of digital play and digital economy are deeply interconnected. Designers are involved in shaping the complex power dynamics that are established when designing contemporary product and services. Therefore, a deeper understanding of the video game system (its productive sector, the actors involved, and the medium itself) is paramount to address the ethical role of design today.

2.6. The need for a shared design space

The arguments and the contribution I have introduced in the previous sections and that will be discussed in the next chapters highlight the heterogeneity of disciplines that participates to the analysis of video games as complex industrial, cultural, social, and political artifacts, whose impact largely exceed that of the entertainment market. However, it emerges that such analysis mainly come from two primary areas of research: the humanistic field of Game and Play Studies, and the technical fields of Game Design and Huma-Computer Interaction. From my review, very few contributions consider what it means to situate video games as design artifacts from the perspective of industrial, service and advanced design. Similarly, a design perspective on video games would allow a wider reflection on video games as knowledge artifacts capable to enable “designerly ways of knowing” (Cross, 1982) (Fig. 2.1).

From the classification and analysis of game-forms that is presented in Chapter 6, it emerges how video games provide a platform for analytical and critical enquiry (cf. Ch. 6, 7). For example, in the field of game research and dissemination, video games have been explored as means of a self-reflexive practice. Such capability develops from their “meta-communicative potential”, the “medium-specific forms and modes of self-reflection”, that situate them as “tools for theory, speculation, and philosophical thinking” (Ferri et al., 2016, p. 6). I argue that

the same approach can be extended in design research, in order to explore the creative and epistemic potential of games in the contemporary system of objects[7].

In describing contemporary products as unstable, probabilistic and agentive, Giaccardi defines "connected things" in relation to their use as research artifacts in *RtD*. According to the Author, connected things are "data-enabled artifacts that hold both perception and possible agency: they sense, log and react to data streams and can autonomously make judgments and perform connections to other products and services" (2019, p. 145). These characteristics mark the shift from prototypes to connected things in design *through* research. I argue that video games, and *game-forms* (cf. Ch.6) in particular, represent a particular form of such connected thing, and, therefore, they can effectively be adopted to "produce, constitute, or perform knowledge via their dissemination and use" (Jenkins et al., 2016, p. 3424). In particular, the collaborative forms of value generation (Robbins & Giaccardi, 2019) that is underpinned by *RtD* practices can be observed in *game-forms* such as *Citizen Science Games*[8], *Crowd Science Games*, *Knowledge Games*[9] (cf. Ch.6). Such forms are both used to participatively generate, gather, and disseminate knowledge through play. It is also important to acknowledge that the potential of games as tools for critical (Flanagan, 2009/2013) and speculative (Coulton et al., 2016; Kahled, 2022) inquiry has been describe by game scholars. In particular, Jagoda does so by situating video games and the art-science duality that characterize their experimental qualities, within the contemporary scocio-economic context:

> "Digital games, I contend, are perhaps the best test case for and the ideal form taken by the emergent contemporary art-science of experiment. Beyond the problem-solution framework of gamification, games can serve as an alternative form of experimental art-science that move us from the realm of problem solving toward problem finding or, more properly, problem making". (Jagoda, 2020, p. xiv)

For Jagoda, video games experimentality can be related both to scientific and non-scientific fields. Games are experimental in similar ways art forms (such as avant-garde cinema), and scientific methodologies do. This latter aspect is clearly exemplified by gamification which rely largely on users' data to model and evaluate and influence their behaviors. However, if from science games derive an experimental method based on hypothesis and testing, from linear media arts borrow the capability to generate questions, problems and alternatives ways of inquiry. Such duality characterizes design discipline as well.

Data collection and transfer is at the center of R*t*D practices that use connected things (or digital games, as argued) as knowledge artifacts. In this context, it worths observing that critiquing, unfolding, and telling the way data are collected and used in such research activities is part of the ethical role of design.

Drawing from my personal research experience (which is undoubtedly limited in time and space), Game Design, as a discipline, appears to be highly sectorized and very limitedly integrated in product and service design curricula. In the Italian academic context, as already noted by Giordano (2020), the available educational offers that addresses video games within design degrees[10] only do so in a general way, and without a systemic integration with the rest of the curriculum[11]. Without such systemic integration in design research and education, the risk is that video games are reduced to their technical and

7 For Baudrillard the system of objects describes "the processes whereby people relate to them [the objects] and with the systems of human behaviour and relationships that result therefrom. (Baudrillard, 1968/2014, p. 8, translation from Italian)

8 "games of citizen science entice players to get involved with cutting-edge research, promising that exploring data sets and simulation algorithms will be good fun. More recently, a number of citizen science projects have crafted fictional narratives to enhance player engagement." (Milburn et al., 2023)

9 "I use the term "knowledge games" to label and express those games that seek to invent, create, and synthesize new understandings of the world, solve real-world problems big and small, and help us reconsider, reframe, and reflect on humanity and our universe. These games solve problems and create new understandings inside the game, but with real-world application." (Schrier, 2016)

10 Specifically, for the Italian academic context, with disciplines from ICAR/13 scientific sector, which is that of Industrial Design. https://www.istruzione.it/archivio/alfresco/d/d/workspace/SpacesStore/28206ac9-fcae-4be5-a716-d3595dadd913/Elenco_Settori_Scientifico_Disciplinari.pdf

technological aspect, and they are not studied and designed contextually with the rest of the product-service system. When games are drawn in design projects without a holistic approach, the cultural significance and the creative opportunities of the medium are left uncharted. Gamification and applied games, as discussed in Chapter 4, are paradigmatic in such sense of the opportunistic and often exploitative use of game technologies and affordances. Therefore, after analyzing the three interconnected layers of video game production (cf. Ch.3), consumption (cf. Ch.4), and technocultural significance (cf. Ch.5), in Chapter 7 I propose a theoretical and applicative framework – the *Design Research Gameplay* – that aims to systemically integrate game cultures with design research.

11 Some of the game-related curses inside Design curriculum are disciplinarily linked to the field of Communication Design. One example is the Complex Artifacts and System Design Studio of the Communication Design degree of the Politecnico di Milano https://www11.ceda.polimi.it/schedaincarico/schedaincarico/controller/scheda_pubblica/SchedaPublic.do?&evn_default=evento&c_classe=828936&lang=IT&__pj0=0&__pj1=f7bf86dda091ec82fb2bfc26901a61c3. Other initiatives have been and are promoted by IULM Communication School, in particular the Gaming & Esports Master (https://gotomaster.iulm.com/masters/gaming-esports/, starting in 2025) and the M.A. program from the Faculty of Comminication in Game Design (active in 2020-21, https://apply.iulm.it/it_IT/courses/course/34-ma-game-design).

Chapter Bibliography

Baudrillard, J. (1994). *Simulacra and Simulation*. University of Michigan Press. (Original work published 1981)

Baudrillard, J. (2002). *Jean Baudrillard: Selected Writings*. Stanford University Press.

Baudrillard, J. (2009). *La scomparsa della realtà. Antologia di scritti*. Fausto Lupetti Editore.

Baudrillard, J. (2012). *Per una critica dell'economia politica del segno*. Mimesis. (Original work published 1972)

Baudrillard, J. (2014). *Il sistema degli oggetti* (Saggi Tascabili). Bompani. (Original work published 1968)

Baudrillard, J. (2020). *Lo scambio simbolico e la morte* (7th ed.). Feltrinelli. (Original work published 1976)

Bleecker, J. (2009). *Design Fiction: A Short Essay on Design, Science, Fact and Fiction* (p. 49). https://blog.nearfuturelaboratory.com/2009/03/17/design-fiction-a-short-essay-on-design-science-fact-and-fiction/

Calleo, A. (2025, TBP). (De)Colonizing Outer Space. Speculative Frontiers of Outer Space Exploration in Video Games. *Proceedings of Cumulus Conference 2024*. Cumulus 2024, Budapest.

Castells, M., & Himanen, P. (2002). *The Information society and the welfare state. The Finnish model*. Oxford University Press.

Celaschi, F. (2000). *Il design della forma merce*. Il Sole 24 Ore.

Celaschi, F. (2008). Il Design come mediatore tra bisogni. Il Design come mediatore tra saperi. In C. Germak (Ed.), *L'Uomo al centro del progetto. Design per un nuovo umanesimo.* (pp. 19–31). Umberto Allemandi & C.

Celaschi, F. (2015). AdvanceDesign Points of View. In M. Celi (Ed.), *Advanced Design Cultures: Long-Term Perspective and Continuous Innovation* (pp. 3–17). Springer International Publishing. https://doi.org/10.1007/978-3-319-08602-6_1

Celaschi, F., & Casoni, G. (2020). *Human Body Design. Corpo e progetto nell'economia della trasformatività*. Franco Angeli.

Celi, M. (2015). Preliminary Studies on AdvanceDesign. In M. Celi (Ed.), *Advanced Design Cultures* (pp. 19–36). Springer. https://link.springer.com/book/10.1007/978-3-319-08602-6

Celi, M., & Formia, E. (2015). Advanced design practices for sharing futures: A focus on design fiction. *The Value of Design Research - 11th International European Academy of Design Conference*, 16. https://doi.org/10.7190/ead/2015/141

Coulton, P., Burnett, D., & Gradinar, A. (2016, June 27). *Games as Speculative Design: Allowing Players to Consider Alternate Presents and Plausible Futures*. https://doi.org/10.21606/drs.2016.15

Cross, N. (1982). Designerly ways of knowing. *Design Studies*, *3*(4), 221–227. https://doi.org/10.1016/0142-694X(82)90040-0

Deleuze, G., & Guattari, F. (2017). *Mille piani. Capitalismo e schizofrenia*. Orthotes. (Original work published 1980)

Deserti, A. (2015). Maps and Tools for AdvanceDesign. In M. Celi (Ed.), *Advanced Design Cultures*. Springer. https://link.springer.com/book/10.1007/978-3-319-08602-6

Ferri, G., Caruso, G., Salvador, M., Fassone, R., & Gualeni, S. (2016). Games on Games. Game Design as Critical Reflexive Practice. *G|A|M|E The Italian Journal of Game Studies*, *1*(5), 5–10.

Flanagan, M. (2013). *Critical Play. Radical game design*. MIT Press. (Original work published 2009)

Floridi, L. (2014). *The Fourth Revolution. How the Infosphere is Reshaping Human Reality*. Oxford University Press.

Giaccardi, E. (2019). *Histories and Futures of Research through Design: From Prototypes to Connected Things*. *13*(3).

Giordano, F. (2020). Nel mezzo del periglioso tragitto. Istituzionalizzazione e riconoscimento accademico della cultura del videogioco in Italia. In M. Benôit Carbone & R. Fassone (Eds.), *Il videogioco in Italia: Storie, rappresentazioni, contesti*. Mimesis.

Han, B.-C. (2022). *Le non cose*. Einaudi.

Jagoda, P. (2020). *Experimental Games: Critique, Play, and Design in the Age of Gamification*. University of Chicago Press. https://doi.org/10.7208/chicago/9780226630038.001.0001

Jenkins, T., Andersen, K., Gaver, W., Odom, W., Pierce, J., & Vallgårda, A. (2016). *Attending to Objects as Outcomes of Design Research* (p. 3430). https://doi.org/10.1145/2851581.2856508

Juul, J. (2022). The Open and the Closed—Games of Emergence and Games of Progression. In F. Mäyrä (Ed.), *Computer Games and Digital Cultures Conference Proceedings* (pp. 323–329). Tampere University Press. https://www.jesperjuul.net/text/openandtheclosed.html

Kahled, R. (2022, April 29). *Speculation and Resonation*. Stanford HCI Group, Human-Computer Interaction Seminar. https://hci.stanford.edu/seminar/speaker.php?-date=2022-04-29

Kirby, D. (2010). The Future Is Now: Diegetic Prototypes and the Role of Popular Films in Generating Real-World Technological Development. *Social Studies of Science - SOC STUD SCI*, *40*, 41–70. https://doi.org/10.1177/0306312709338325

Kopytoff, I. (1986). The cultural biography of things: Commoditization as process. In A. Appadurai (Ed.), *The Social Life of Things* (1st ed., pp. 64–92). Cambridge University Press. https://doi.org/10.1017/CBO9780511819582.004

Lehdonvirta, V. (2012). *A History of the Digitalization of Consumer Culture: From Amazon Through Pirate Bay to Farmville* (SSRN Scholarly Paper No. ID 2501350). Social Science Research Network. https://papers.ssrn.com/abstract=2501350

Lombard, M., & Ditton, T. (1997). At the Heart of It All: The Concept of Presence. *Journal of Computer-Mediated Communication*, *3*(2), JCMC321. https://doi.org/10.1111/j.1083-6101.1997.tb00072.x

Maldonado, T. (2008). *Disegno industriale: Un riesame*. Giangiacomo Feltrinelli Editore. (Original work published 1991)

Mauss, M. (2002). *Saggio sul dono. Forma e motivo dello scambio nelle società arcaiche.* Einaudi. (Original work published 1924)

Milburn, C., Buse, K., Dhaliwal, R. S., Wills, M., Aldosari, R., Camarador, P., Miller, J. A., & Siegel, J. (2023). Join the Fold: Video Games, Science Fiction, and the Refolding of Citizen Science. *Design Issues*, *39*(1), 70–87. https://doi.org/10.1162/desi_a_00707

Nguyen, C. (2018). *Games: Agency as Art*. https://doi.org/10.1093/oso/9780190052089.001.0001

Nguyen, C. T. (2020). *Games: Agency As Art* (1st ed.). Oxford University PressNew York. https://doi.org/10.1093/oso/9780190052089.001.0001

Perniola, M. (2011). *La società dei simulacri.* Mimesi. (Original work published 1980)

Pine, B. J., & Gilmore, J. H. (1999). *The Experience Economy: Work is Theatre and Every Business a Stage*. Harvard Business Press.

Pine, B. J., & Gilmore, J. H. (2013). The Experience Economy: Past, Present and Future. In J. Sundbo & F. Sørensen (Eds.), *Handbook on the experience economy* (p. 269). https://doi.org/10.4337/9781781004227.00007

Rifkin, J. (2001). *The age of access: The new culture of hypercapitalism, where all of life is a paid-for experience* (1. paperback ed). Jeremy P. Tarcher/Putnam.

Robbins, H., & Giaccardi, E. (2019). Generating value across academic and professional design practice in the Internet of Things. *CoDesign*, *15*(1), 24–40. https://doi.org/10.1080/15710882.2018.1563192

Sanders, E. B.-N., & Stappers, P. J. (2008). Co-creation and the new landscapes of design. *CoDesign*, *4*(1), 5–18. https://doi.org/10.1080/15710880701875068

Schrier, K. (2016). *Knowledge games: How playing games can solve problems, create insight, and make change*. Johns Hopkins University Press.

Smith, P. G., & Reinertsen, D. G. (1998). *Developing products in half the time: New rules, new tools* (Second edition). John Wiley & Sons, Inc.

Sterling, B. (2006). *Shaping Things*. MIT Press.

Taylor, T. L. (2009). The Assemblage of Play. *Games and Culture*, *4*(4), 331–339. https://doi.org/10.1177/1555412009343576

Venturi, R., Scott Brown, D., & Izenour, S. (2010). *Imparare da Las Vegas*. Quodlibet. (Original work published 1972)

Wark, M. (2021). *Capital is dead. Is this something worse?* Verso.

Zannoni, M. (2018). *Progetto e interazione. Il design degli ecosistemi interattivi*. Quodlibet.

3. A Map of the Local Video Game Industry: Analyzing Global Dynamics in the Italian and Emilia-Romagna Game Sector

3.1. Introduction

With the constant growth of the video game market, the number of video game development studios and companies is increasing. It has been estimated that in 2022 the global market reached 3.2 billions users and almost 200 billion dollars in revenues (Newzoo, 2022). Over the last two decades, a particular interest has grown around the geography of industrial evolution and the impact of digital entertainment production in the context of creative and cultural industries (Aoyama & Izushi, 2003; Pilon & Tremblay, 2013). The complexity that emerges observing the development of new national game industries is characterized by the diversity of each local context. Indeed, over the last decade, the research on video game production outside Western Europe and North America has grown, defining the field of regional game studies (Liboriussen & Martin, 2016).

The scope of this chapter is to contextualize and situate the Italian video game production system and its defining characteristic, paying particular attention to the present years (2019-2024) and to the Emilia-Romagna region. To complement the analysis of the local scale, in the appendix I provide a brief description of the global game industry geography alongside relevant historical notes.

It is worth considering that, besides documenting regional stories, regional video game industry histories need to be drawn in parallel with a critical reading of the industry and market transformations happening on both local and international scales. In this way, the documentation of regional game industry evolution can provide informative tools to producers, policy makers, educational institutions, and stakeholders. Within the scope of this thesis, such analysis is developed to supports the hypothesis that designers can positively influence the evolution of the local game industry. I argue that product and service designers can be key figures in the future evolution of the local game industry. The heterogeneity and trans-disciplinarity of design curricula prepare designers to fit, specialize and innovate into different industries. Indeed, designers' main skill is the capability and attitude to mediate across disciplines (Celaschi, 2008b) and between industrial sectors. Such cultural sensibility is increasingly needed in a competitive and international market. However, as it is further discussed, in Italian academic departments of architecture and design, the study of video games as a product-service system is limitedly and rarely integrated within the teaching curriculum. Therefore, the aim of this chapter is to analyze the characteristics of the local video game industry within the national and European context, and to identify the transformative role that designers can bring to the game sector.

3.2. Methodology and Limits

For the sake of readability, synthesis, and scope, I have opted to narrow down the focus of this chapter to the Italian and Emilia-Romagna context.

However, since video game production and consumption are a global phenomenon, in the appendix (cf. APX.X) I provide a synthetic overview of the global game industry. The aim is to provide an introduction for readers who are not familiar with the video game sector. In such global overview, I adopt a broad geographical clusterization to frame a synthetic historical background of the main local industries evolution. Although this framing will loosely follow the most often adopted narrative on the evolution of video games as industrial artifacts, it acknowledges the necessity to consider and use local perspectives that describe the non-uniform development and diffusion of the medium (Swalwell, 2021). Within this contribution, in fact, it appears functional to frame the local video game industry adopting a global to local approach that moves from the most documented and established market towards the local characteristic of the industry in the Emilia-Romagna region. Moreover, such approach is also due to the characteristic of the video game market that, thanks to digital distribution, is not confined by national borders. The scope is not to outline a comprehensive and detailed analysis of each cluster, but rather to highlight relevant characteristics and key historical events that can offer comparison elements between the global, the Italian, the regional contexts.

Both for the global overview (cf. APX.X) and for the Italian and Emilia-Romagna analysis, data are derived from a heterogeneity of fields of studies and formats that include game histories, industry reports and analysis, exhibitions, and interviews. To support a broader understanding of complexity of video game production, the next two section synthetically outline the main phases and infrastructural requirement of video game production.

3.3. Video games as advanced industrial artifact

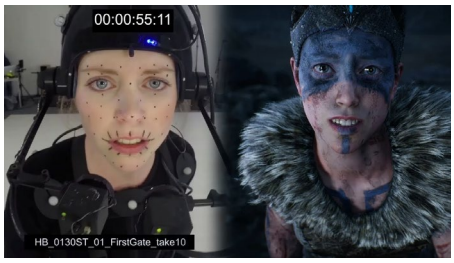


Figure 3.1 - Use of motion capture technology to record actor's facial expressions in Senua's Saga: Hellblade II, Ninja Theory, 2024

In the introductions of this chapter and this thesis, I've defined video games as technocultural artifacts which production and consumption involve the use of digital software and hardware. Despite being evident that this product category encompasses a wide range of artifacts, it is worth to briefly describe the main production aspects that are involved in video game development[1]. In fact, the design, production, distribution and maintenance of a video games involve numerous specialized professionals and necessitate a wide spectrum of economic resources.

In short, making games is generally an expensive endeavor. The number of working hours and, therefore, economic resources is dependent on several aspects such as game genre, target platform, game duration, art style. Specific game genres, like *Massive Multiplayer Online Role-Playing Games* (*MMORPGs*), require significant resources not only during design and production, but most importantly after the game is commercialized and when players crowd the online servers. Casual smartphone games, despite being relatively inexpensive to develop, require massive investments in marketing a promotion to attract players (player acquisition). Narrative intensive games require significant localization work which not only involves text translators, but often

1 This section will only address production aspects and will not discuss how video games are designed.

professional voice actors. The adoption of a particular art style will determine the type of visual asset and production technologies involved. Gradually more often, contemporary 3D games are using photogrammetry and laser scanning technology to realistically capture geometries and textures. Motion capture suits are used to track actors body movements and facial motions (Fig. 3.1).

The game industry adopts an empirical categorization to describe the resources needed for a specific production[2] (Tab. 3.1).

Regardless of the game budget, it is possible to subdivide the whole production cycle in four phases: preproduction, production, testing, postproduction (Chandler, 2014).

A detailed preproduction is fundamental to define the game concepts, features, art style, technical specifications, and therefore accurately estimate production costs. This phase can account for a 10-25% of the whole production cycle. In this phase it is already clear if the game will be based on an original IP, a licensed one or on a studio expertise or proprietary technology. This aspect is fundamental since it determines not only the target audience, but also cost allocation, risk and expected sales[3].

During the production phase, game assets (such as 3D models, animations, sound effects, illustration) are produced and code is developed. Video games are generally developed using specialized software, called, engines, which facilitate the management of aspects like graphical rendering, game physics and interaction with the virtual environment. Game engines are complex software that until recently were proprietary assets of major game studios which had the resources and the knowledge for the development of their own (Fig. 3.2). Until recently, licensing such engines, or developing one, was accounted for a significant part of production costs. Today, professional engines are available under much more accessible licensing options. Also, open-source engines, like *Godot*[4], are now viable solution for commercial production as well.

2 For more on video game budget classification see: (Garda & Grabarczyk, n.d.; Lipkin, 2013; Mathews & Wearn, 2016; Steinberg, 2007)

3 Interview to Andrea Basilio, From AA to Indie. Diferent Players, Differente Challenges. http://gamedesign.university/andrea-basilio

4 https://godotengine.org

Table 3.1 – Video games categories according to budget

	Definition	**Budget, team size**	**Examples**
AAAA (Quadruple A)	Used to market ninth generation game consoles. There is not an industry-shared agreement on this definition.	>AAA	Skull and Bones, Ubisoft, In development
AAA+ (Triple A plus)	AAA-budget games that generate additional revenues from game-as-a-service (SaaS) methods.	As for AAA + SaaS support	Destiny, Bungie, 2014-2024 Battlefield, DICE, 2002-2021
AAA (Triple A)	Video games produced and published by major companies.	>50 million $ > 100 people involved	Final Fantasy VII, Squaresoft, 1997 Halo 3, Bungie, 2007 Grand Theft Auto V, Rockstar, 2013
AA (Double-A)	Mid-market video games that are developed by smaller-scale companies.	Budget < 50 million $ 20-50 people involved	PlayerUnknown's Battleground (PUBG), Bluehole (2017) Life is Strange, Dontnod Entertainment, 2015 MotoGP series, Milestone (2000-2024)
Indie	Video games developed by independed or smaller teams without support from large publishers.	< 1 milione di $ 1 – 10 people involved	Minecraft, Markus Persson & Mojang Studios, 2011 Paper, Please, 3909 LLC, 2013 Limbo, Playdead, 2010

Quality check is assured in the testing phase. This phase is recursively reiterated during the whole production cycle, often in conjunction with milestone achievements. In bigger production, producers hire specialized testing company which playtest and reports bugs, gameplay issues, UI and UX, localization, technical issues. Testing and quality check are fundamental parts of game production which have a major impact on the game's success.

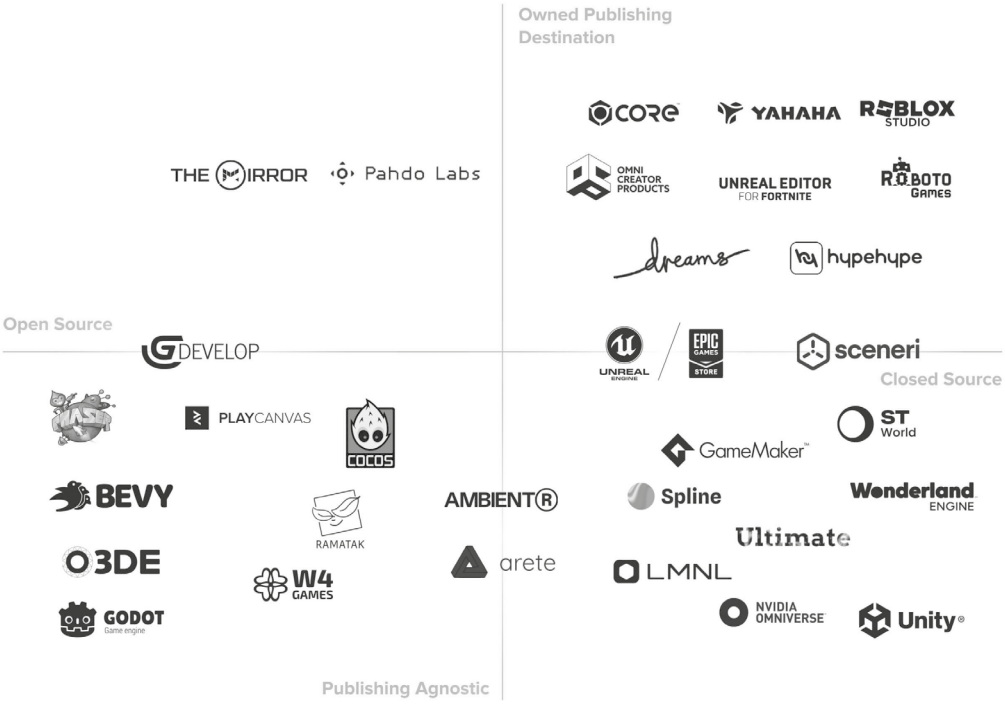
Postproduction involves all the activity that happen after the final build has been shipped. It includes submission to distribution platforms, marketing and communication activities, community management, post-release bug fix, and updates. It also represents the moment to collect and reflect on the knowledge that have been built during production. In general, these are collected in the so-called *postmortem. Postmortems* are useful sources of information to study and gather insights on game production. This documents, that come in different forms, aim to reconstruct the production process of a game, discussing technical, design, or productive challenges[5].

The *Italian Party of Indie Developers* has summarized video game production in a flow diagram (Fig. 3.3) that schematizes the different production activities according to four areas of competences: design and production, art, coding, business. The diagram shows the interconnection between the different areas, emphasizing how decisions taken in one area influence the overall production process.

Team sizes is another aspect that characterize game production. As described in Table 3.1, game budget determines and is determined by the number of required people. Whereases in small teams the same person can be responsible for multiple aspects of a specific area, bigger teams divide by sectors and specialize in working task. It is also usual that team size varies during production or externalize specific activities. Together with the growth of Indi production, there are more and more online stores that sell production assets, allowing smaller teams to speed up production times.

5 A wide collection of postmortems can be found in the archive of the Game Design Conferece (GDC), one of the most important conferences about game design and production. http://gamedesign.university

Figure 3.2 - Game Engine Market Map. Retreieved at https://a16z.com/unbundling-the-game-engine/



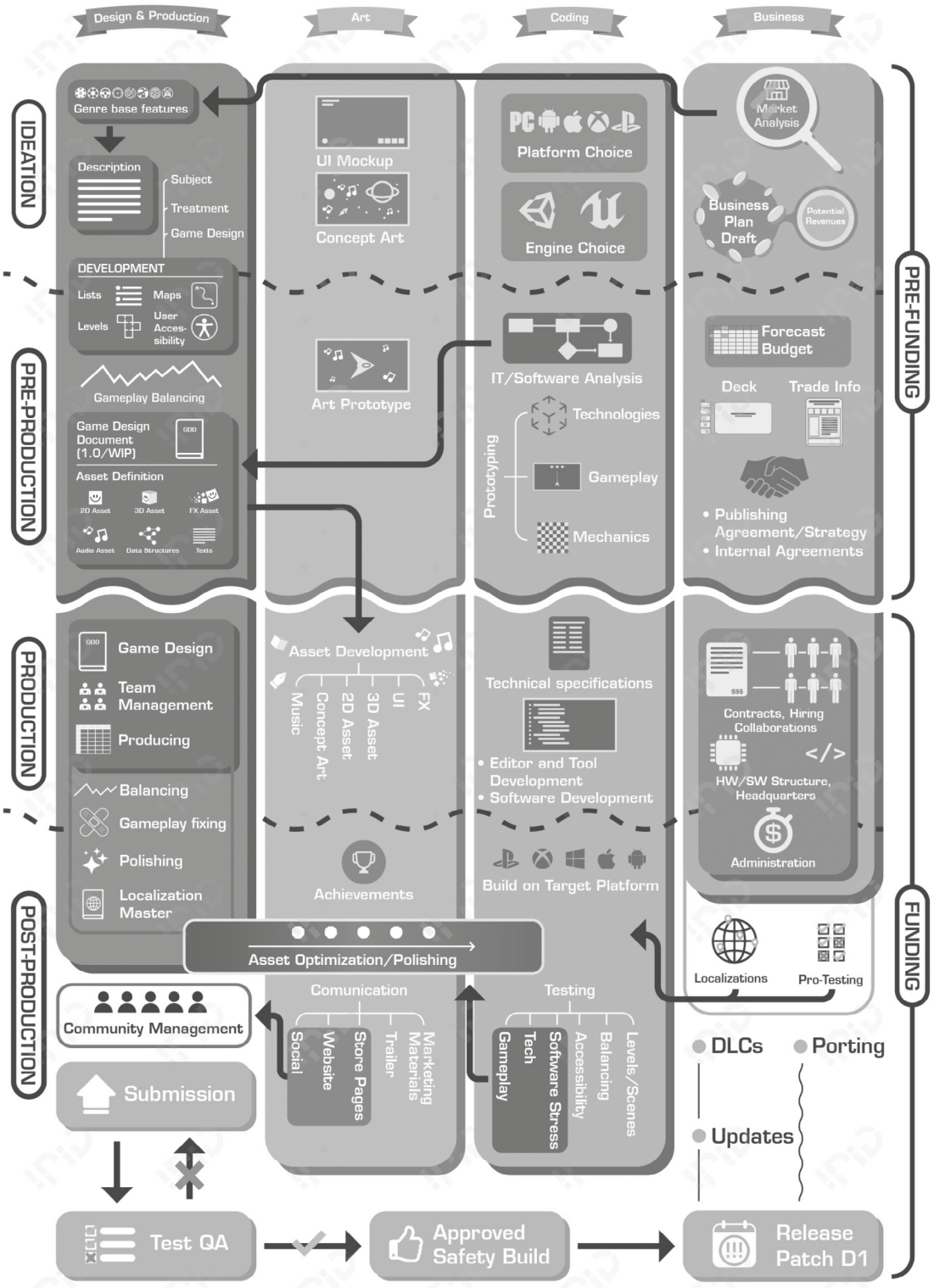


Figure 3.4 - Video Game production phases provided by Italian Party of Indie Developers, Ivan Venturi (Italian Games Factory), and Marco Sessa (Moloto-as Studio). Retrieved at: https://www.ipid.dev/sdm_downloads/the-definitive-scheme-of-videogame-development/

Production of applied games (cf. Ch. 4), Art Games (cf. Ch. 5), or other forms of games not specifically designed for the entertainment market (cf. Ch. 6), may follow slightly different workflows which compress or expand the phases of the production cycle. This is due both to the different game scope, involved stakeholders and target audience, logics of resource optimization between similar projects, reduced production times.

3.4. Industry evolution: infrastructural requirements and challenges

Size, impact and characteristics of the game industry varies greatly across countries. In fact, despite the growing availability and accessibility of technologies and information, video game production requires an extended range of technical knowledge, technological infrastructure, and cultural sensibility in order to develop as an economically sustainable activity. As observed by Wolf (2015), three levels of infrastructure are needed for a national video game industry to be able to establish and develop. The first level addresses basic needs as access to electricity, verbal and visual literacy, as well as a lifestyle that allows for leisure time to dedicate to play. Such essential requirements could appear obvious from an industrialized global North perspective, but, from another geographical perspective they are not, as global climate disasters, social and political instability, and energy justice debate are highlighting. The absence of this minimum infrastructural system is not only affecting the development of the game industry in countries where such basic needs are lacking and affecting other aspects of life as well. The coming apart of the basic condition is having an impact also in countries with an established video game production industry, as it is currently happening in Ukraine where video game companies had to relocate due the military conflict (Winkie, 2023).

The second level of infrastructure identified by Wolf (2015) is the availability of basic technological tools, know-how, distribution and marketing network. It is worth noticing that since the diffusion of digital distribution platforms, such as *Steam* introduced by *Valve Corporation* in 2003, the traditional model of physical copies market has substantially changed. Moreover, the adoption of new ownership models and cloud gaming technology is transforming the way video game can be consumed. Non-conventional marketing campaigns and the proliferation of user-generated content on social platform allow alternative communication channels for video game promotion. Such transformations suggest that this secondary level of infrastructure do note appears to be specific to video game production, distribution, and consumption, but it blends and synergically adapt to the development of networked and internet services. Technology innovation, from coin-operated gaming machine to home consoles and now to mobile and cloud-based technology, has accelerated the adoption of new business models in the game market and, generally speaking, in the creative industry (Landoni et al., 2020; Lantano et al., 2022). The availability of general-purpose technology for video game consumption, such as smartphones, allows for a faster market diffusion. To this regard, it is significant to observe that today about half of the revenues of the global game market are coming from mobile platform (Newzoo, 2022).

The third infrastructural level identified by Wolf is represented by the existence of professional network of game designers, developers, programmers. In order to sustain the development and

the availability of such expertise, it is argued that two key roles are played by local and national professional association, and dedicated education and training programs. Despite the positive global revenue reports, articles published of game and tech magazines have reported that in 2023 more that 7.000 people working in the video game industry have been increasingly and significantly fired from 2022 (Carpenter, 2023; Parrish, 2023; Purchese, 2023). As reported in interviews to representatives of industry associations, the rapid market request during the Covid-19 pandemic has pushed companies to make significant investments that in some cases have not been compensated by sales. Moreover, the general economic condition and the rising cost of interest rates and inflation have contributed to destabilize the game industry. The reports about the unemployment situation clarity is consistent with testimonies of exploitative work practices, if not actual forms of discrimination (Carpenter, 2021). A grown sensibility and awareness about such issues have brought attention to working condition in the game industry and to the emergence of work-related mental health issues (Anderson & Orme, 2022). The video game industry, in fact, is often described as one that leverages on employees' passion and enthusiasm[6] to obtain low-played labor for entry-level work and to impose overtime "crunch" over several weeks or months. Moreover, global trends that characterize contemporary capitalism, such as commoditization, platform economy and production management leveraging on the global North-South divide, reflect in the video game industry (Woodcock, 2019). The possibility to contest exploitative working condition and report abuses and discrimination represent important motivators for workers to organize in trade unions (Woodcock, 2020). Industry association and trade union (Tab. 3.2) play an important role in sustaining workers recognition and rights, offer legal support, promoting inclusion and denouncing discrimination, but they mediate between the video game industry and local institutions.

6 Workers in these industries are often driven by a strong personal passion for video games. Some players are so passionate about games that eventually start self-training and educating on game production skills. By sharing their technical skills achievements online, they hope to impress game studios and get commissions and jobs. Such condition, particularly spread among creative professions, has been described by Lorusso by the neologism Entepreneriat (Lorusso et al., 2019).

Table 3.2 – List of major Video Game Industry Associations

International Game Developer Association (IGDA)	https://igda.org
AEPIDU - Associação de Empresas Produtoras e Distribuidoras de Videojogos (Portugal)	http://aepdv.pt/
AEVI – Asociación Española de Videojuegs	http://www.aevi.org.es/
ANGI – Association for the Nordic Game Industry	http://angi-nordic.com/
Dataspelsbranschen – Swedish Game Industry	https://dataspelsbranschen.se/
Entertainment Software association of Canada	https://theesa.ca/
ESA - Entertainment Software association	https://www.theesa.com/
European Games Developer Federation (EGDF)	https://www.egdf.eu/
Game – Verbond der Deutschen Games-Branche	https://www.game.de/
Italian Interactive Digital Entertainment Association	https://iideassociation.com
OVUS - Österreichischer Verband für Unterhaltungssoftware (Austrian association for entertainment software)	https://www.ovus.at/
RGDA – Romanian Game Developers Association	https://rgda.ro/
SEII – Syndicat des Éditeurs de Logiciels de Loisirs (France)	https://sell.fr
SGA – Serbian Games Association	https://sga.rs/en/
SIEA – Swiss Interactive Entertainment Association	https://www.siea.ch/
SPIDOR (Poland)	http://www.spidor.pl/
The Independent Game Developers' Association	https://tiga.org
Trade Association for UK Interactive Entertainment	http://ukie.org.uk/
VGFB – Video Games Federation Belgiu	http://vgfb.be/
VGFN – Dutch Video Games Industry	https://nvpi.nl/nvpi-interactief/
Videogames Europe	https://www.videogameseurope.eu

Another key element that is required to support the establishment of a video game industry is the presence of education and training system that support knowledge production and transfer. Since the game industry is a relatively young sector, senior roles are generally guided by people with no formal training in game development or game design. Expert game designers, developers and producers have developed their professional skills through experience, building on top of the initial passion for video games. As told by stories of popular game companies, for many developers, learning by doing has been the major source of learning. Today's availability of resources has greatly facilitated knowledge acquisition. Dedicated professional training and academic degrees are more easily accessible and, in general, the professional path in the game industry has become more structured. However, a systemic approach to training and educating future industry professional is needed in the same way it is designed for other advanced industrial sectors. The role of clusters and the development of communities of practices (Wenger, 1998) in creative industries have been investigated by economic geography research, who have outlined their capability to act as catalysts in the formation of specialized labor market through social and business relations that can eventually influence the evolution and the competitiveness of an industrial sectors (Izushi & Aoyama, 2006). Moreover, the continuous dialogue between the game industry, training and academic institutions, local and national administrations is a necessary condition to establish the premises for the development of the sector.

Although this incremental process appears to be linear and consequential, it is mainly theoretical and is not descriptive of all the complex dynamics, both local and global. It is also important to acknowledge that framing video game production under the expression "video game industry" risks to overlook the broader range of phenomena that describe the working conditions and the variety of involved subjectivities. This argument has been addressed by Keogh (2023) who provocatively argues that the video game industry, as it is commonly described, does not exist. Rather, he argues, there is a misalignment between the game industry mediatic and self-representation, and the range of experiences, identities, and working conditions of video game makers. As he argues,

> ""The videogame industry" as a concept, as a defined and distinctive area of commercial activity, only accounts for a small, particularly lucrative, and geographically concentrated aspect of gamemaking activity while failing to account for a much broader and complex range of gamemaking identities, cultures, and sites." (Keogh, 2023, p. 3)

To provide a more accurate representation of the phenomena, Keogh suggests to frame this more articulated production system as "*the field of video game production*" (Keogh, 2023, p. 6; original emphasis). Indeed, according to Keogh, despite the industrialization process of video game production has been widely discussed, there are still few research on video games production as a *cultural* production – with all the connected issues that concern cultural workers. Such consideration is in line with that of O'Donnell who argues that, although video game are software, the "wide array of expertise, broad social phenomenon that surrounds games and the technological and political-economic system that surrounds the game industry cannot and should not be collapsed into the roughshod category of software" (O'Donnell, 2012, p. 28).

This chapter aims to contribute to the description of the *field* focusing on the Italian context and specifically on the regional one of Emilia-Romagna. In this regard, as stated in section 3.2, the approach adopted here aims to describe the multitude of conditions that characterized game production in the specific analysis context that, far from being a structured industrial system, strives to obtain a more stable organization and recognized status. In achieving such equilibrium, the game field needs to negotiate between its intrinsic essence of being in between cultural and technical production. A condition that the game field shares with design cultures.

3.5. Italian Video Game Industry: origins and the current state

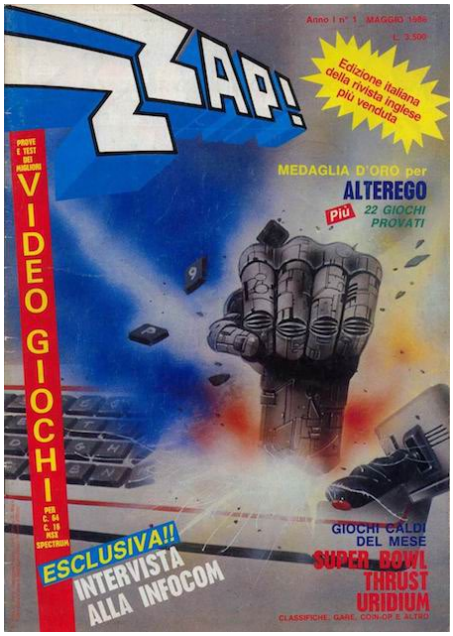


Figure 3.5 - © Zzap!.it, Zzap! n. 1, May 1986, Edzioni Hobby S.r.l. Retreived at https://www.zzap.it/numero/1

The origins of the Italian video game industry, its current production and distribution dynamics, its cultural representations of local identities, and, in general, the analysis of its peculiarities in relation to the global context are being investigated by a growing number of contributions. A particular interest is coming from the field of media studies. The publication *Il videogioco in Italia: storie, rappresentazioni, contesti* (Benôit Carbone & Fassone, 2020) has contributed to the systematization of the growing academic production addressing the Italian context proposing a multidisciplinary perspective. The volume frames the directions that scholars are investigating when situating the Italian context in the current debate on games. The discussion aims to connect the theoretical/historical analysis with the practice of production and use. In the presented research, the authors set the Italian video game industry in relation with the industrial, productive and distributive forms that contributed to materialize its emergence. It is the case of the chapters dedicated to pinball cabinet producer *Zaccaria* (Fassone, 2020), to the first Italian video game company *Simulmondo* (Benôit Carbone, 2020), to the elusive form of distribution of copyrighted products acquired from abroad during the 1990s (Tosoni et al., 2020), to the analysis of the contemporary productive context (Balla, 2020), to the meaning of the *independent* status for Italian productions (Ruffino, 2020), and to the specific national characteristic of the e-sport sector (Gandolfi, 2020).

As for other countries (Wolf, 2015a), a prehistory of the Italian video game industry has been traced back to the articulated ecosystem of electronic and electromechanic game producers (Fassone, 2020). Specifically, in analyzing the story of the pinball cabinet producer *Zaccaria*, Fassone situates the company in the process of technological evolution that, during the late 1970s, saw the transition from electromechanic to electronic systems. Fassone notices how such evolution was possible because of producers' profound knowledge of the arcade market demand and thanks to the flexibility of the procurement network of suppliers that implied only minor changes to the production processes. In addition, companies like Olivetti and other electronic hardware manufacturers started exploring possible commercial opportunities in the emerging video game market. In 1974, the home appliances producer *Zanussi*, produced the *Ping-O-Tronic*, a home system for playing *Pong* (Atari, 1972) inspired games. In 1977, *Zanussi* commercialized a second updated version called *Play-O-Tronic*. Over the years, the company sold an estimated of one million units. The diffusion of the *Olivetti*'s *M20* and *M24*, the *Commodore Amiga,* and the largely popular *Commodore 64*, together with the growing availability of magazines like *Video Giochi*, *MCmicrocomputer*, *The Games Machine*, *K*, and *ZZAP!* (Figure 3.4), started the diffusion of local game and informatics communities (Gandolfi, 2015).

During its early years in 1980s, the Italian video game industry borrowed topics and commercial strategies from the traditional cultural and media production. As discussed above, the role of printed magazines has been described also in other national context, such as the case of the United Kingdom (cf. APX.XX). However, it can be observed that in Italy the narrative describing the emergence of bottom-up production practices, thanks to magazine publications such as that of the bedroom coders, intertwines with distinctive modes of appropriation, serialization, and distribution. In fact, although magazines had a role in spreading programming knowledge and interest for informatics, the peculiarity of the Italian context lies in the way the logic of magazine distribution through the capillary network of newsstands and the comic book specific practice of content serialization were applied to video games (Fassone, 2016, 2018; Genovesi, 2017). Moreover, a salient character of the early Italian video game market, that will influence and propagate in the wide availability of pirate software during the 2000s, is the diffuse practice of importing, cracking and commercializing foreign software (Fassone, 2016; Tarantino & Tosoni, 2017; Tosoni et al., 2020). During the 1980s, in fact, the practice of subdividing game content in periodical publication, was not only applied to original production, but also to foreign video games that were cracked and redistributed on the Italian market taking advantage of the gray legislation on copyright. It can be observed how in Italy game magazines and newsstand distribution had a significant and distinctive impact on the creation of a consumption demand, compared to the few existing specialized computer shops.

During the 1990s, the first game companies start to emerge, structuring the sparse presence of amatorial video game developers. *Simulmondo s.r.l.* is considered the first Italian software house which started developing and publishing video games. *Simulmondo* was founded in 1988 in Bologna by Francesco Carlà and produced games for home computers such as the *Comodore 64* and the *Amiga* systems. *Genias* was founded in Castenaso (Bologna) by a former *Simulmondo* partner, Riccardo Arioti. *Idea s.r.l.* was founded in 1990 in Casciago (Varese) and was a development company part of *Leader Distribuzione s.p.a*, a company specialized in software and hardware commercialization and distribution. In addition to growing number of development companies, distributors like *Leader* and *CTO s.p.a* (Zola Pedrosa, Bologna) started to officially import games. *Trecision s.p.a* was founded in 1991 in Rapallo (Genova) and, in 1993, Antonio Farina, former *Idea* s.r.l. coordinator, funded *Graffiti* that in 1995 will become *Milestone*, one of today's leading Italian video game companies.

The presence of official distributors, the debate on copyright laws, and the marketing campaigns against piracy on game magazines, contributed to downsizing the unofficial game distribution market (Fassone, 2016). However, the serial format of game publication and distribution through newsstands continued. During the 1990s, Italian game companies not only borrowed from the comic book sector the means and methods of distribution, but also stories and characters. Game producers established licensing partnerships with comic book editors for producing games based on intellectual properties of characters such as *Dylan Dog*, *Tex Willer* (Sergio Bonelli Editore), Diabolik (Astorina), *Lupo Alberto* e *Cattivik* (ACME, McK Publishing). In addition to comic books, other characteristic traits of the national culture were also source of inspiration for the first games produced in Italy. In this sense, it appears paradigmatic that the first Italian commercial videogame was a transposition of national traditio-

Figure 3.6 - © IPID. Bocce, Simulmondo, 1987, Comodore 64. Retreived at: https://www.ipid.dev/game-studies/una-volta-eravamo-giganti-la-storia-di-simulmondo-la-prima-software-house-italiana-parte-i/

Figure 3.7 - I Play 3D Soccer, Simulmondo, 1991. Retreived at https://it.wikipedia.org/w/index.php?curid=5827724

nal street game[7], *Bocce* (Simulmondo, 1987) (Fig. 3.6). Arguably, not the most frenetic and exciting video game, compared to the futuristic space wars of foreign game producers.

The abundance of foreign products on the domestic market made the Italian consumers becoming familiar with to the design canons that were being defined internationally. Such consumers' expectations led Italian companies to adapt the national thematic inspirations to the international canons and standard that were already developing (Benôit Carbone, 2020). A notable exception to this practice is *I Play 3D Soccer* (Simulmondo, 1991), a football simulator which allows to play from the footballer perspective (Fig. 3.7).

During the early 1990s, newsstand video games become commercially successful. Between 1993 and 1994 *Simulmondo* produced monthly episodes of *Diabolik*, *Tex Willer* and *Dylan Dog*. Whilst the commercial success of serial distribution in newsstands allowed *Simulmondo* to achieve an economic stability, the demanding production rhythms and pressing deadlines of monthly publication undermined the internal equilibrium of the development team. During an interview[8] with Ivan Venuri, *Simulmondo*'s former software manager, he argued that the pressure deriving from the production schedule and the workload management were major factors that led to the fall in production quality and, eventually, to the company shutdown. At the same time, *Simulmondo*'s international ambitions had to face the skeptic reception of foreign magazine reviewer that contested the technical limits of the productions and the substantial unfamiliarity of the international public with Italian comic's characters (Benôit Carbone, 2020). The technical and structural limits of *Simulmondo*, that led to the closure of the company in 1999, were representative of the problematics faced by the Italian video game industry in general. Benôit Carbone notices how, compared to the United Kingdom where the government adopted policies to promote computer literacy across the country, in Italy the strategic investments in technology innovation and establishing synergies with the creative industries were lacking (Benôit Carbone, 2020). In the meantime, home console diffusion grew rapidly. *Nintendo SNES, Sega Mega Drive* and *Sony PlayStation* in particular, became largely popular. *PlayStation* became the most diffused game system in Italy also thanks to the presence of a broad pirate market (Gandolfi, 2015). The user base expansion towards console platforms made the market less accessible to Italian developers who were mostly developing for home computer systems.

During the late 1990s and early 2000s, many of the early game companies closed. *Simulmondo* closed in 1999 after some key figures like Riccardo Cangini, Michele Bruscella, and Michele Sanguinetti left the company. With the growth of the console market, which required specific and expensive development kit and engines, smaller Italian companies couldn't afford production costs. *Milestone*, however, was able to establish commercial partnerships with important international companies like *EA Sports* and *Capcom* and, over the years, developed its expertise in the field of motorbike racing games, becoming one of the biggest Italian video game producers. In 1998 *Ubisoft* started an Italian branch in Milan.

A new rise of Italian game development happened thanks to main two factors: digital distribution and new economic models for accessing game engine software. The diffusion of digital distribution platforms, like *Steam*, allowed to significantly reduce production costs linked to physical game copies manufacturing

7 A traditional Italian game in which players have to throw heavy balls as close as possible to a smaller target ball.

8 Live interview February 7th 2024

and distribution. Game engines software, which were expensive production tools, became free or adopted accessible licensing also for smaller developer teams.

In 2022, the French developer and publisher *Nacon*, opened the Milan branch where the core team is formed by former *Milestone* team members[9], such as the CEO and Creative Director Marco Ponte, formerly working as *Lunar Great Wall Studios*.

Today, industry reports describe the Italian context as a predominantly consumer market. According to the report published by the *Italian Interactive Digital Entertainment Association* (*IIDEA*), in 2023 the Italian video game market reached 2,3 billion euro with a 5% increase over 2022 (IIDEA, 2023). In 2023 the report estimates that 13 millions Italians play video games, whit an 8% decrease from the precedent year mainly due to the gradual market stabilization after the Covid-19 pandemic, during which the video game salse rapidly increased. The average age of video game players is 30 years-old. 39% of the players is formed by women. 73% of players spend at least one hour playing per week. 71% of players use mobile devices as gaming platform, often in combination with console (43%) ad PC (35%). *IIDEA*'s 2022 report has collected data from 160 development studios (IIDEA, 2023). Since 2021, the number of people working in the industry grew of a 50% from 1600 to over 2400 in 2022. The regions with the greatest number of development studios are Lombardia, Emilia-Romagna and Lazio. 75% of Italian companies have been active for over 4 years. It has been estimated that the total revenue of Italian game companies is between 130 and 150 million euro. 52% of the companies have reported revenues under 100.000 euro, 26% between 100.000 and 500.000, and only 22% are above 500.000 euro. The primary market is that of B2C, and the mostly used development platform is the PC. The survey reports that the national industry is in a consolidation phase. 40% of the companies are Small Medium Enterprises (SME) with more than 10 employees. However, the report indicates that 86% of the studios self-finance the development and only 30% can rely on a publisher and 19% on private investors.

In 2021 the Italian Ministry of Economic Development allocated 4 million euros to the "First Playable Fund" with the aim to support the digital entertainment industry through a 50% non-repayable contribution within a range of 10.000 to 200.000 euros for the development of a commercial game prototype (Decreto Direttoriale 21 Maggio 2021 - Fondo per l'intrattenimento Digitale, 2021). However, the available budget was exhausted in three hours and no further requests were accepted. Since 2021 the Italian Ministry of Culture has extended the tax credit available for cinema and audio-visual productions to video games (DM 12 Maggio 2021 Rep 187 - Tax Credit Videogiochi, 2021). The tax credit amounts to 25% of the development costs, up to 1 million euro.

3.6. The case of Emilia-Romagna region in Italy

As discussed in the introduction to the previous chapter, during the 1980s and 1990s the emergence of a protoindustrial form of game production took place in Emilia-Romagna. The productive and commercial experience represented by *Simulmondo* during the late 1980s and 1990s has been interpreted as particularly notable "episode of professionalization" in the Italian game sector that was at the time primarily characterized by non-professional operators (Benôit Carbone, 2020). During its evolution, *Simulmondo* acted as a pan-regional catalyst for

9 https://it.ign.com/rims-racing/192654/feature/nacon-studio-milan-il-racconto-di-una-tempesta-perfetta

10 ART-ER – Attrattività Ricerca Territorio Emilia-Romagna, is the Consortium company of Emilia-Romagna created to promote the sustainable growth of the region through the development of innovation and knowledge, the attractiveness and internationalization of the territory.

the development of a professional practice with the aspiration to commercially expand over the national borders. *Simulmondo* was one of the training grounds for today's Italian industry veterans. Among them Ivan Venturi was the first to be hired by Carlà as software manager and artistic director of *Simulmondo*. Venturi held that role in the company until the company closed but kept working in the game sector and today is particularly active both at regional and national level as a developer, producer and educator.

As reported by *IIDEA* (IIDEA, 2023), Emilia-Romagna is the second Italian region for number of active game development companies (see Tab. 3.3 and Fig. 3.8). In 2022 the survey conducted by *IDG Consulting* for ART-ER[10] reported that 29 game development teams were active in the region, accounting for 18% of the total on national basis. 64% of game studios has been active for over 4 years and 24% for over 7 years. Considering team sizes, 50% are teams made by one or two people, 28% by 6-10 people, 17% by 3-5 and only 3%, meaning one company employees between 11 and 20 workers. Studios in Emilia-Romagna are smaller compared to the national average. In 2022, 125 people were working the regional game industry as designers (22%), artists (26%), programmers and technical directors (29%), managers and producers (14%) and supporting roles (9%). 86% of workers were younger than 36 years-old. The interview for this thesis reported that in 2021-2022 the most needed roles were in the field of technology and art.

Regional game companies still seem to be struggling to attain economic stability. In Emilia-Romagna, 70% of the studios reports revenues under 100.000 euros; 15% between 250.000 and 500.000 euros, 11% between 100.000 and 250.000 euros, and only 4% over one million. Compared to the national average, where 26% of studios reports business volumes over 250.000 euro, in Emilia-Romagna only 19% exceeds such threshold. In line with national reports, the vast majority of the studios relay

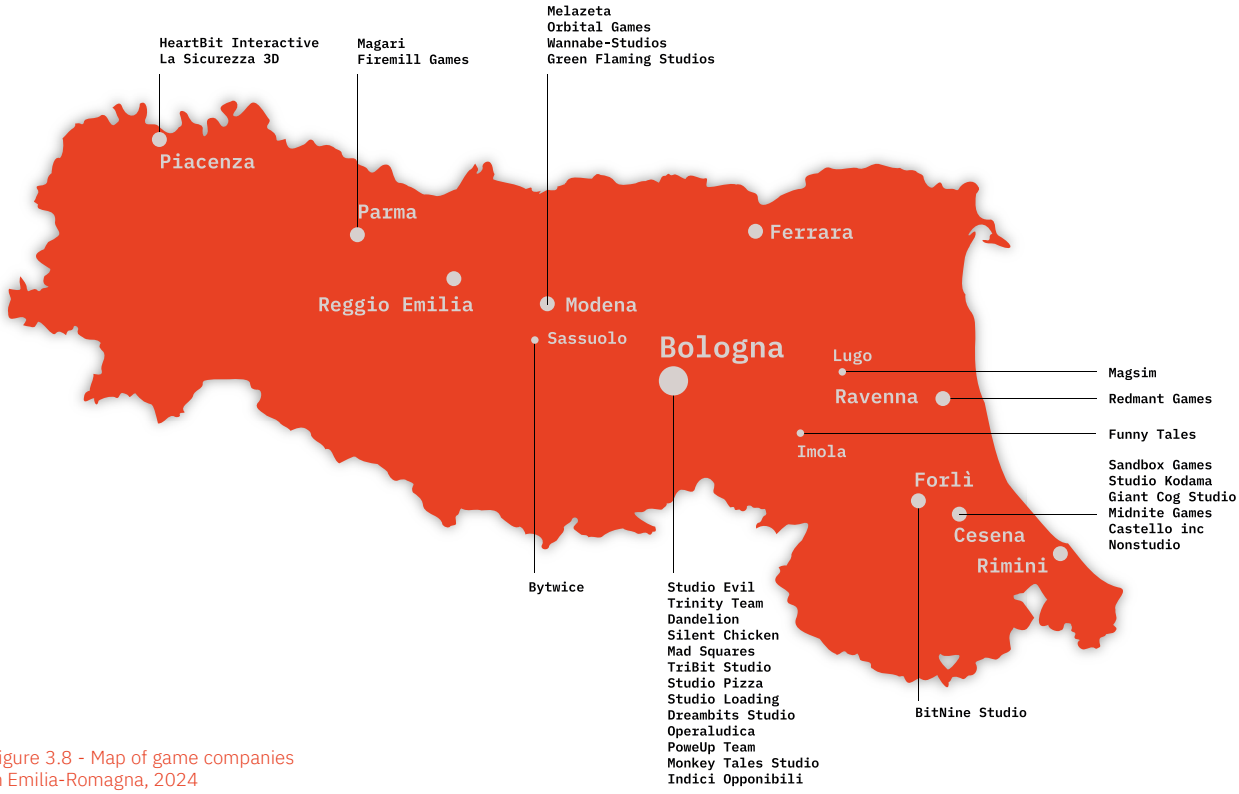


Figure 3.8 - Map of game companies in Emilia-Romagna, 2024

on self-financing their productions (97%). 28% have support from publishers, 24% from banks, 21% from public institutions, 17% from fundraising platforms and 7% from private equity. In regard to crowdfunding, the development studio Trinity Team successfully launched two funding campaigns on *Kickstarter.com* for financing the development of the two games based on the *Bud Spencer and Terence Hill* intellectual property. In 2021, the *Slaps and Beans* campaign collected 212.557 euros (on an initial goal of 130.000 euro) from 6.808 backers[11]. A second campaign in 2021 collected 257.476 euro (on a goal of 220.000) from 3.671 bakers[12] to finance the development of the sequel *Slaps and Beans 2*. The successful funding of the two games can be in part ascribed to the appeal of the *Bud Spencer and Terence Hill* brand on Italian and German audience, which were the two main target markets for the campaign. However, since self-financing remains the primary source of investment, regional productions are inevitably constrained in terms of both scale and ambition. As revealed in private conversations with local developers, this aspect hinders the attractiveness of their games to international publishers, who tend to favor larger productions.

There are a number of initiatives in support to the game developer network of Emilia-Romagna. *Svilupparty*[13] is a yearly meet-up held in Bologna since 2010. The event is organized by Ivan Venturi and *IPID*[14], the *Italian Party of Indi Developers*, an association born in 2014. This initiative echoes the *Simulmondo Party* held in 1988 to celebrate the company's opening and represents a community building moment where developers can show their work and build network.

Bologna Game Farm (*BGF*) had the merit to be among the first public initiatives on a national level to finance and accelerate game development projects. Promoted by Regione Emilia-Romagna and the municipality of Bologna, BGF is part of the actions in support of the Cultural and Creative Industries activated by *Art-ER* in collaboration with *IncrediBOL*![15], and with the technical support of IIDEA. Every year since 2021, BGF opens a call aimed at region-based companies and professionals working in the field of game design and development. Each year, four teams are financed with 30.000 euros and a start-up and mentorship program to develop a vertical slice[16] of the game project. At the time of writing, only another similar initiative has been documented in Italy, *Cinecittà Game Hub*[17], making these initiatives two remarkable examples of public support to the video game industry. The 2021, 2022 and 2023 BGF editions have financially supported and accelerated 12 teams in the development of their projects. Among the funded teams, Nonstudio – that has been aquired by *Indici Opponibili Soc. Coop* – has signed a publishing agreement with *Skystone Games*[18], as well as *Orbital Games* and *Green Flamingo*[19], two of the winners of the first BGF edition. Commenting on the results of the first editions of *BGF*, Venturi, who is the initiative coordinator, has observed that in the last years publisher have become less interested in financing small-budget projects[20]. Therefore, instead of aiming at publishing agreement, *BGF* is now working with teams with the goal to self-publishing their game and, on top of the revenues, organically scale the company. In 2024, *BGF* has extended the call to all Nation game-companies, raising the number of financed projects with a total budget of 199.000 euros[21]. Form this experience and with the support of expert development team, a second mentorship program, *BGF@Mobile*[22] about mobile game design started in 2023.

11 https://www.kickstarter.com/projects/1684041218/bud-spencer-and-terence-hill-slaps-and-beans?lang=it

12 https://www.kickstarter.com/projects/1684041218/bud-spencer-and-terence-hill-slaps-and-beans-2?lang=it

13 https://www.ipid.dev/en/svilupparty-2/

14 https://www.ipid.dev/en/home-2/

15 https://www.incredibol.net

16 A prototypical game demo that is generally used to discuss commercial partnerships with publishers.

17 However, there are no active calls for 2023 and 2024. https://cinecitta.com/categoria/cinecitta-game-hub/

18 https://bolognagamefarm.com/2024/06/20/bologna-game-farm-siglato-un-accordo-con-skystone-games-per-handmancers-grande-successo-del-gioco-anche-al-next-fest-di-steam/

19 https://bolognagamefarm.com/2023/11/13/bologna-game-farm-firmati-i-primi-accordi-di-publishing-per-orbital-games-e-green-flamingo/

20 Cf. interview

21 https://bolognagamefarm.com/2024/07/04/bologna-game-farm-al-via-un-nuovo-bando-a-livello-nazionale-per-lo-sviluppo-di-videogiochi/

22 https://bolognagamefarm.com/bgf-mobile/

Table 3.3 – Video Games Companies in Emilia-Romagna

Company	Location	Website	People	Published games
DESTINYbit	Ravenna	https://destinybit.com	7	Dice Legacy (PC, Xbox, PS4) Empires Apart (PC), 2018
IV PRODUCTIONS	Bologna	https://www.ivproductions.it		RIOT: Civil Unrest, Pride Run, VR Ping Pong pro, Nicolas Eymerich, Inquisitor I "The Plague", Nicolas Eymerich, Inquisitor Ii "The Village", Nostradamus: Four Horsemen Of Apocalypse, Progetto Ustica, Pixel Bundle, Feudalism, Black Viper: Sophia's Fate, Kring
FUNNY TALES	Milano, Imola, Miami	https://funnytales.us	14	VRider SBK, SBK16, SBK15, SBK14, Venetia, Bookbound Brigade, Pirate's Dice, Cairoli Challenge, Kudoku, Bravura Quest Rush, Battleloot Adventure, MotoGP08 Started from the fusion of Digital Tales and Just Funny Games (Imola)
INDICI OPPONIBILI Digital Interactive Creativity	Bologna	https://www.indiciopponibili.com		Gli strati della Storia, Museo Egizio di Torino Ritorn a Deir el-Medina
MELAZETA®	Modena, Milano	https://www.melazeta.com	22	Viva la Frutta, SkillUpp, Domande Scomode, Generazione Alpha, Zaaratan and the legendary stars, Pollinator Coop, Tutti a Tavola - Esselunga, SleepOsas, Patrimoni Sicuri, Eyestar Mission - Serious Game, Play The Site - Regione Lombardia, Metamorphosis Villæ, Rollinz 2.0, Leonardo Da Vinci's Mysterious Gearworks, Kukua - Super Sema, SMART & STEAM VET, WunderBo & Aldrovandi Experience, Change Game: Play with Earth
SANDBOX GAMES	Cesena	https://sandboxgames.it/		Racecraft eSport (Steam), Racecraft Coin-Op (Arcade) Racecraft Arena (Live platform)
STUDIO EVIL	Bologna	https://www.studioevil.com/	19	Syder Arcade, Syder Reloaded, Relive, Super Cane Magic ZERO, Maggie: the Treasure of Seshat
TRINITY TEAM	Bologna	https://www.trinityteam-games.com/	4	Slap and Beans, Slap and Beans 2, the Darkest Tales
BitNine STUDIO	Forlì	https://www.bitninestudio.com/	3	tERRORbane VIRAL Winner of the 2023 edition of Bologna Game Farm
Dandelion	Bologna		1	KAI Winner of the 2023 edition of Bologna Game Farm
Silent Chicken	Bologna	https://x.com/SilentChicken01		Sliding Hero Winner of the 2023 edition of Bologna Game Farm
Mad Squares	Bologna		1	Block Number 5 Winner of the 2023 edition of Bologna Game Farm
</TriBit_studio>	Bologna	http://www.tribitstudio.com/	3	A Western Drama
HeartBit interactive	Piacenza		4	Doom & Destiny, Miner Warfare, Spyleaks
Studio Pizza	Bologna	https://www.studiopizza.net/	7	Monster Chef Winner of the 2022 edition of Bologna Game Farm
STUDIO LOADING	Bologna	https://studioloading.itch.io/		Draconian Nexus, Seven Forces, Cobra Kai 1, Flying Arrows
Dreambits studio	Bologna	https://www.dreambits-studio.com/	7	War of Wheels, le Acque di Bologna in VR

Company	Location	Website	People	Published games
STUDIO KODAMA	Cesena	https://www.studio-kodama.com/	11	Ryoka
nonstudio	Cesenatico	https://www.nonstudio.org/#start	6	Handmancers (the First Hand) Winner of the 2022 edition of Bologna Game Farm Acquired by Indici Opponibili
	Giant Cog Studio	https://www.instagram.com/p/Cbfgw8vM1AL/	4+	FarAfter Winner of the 2022 edition of Bologna Game Farm
Orbital games	Modena	https://www.basketparty.app/it	7+	Basket party Winner of the 2021 edition of Bologna Game Farm
GREEN FLAMINGO STUDIOS	Modena	https://www.instagram.com/greenflamingostudios/	3	Spanky's Battle Swing Winner of the 2021 edition of Bologna Game Farm
MAGARI	Parma (Fidenza), Milano	https://magari.fun/	2+	Flagship, Geronimo Stilton Home Adventure – Viaggio nella Preistoria, Il Cinema prima del Cinema, D&G Island 1 Dawn, House of the Dragon – DracARys, Giù la Maschera, Giovani Ambasciatori, Play Green, Elfo Game, Flesh Bang, Winner of the 2021 edition of Bologna Game Farm
operaludica	Bologna	https://operaludica.com/	20	Dragonero
	Bologna	https://power-up-team.com/		Vespera Bonomia, Doc Land
midnite games	Cesena	https://www.midnite.games/	11-50	Slices, Get Lucky, Push It, Color Wall
CASTELLO	Cesena	https://www.castelloinc.it/	2-10	ARK&ADE
Megasim	Lugo	https://megasim.it/	2-10	Racing Simulator – *Viper*, Scuole Guida – *Drive Easy*
REDAMANT GAMES	Faenza, RA	https://redamantgames.com/	2-10	Shelf
MONKEYS TALES STUDIO	Castel Maggiore, BO	https://monkeystales.xyz/	1	A Painter's Tale, OMEGA: The Beginning, Prototype, The NADI Project
WANNABE-STUDIOS	Modena	https://www.wannabe-studios.com/	2-10	Astralis – Forgotten Fighters, Brush Chronicles
LA SICUREZZA 3D	Piacenza	https://www.sicurezza3d.com/	2-10	Safety Role Game
FIREMILL GAMES	Fontanellato (Parma)	https://firemillgames.com/	2	Albedon Wars
Bytwice	Sassuolo	https://www.bytwice.com/	11	Magisterapp, Birthday Factory, Archeologo – Profondo Blu Il Ballo Delle Goccioline, Archeologo, Dirty Farm, Dirty Kids, Ornitorinco, Oceano, Oceano Ii, Africa, Africa, La Fattoria, Ortolano, Etc.

Among the various initiative promoted by *IPID*, the association coordinates the Factory program. The Factory connects the associates for the development of non-profit projects. Two projects have been developed and released. *BO 020880*[23] is a visual novel produced for the 40th anniversary of the terrorist bombing of the Bologna railway station on August 2nd, 1980. The game was designed in collaboration with the *Associazione tra i Familiari delle Vittime della Strage della Stazione di Bologna del 2 Agosto 1989* and with students from the *Accademia Belle Arti* of Bologna. The second project is *Nocturama*[24], a collection of urban fantasy visual novels set in Bologna and developed in collaboration with *Accademia delle Belle Arti* di Bologna, *Conservatorio Giovan Battista Martini*, and *Demetra Formazione*.

As far as skill formation is concerned, some professional education courses have been activated and promoted by the Emilia-Romagna region through local association and training institutions. In particular, the higher education course *Game Producer*[25] and the Higher technical education and training course *3D modeler technician specialized in motion/performance capture in live events, performance and exhibition VR*[26] (see also Tab. 3.4).

The cultural association *IVIPRO – Italian Videogame Program*[27] is based in Castello d'Argile (Bologna) and its main goals are to promote game literacy and to facilitate the production of video game set in Italy and inspired by the national cultural heritage connecting developers and local institutions[28]. *IVIPRO* is building a national database of location and narratives that offer a creative potential for the development of game content. The project records both material culture artifacts, such as historical architecture, but also evidence of immaterial culture represented by local folklore and tradition. At the time of writing, *IVIPRO* narrative database lists 408 records subdivided in four main categories: location, objects, characters and themes. The majority of records are set in North and Center Italy. Each record provides a card with an historical and a narrative description, with pictures and references. Also, ideas for possible game content are suggested in the cards. *IVIPRO* has contributed to several game projects both by collecting narrative material, contributing to game design, and facilitating interaction between game studios and local administrations. *IVIPRO* is promoting national game culture with educational programs for cultural institution and schools and with the yearly event *IVIPRO DAYS*. The event promotes the dissemination of case studies that explore video game potential as a mean to narrate national territory and cultural heritage. *IVIPRO* president Andrea Dresseno is particularly active in the promotion of the video game culture and has contributed to the creation of the Videogame Archive of the Cineteca di Bologna.

The *Clust-ER – CREATE*[29] is the regional cluster association of public and private bodies that are active in the cultural and creative sector. Several of the reginal game companies are partners, and since 2023 there is an active working group on video games.

The regional game sector, one of the first to emerge in Italy, appears to be experiencing an acceleration. Institutional attention is demonstrated by the financing opportunities like *BGF* which constitutes a significant initiative not only at the national level but also within the broader European context. However, it has to be noted that collaboration between industry and university is still very limited. The only initiatives I was able to document are those with the *Academia delle Belle Arti* and *Conservatiorio Giovan Battista Martini* described above. Other non-documented collaborations involve the Department of Informatics of the Univer-

23 https://www.ipid.dev/en/bo020880-2/

24 https://www.ipid.dev/nocturama/

25 https://www.demetraformazione.it/corso/game-producer/

26 https://formazionelavoro.regione.emilia-romagna.it/rete-politecnica/approfondimenti/istruzione-e-formazione-tecnica-superiore-ifts/archivio-offerta-formativa/percorsi-2022-2023

27 https://ivipro.it/en/home-en/

28 It has been observed the emergence of a common thread connecting some Italian productions in their interest for the representation of local stories and marginal communities (Raffa & Toniolo, 2021). The will to realistically depict the historical and physical environment of lesser-known stories is particularly evident in productions like The town of Light (LKA, 2016) and Martha is Dead (LKA, 2022) developed by Tuscany-based developer Luca Dalcò. The town of Light is based on the documental research that the development team has carried out on the former Volterra's asylum, whereas Martha is Dead is set during the Second World War between San Casciano and La Romola in Tuscany.

29 https://create.clust-er.it

sity of Bologna. Systemic and synergic collaborations with the disciplinary sector of Industrial Design, despite sharing multiple areas of expertise with game production, are still lacking. During the three years of research and development of this thesis, together with the rest of the Advanced Design Unit of the Department of Architecture of the University of Bologna, I was able to foster a few limited but meaningful collaboration initiatives. In particular, two initiatives are described as applicative case studies in Chapter 8 (EX.07, EX.12).

From the analysis of other regional and national contexts, one of the major factors for the development of a structured game sector is represented by the synergic integration with local productive and educational system. In the next paragraph, I introduce the Dundee game cluster as an exemplary case study that demonstrates the successful integration of the game industry with the local educational and industrial sectors that meaningfully foster the regional and national development.

Table 3.4 – Video Games Promotion & Education in Emilia-Romagna

What	Organization	Type	Location	Website
Game producer di mobile app videoludiche	Demetra Formazione	Training	Bologna	https://www.demetraformazione.it/corso/game-producer-di-mobile-app-videoludiche/
Animazione 2D Paperless con Toon Boom Harmony	Demetra Formazione	Training	Bologna	https://www.demetraformazione.it/corso/animazione-2d-paperless-con-toon-boom-harmony/
Tecnico della produzione multimediale per la digitalizzazione del patrimonio culturale	Demetra Formazione	Training	Bologna	https://www.demetraformazione.it/corso/tecnico-della-produzione-multimediale-per-la-digitalizzazione-del-patrimonio-culturale/
Creators Day	La Merenda Podcast	Event	Bologna	https://www.lamerendapodcast.it/creators-day
Start You Up	-	Association	Bologna	https://www.startyouup.eu/
Pangea Games	-	Association	Argenta (FE)	https://sites.google.com/view/pangeagames/home
Bologna Nerd	-	Association	Bologna	https://bolognanerd.it/
Future Videogames	24 Frame Future Film Festival	Event	Modena	https://www.futurefilmfestival.it/it/edizione-2023/future-videogames-hackathon/
Videogame Art Museum	Associazione Insert Coin	Association and Museum (closed)	Bologna	https://www.insertcoinbologna.it/video-game-art-museum/
Tecnico modellatore 3D specializzato in motion/ performance capture in live events, performance & exhibition VR	Music Production and Dance Academy	Training	Bologna	https://formazionelavoro.regione.emilia-romagna.it/rete-politecnica/approfondimenti/istruzione-e-formazione-tecnica-superiore-ifts/percorsi-2022-2023/cultura-informazione-e-tecnologie-informatiche
Tecnico delle produzioni multimediali per la valorizzazione del patrimonio artistico e culturale -	Formodena	Training	Modena	https://formazionelavoro.regione.emilia-romagna.it/rete-politecnica/approfondimenti/istruzione-e-formazione-tecnica-superiore-ifts/percorsi-2022-2023/cultura-informazione-e-tecnologie-informatiche
Play		Festival	Modena / Bologna	https://www.play-modena.it/
Ivipro Days	Associazione Culturale Ivipro	Event	Bologna	https://ivipro.it/en/ivipro-days-eng/
Nerd Show Bologna	-	Festival	Bologna	https://www.nerdshow.it/

3.7. Scottish Video Game Industry: Dundee and Abertay University

As seen in 2.5.4, today's UK game industry is one of the most developed worldwide with a capillary system of education and associations. In this system Scotland has a particular place. The *Scottish Game Network*, a national independent organization that connects business, academia and consumers, provides a directory that maps enterprises and professionals that operate on the local game industry[30]. In this list, Dundee, a small city north of Edinburgh, recurs several times. After more investigation, the history of the Dundee game scene and its current state emerged as peculiar in the European context for their pioneering role. Therefore, I spent a three-months visiting research period at Abertay University in Dundee between September and December 2022 to delve deeper into the local video game production and education system and to draw parallels the Emilia-Romagna context. This paragraph briefly presents data and references that describe how Dundee has become a place that significantly contributed to the development of national game industry with a global impact on contemporary video game production.

Dundee is located in the eastern central Lowlands on the north bank of the Tay River. It is the fourth most populated city in Scotland with almost 150.000 inhabitants. From 1700, its development was linked with the rising of the whaling, shipbuilding and textile industry. In early 1900, smaller but successful production started to emerge. One of these is the publishing firm *DC Thomson* which was founded in 1905 became known for publishing newspaper (like *The Courier*, *The Evening Telegraph*, and *The Sunday Post*) and popular comics like *Oor Wullie*, *The Broons*, *The Beano*, *The Dandy* and *Commando*. The relevance of the comics industry in Dundee is still acknowledged and it is documented by the institutional and non-institutional initiatives such as the Scottish Center for Comic Studies[31] of the University of Dundee launched in 2014, and the UK's first MLitt in Comics studies and MDes in Comics and Graphic Novels respectively launched in 2011 and 2016[32].

In the early 20th century, the decline of the jute industry, which was leading the local industrial development, led to high level of unemployment. After the Second World War, a new impulse to the local economy was given by the new manufacturing company such as *NCR* and *Timex* (Illsley & Jackson, 1999). *Timex*, in particular, during the 1980s was producing the *ZX Spectrum* in Dundee for *Sinclair Research Ltd*. The *ZX Spectrum* was one of the first home computer. Its production in *Timex* Camperdown factory had a major impact on the local labor landscape due to the industrial transition into microelectronics subcontracting (Wright et al., 2021), and on the future development on the video game industry. In fact, as for the rest of the United Kindgdom (Tsang, 2021), the emergence of the game industry in Scotland is directly connected to the diffusion of home computer systems and to the development of games by self-taught *bedroom-coders*. In 2018, Abertay University developed the *Generation ZX(X)* project on the heritage of the Timex factory to provide new perspectives on its historical role of growth of the local game industry (Bozdog & Galloway, 2018). The project combined live and digital components to investigate the contributions of hidden figures, such as the over 1,000 women involved in the *ZX Spectrum* assembly.

The diffusion of ZX Spectrum[33] and other home computers in Dundee fostered the emergence of a computer culture that gra-

30 https://scottishgames.net/companydirectory/

31 https://scottishcomicstudies.com

32 In 2024, however, the MDes Comics and Graphic Novels was craped from the academic year. Report from the industry argues that this decition could be detrimental to the city comic sector. https://www.thecourier.co.uk/fp/news/dundee/4994787/dundee-university-scraps-five-masters-low-numbers/

33 During an interview, Brian Baglow reported that it is anecdotally told that some of the ZX Spectrum computers that did not officially pass the quality inspection were brought by employees to their homes.

dually evolved in professional activities. Some of these managed to further develop in game companies (Tsang, 2021), such as *DMA Design* which was funded in Dundee in 1987 by college friends David Jones, Mike Dailly[34], Russel Kay and Steve Hammond. After *Menance* (1988) and *Bloody Money* (1989), *DMA Design* developed *Lemmings* (1991) which was published by *Psygnosis* for the Amiga system and rapidly became a commercial success, allowing *DMA Design* to scale their business[35]. *DMA Design* kept working of several other titles, until when in 1997, the first title of the *Grand Theft Auto* series was published. The game violent contents brought public attention to the game company which, nevertheless, become a global commercial success. The success of *Grand Theft Auto* projected *DMA Design* on the global video game industry. Today, the company's name is *Rockstar North*, it is based in Edinburgh, and is part of the *Rockstar Games* publisher, subsidiary of *Take-Two Interactive*. In 2020, *Rockstar Dundee* was funded as a second subsidiary of *Rockstar Games* in Scotland.

Today, Dundee is home to several internationally renowned game studios, such as *4J Studios* which was responsible of porting *Minecraft* (Mojang Studios) on consol systems, and *YoYo Games*, the developers of *Game Marker* engine. The *Scottish Game Network* archive[36] lists 70 entries among studios, developers and organizations based in Dundee.

Abertay University played a pivotal role in establish Dundee as one of the major centers in game education worldwide. In 1997 Abertay University started the world's first video game degree[37], and today is ranked among the world's top universities for undergraduate and graduate programs[38]. Abertay University is partner of the GAME-ER research project[39], funded by Horizon Europe and UKRI, with the goal to understand the evolving dynamics of local game clusters and provide useful insights to policymakers.

During the interviews I had with the game industry actors, it was often highlighted the strategic importance of the connections between education institutions and game companies. The vitality of the local game scene indicates that the flow between academic and industrial settings fosters innovation, knowledge advancement, and competitiveness in both research, education and industrial development. Such interconnection is supported also by initiatives such as *InGAME* who between 2018 and 2024 fostered research and development projects between academia and game industry[40]. The project developed a responsible collaboration model, aiming at establishing strategies for achieving sustainable and diversified industry growth.

Dundee's game sector is part of a larger network of local cultural and creative industries. In 2014 Dundee has been nominated UK's first City of Design by the United Nation[41]. The recognition was awarded for the city contribution to several fields among which video games and comics. From 2018, the city is home to the *Victora and Albert Design Museum*[42](*V&A Dundee*), designed by the Japanese Architect Kengo Kuma. From September 2018 to February 2019, the museum hosted the exhibition *Videogames: Design/Play/Disrupt*[43]. Dundee Contemporary Arts is cultural center that hosts several game-related initiatives. In 2016 it hosted two exhibitions[44], *Small Wars* and *CD-ROMS*, curated in partnership with Dr William Huber, Head of the Center for Excellence in Game Education of Abertay University. During the same days, Abertay University hosted the first joint conference[45] between the *Digital Game Reserarch Association*[46] (*DiGRA*) and the *Foundation of Digital Games*[47] (FDG). The DCA also hosts the *Drop in and Play* initiative, a free event where local game developers can

34 Micheal Dailly is now Head of Development of the Game Maker engine at YoYo Games. Game Maker is one of the most popular, entry level, game engine tool. The company is based in Dundee. https://gamemaker.io/en

35 More insight on the story of DMA Design and its evolution are available in the documentary The History of Grand Theft Auto, Lemmings & DMA Design (2022) by Noclip available at: https://www.youtube.com/watch?v=Ev7FqNa5rD0

36 https://scottishgames.net/companydirectory/

37 https://www.abertay.ac.uk/academic-faculties-and-graduate-school/faculty-of-design-informatics-and-business/department-of-games-and-arts/

38 https://www.princetonreview.com/college-rankings/game-design

39 https://www.game-er.eu

40 https://innovationforgames.com

41 https://www.dundeecity.gov.uk/service-area/chief-executive/chief-executives-services/dundee-unesco-city-of-design

42 https://www.vam.ac.uk/dundee?srsltid=AfmBOoqYwV5X-aLOzm-pWLmbfYB3EtUk7d7TqQvW49rkKn1j_kCwcAuwX

43 https://www.vam.ac.uk/dundee/info/videogames-exhibition-opens-at-va-dundee?srsltid=AfmBOoq4xtVZOtTJGAz5FrYa0R9i-mBTrIPTfBIk7lkaiNRIJ9IjA_wc

44 https://www.dca.org.uk/exhibition-archive/eddo-stern/

45 Conference website is no longer accessible. Proceedings can be found here: https://dblp.org/db/conf/digra/digra2016.html

46 http://digra.org

47 http://www.foundationsofdigitalgames.org

showcase their work to visitors. Such initiatives play a key role is supporting local developers, and in facilitating networking among professionals and encounters with consumers and potential stakeholders.

The Dundee game cluster case study shows that, while the initial momentum and popularity were catalyzed by successful companies such as *DMA Design*, the sustained growth of the industry and its establishment as a prominent global cluster has been largely supported by a combination of institutional, non-institutional, and educational networks that favored the flow of knowledge between production, education, and research. Moreover, synergic collaboration with other industrial sectors, like those fostered by *InGAME*[48], demonstrated to be a key factor for long-term economic sustainability and growth.

The Dundee case shows that cross-industrial collaborations and mutual support with the network of cultural creative industries ought to be implemented to support emerging game clusters, like the one that is developing in Emilia-Romagna. Taking example from established clusters like the Dundee one described in this section, the development of Emilia-Romagna game industry could greatly benefit from a shared programmatic plan with local education and research institutions. As argued in the following paragraph, Design as a discipline is inherently predisposed to operate within multi-stakeholder and interdisciplinary contexts and, therefore, can act as a mediator between industries and cultures. This argument is further developed in the next section.

3.8. A Design(er) Perspective on Italian Game Industry and Academic Education

As I have outlined in the section about the Italian game industry, several factors hinder the growth of the local game. Issue of project funding is a central one for the Italian game industry. Italian companies struggle to attract investments from international publishers and public fundings are limited (cf. §3.5). From interviews, it emerges that publishers are interested in larger scale project compared to the one pitched by local game studios. However, the lack of fundings refrain developers to invest available resources in bigger projects. Smaller projects are also much more activable in terms of technical feasibility. As a matter of fact, a structural issue of the Italian game industry is the lack of senior technical figures, mainly developers but also artists with advanced technical skills, which are crucial for more complex and ambitious projects. Only recently, training and education in game professions have become available, mainly through private programs. In the Italian academic contest, game education appears to be mainly limited to intensive trainings or thematic courses and has not been systematically and widely integrated in academic degrees unlike what happened in the nations with established game industries. The lack of such connection not only limits to the growth potential of the talent market but also hinders the establishment of more qualified and stable job positions within the local game industry. Moreover, as seen in the previous section, the continuous exchange between research and industry is a fundamental instrument for fostering innovation on both ends.

As initiatives like *InGAME* demonstrate, the potential of video games to branch over multiple industries, and research sectors, however, allows the development of Business-to-Business collaboration opportunities between the game industry and other industrial partners. Although smaller studios often need to rely on contract work for larger game companies for sustain the development cost of their own game projects, cross-industrial collaboration may offer a more diversified form of income. In fact, collaborations with other sectors have the potential to open new markets, particularly in contexts like the Italian one, which are relatively unaccustomed to such partnerships.

48 With 177 industry collaborations, InGAME esteems that, over the next ten years, these activities will generate £84.7 million in gross value added for the Scottish economy. https://innovationforgames.com

Nevertheless, the management of such relationship can be challenging since expectations and available resources do not always align. In fact, as I have experienced during my interviews with game industry operators, the management of B2B commissions requires different work management and scheduling strategies. Some local game companies that are working on cross-industrial collaborations have a stable part of the team specifically working on B2B productions[49]. To this, I would add that game studios, legitimately, are more drawn to B2C game development in which they can express their game design knowledge and creativity. In a highly competitive market that is mainly driven by high-budget multinational production, however, it is possible to acknowledge in B2B cross-industrial collaboration represents a concrete path for the organic growth of the local game sector.

Another critical aspect that emerges is that effective cross-industrial collaborations require a shared language between actors that can only be built through systemic and ongoing exchange and contamination. Designers have the potential to facilitate and manage such process since inter-disciplinarity characterizes design activity. Being at the crossroad between humanities, economics and management, fine arts, technology and engineering, design is mediator of knowledge and needs (Celaschi, 2008b, 2008a). During my research experiences with local and national companies, I witnessed a growing sensibility toward design-driven innovation processes. Local manufacturing companies have traditionally been the home to specialized engineering disciplines only, and relatively recently opened to industrial design as a driver for innovation. The development of game-based technological application for industrial needs, and the introduction of game-based strategies for product and service innovation in Italian small-medium enterprises, provide an opportunity for Italian game companies to expand their activities.

Product and service designers can operate across these margins to build knowledge and practice bridges. Given the characteristic of the national manufacturing system, and the mediating role that designers are gradually establishing within this context, in fact, it appears plausible that game culture can gradually find their space in these industrial sectors with the synergic integration with design disciplines.

To actuate this process, design curriculum should include more knowledge about games, game design and game production. From a review on Italian academic programs dedicated to game education, it has been observed that the most relevant initiatives can be framed within the disciplines of Media Studies (L-ART/06), Sociology of Communication (SPS/08), Informatics (INF/01), Human Sciences: Pedagogy and Psychology (M-Ped/01, M-Ped/03) (Giordano, 2020). Although these initiatives are clearly fundamental for the institutionalization and accreditation of video games in cultural and academic contexts, it appears that a virtuous circle of mutual exchange between education and industry has not been established yet. As noted by Giordano (2020), initiatives from disciplines of design cultures (ICAR) are hardly possible to map. Despite providing technical knowledge that can easily be applied to game production, systematic and extensive vertical programs in product and service design degrees are still lacking. The addition of game design and game studies literacy to product and service design degree is not only an opportunity to synergically connect two sectors that sit in-between cultural and technical production, but it also is coherent with the skills that designers need to develop

49 As reported during interview with local developers. In Emilia-Romagna, for example, Studio Evil has a specialized B2B division https://b2b.studioevil.com/en/home

to answer the contemporary design challenges, such as system thinking, cooperation and co-design, iteration, testing, user engagement, ethical use of technologies. This aspect is further discussed in Chapter 7. Moreover, as argued in Chapter 2, the relevance of video game education in design curricula is deeply connected to the characteristics of contemporary commodity form.

From a practical perspective, having designer act as mediators in this cross-industrial processes should not be considered as a flattening towards mere technical competence of design education and profession. On the contrary, in line with Malazita and O'Donnell call for a "Critical Game Design" (Malazita & O'Donnell, 2023, p. 6), designers contribution ought to be a critical one, capable to drive innovation to both ends of the collaboration. The approach, far from being pretentious, should be that to learn from practical competences that have been produced through field experience by industry veterans, and to engage with the large body of knowledge developed by game and play scholars. An approach that I sought to adopt within the extent of this research.

Chapter Bibliography

Anderson, S., & Orme, S. (2022). *Mental Health, Illness, Crunch, and Burnout: Discourses in Video Games Culture*. Hawaii International Conference on System Sciences. https://doi.org/10.24251/HICSS.2022.385

Aoyama, Y., & Izushi, H. (2003). Hardware gimmick or cultural innovation? Technological, cultural, and social foundations of the Japanese video game industry. *Research Policy*, *32*(3), 423–444. https://doi.org/10.1016/S0048-7333(02)00016-1

Atari. (1972). *PONG* [Arcade].

Balla, G. (2020). Produzione, finanziamento e distribuzione del videogioco in Italia:Lo stato dell'industria nel quinquennio 2015-2019. In M. Benôit Carbone & R. Fassone (Eds.), *Il videogioco in Italia: Storie, rappresentazioni, contesti*. Mimesis.

Benôit Carbone, M. (2020). L'Italia del Simulmondo. Caratteri nazionali e transnazionali dell'industria italiana del videogioco. In M. Benôit Carbone & R. Fassone (Eds.), *Il videogioco in Italia: Storie, rappresentazioni, contesti*. Mimesis.

Benôit Carbone, M., & Fassone, R. (Eds.). (2020). *Il videogioco in Italia: Storie, rappresentazioni, contesti*. Mimesis.

Bozdog, M., & Galloway, D. (2018). *Generation ZX(X)*. https://www.performingplay.co.uk/generation-zx-x

Carpenter, N. (2021, December 28). Riot Games will pay $100M in gender discrimination settlement. *Polygon*. https://www.polygon.com/22856713/riot-games-lawsuit-gender-discrimination-settlement

Carpenter, N. (2023, November 21). Video game company layoffs are creating an industry crisis. *Polygon*. https://www.polygon.com/23964448/video-game-industry-layoffs-crisis-2023

Celaschi, F. (2008a). Design mediatore tra bisogni. La cultura del progetto tra arte-scienza e problemi quotidiani: L'esempio dei beni culturali. In C. Germak (Ed.), *Uomo al centro del progetto Design per un nuovo umanesimo Man at the Centre of the Project Design for a New Humanism* (pp. 40–45). Umberto Allemandi & C.

Celaschi, F. (2008b). Il Design come mediatore tra bisogni. Il Design come mediatore tra saperi. In C. Germak (Ed.), *L'Uomo al centro del progetto. Design per un nuovo umanesimo.* (pp. 19–31). Umberto Allemandi & C.

Chandler, H. M. (2014). *The game production handbook* (Third edition). Jones & Bartlett Learning.

Decreto Direttoriale 21 Maggio 2021 - Fondo per l'intrattenimento Digitale (2021).

DM 12 Maggio 2021 Rep 187 - Tax Credit Videogiochi, Pub. L. No. 15 l. 14 nov. 2016, n. 220 (2021). https://media.beniculturali.it/mibac/files/boards/be78e33bc8ca0c99bff70aa174035096/DECRETI/ANNO%202021/DM%2012%20maggio%202021%20rep%20187%20_tax%20credit%20videogiochi.pdf

Fassone, R. (2016). Programmatori e pirati. I primi cinque anni del videogioco in Italia. *Bianco & Nero*, *582–583*, 94–101.

Fassone, R. (2018). *Cammelli and Attack of the Mutant Camels. A Variantology of Italian Video Games of the 1980s*.

Fassone, R. (2020). Una presistoria del videogioco italiano. In *Il videogioco in Italia: Storie, rappresentazioni, contesti*. Mimesis.

Gandolfi, E. (2015). Italy. In M. J. P. Wolf (Ed.), *Video games around the world*. MIT Press.

Gandolfi, E. (2020). Gli esport in Italia, tra vecchio e nuovo. In M. Benôit Carbone & R. Fassone (Eds.), *Il videogioco in Italia: Storie, rappresentazioni, contesti*. Mimesis.

Garda, M. B., & Grabarczyk, P. (n.d.). Is Every Indie Game Independent? Towards the Concept of Independent Game. *Game Studies*, *16*(1). gamestudies.org/1601/articles/Garda-grabarczyk/

Genovesi, M. (2017). *Simulmondo: Uno sguardo al passato per comprendere il presente*. DiGRA Italia: Made in Italy.

Giordano, F. (2020). Nel mezzo del periglioso tragitto. Istituzionalizzazione e riconoscimento accademico della cultura del videogioco in Italia. In M. Benôit Carbone & R. Fassone (Eds.), *Il videogioco in Italia: Storie, rappresentazioni, contesti*. Mimesis.

IIDEA. (2023). *I videogiochi in Italia nel 2022*. IIDEA.

Illsley, B., & Jackson, T. (1999). The Third Sector and Local Economic Development in a Peripheral Scottish City: The Case of Dundee. In *Community Economic Development*. Routledge.

Izushi, H., & Aoyama, Y. (2006). Industry Evolution and Cross-Sectoral Skill Transfers: A Comparative Analysis of the Video Game Industry in Japan, the United States, and the United Kingdom. *Environment and Planning A: Economy and Space*, *38*(10), 1843–1861. https://doi.org/10.1068/a37205

Keogh, B. (2023). *The videogame industry does not exist: Why we should think beyond commercial game production*. The MIT Press. https://doi.org/10.7551/mitpress/14513.001.0001

Landoni, P., Dell'era, C., Frattini, F., Messeni Petruzzelli, A., Verganti, R., & Manelli, L. (2020). Business model innovation in cultural and creative industries: Insights from three leading mobile gaming firms. *Technovation*, *92–93*, 102084. https://doi.org/10.1016/j.technovation.2019.102084

Lantano, F., Petruzzelli, A. M., & Panniello, U. (2022). Business model innovation in video-game consoles to face the threats of mobile gaming: Evidence from the case of Sony PlayStation. *Technological Forecasting and Social Change*, *174*, 121210. https://doi.org/10.1016/j.techfore.2021.121210

Liboriussen, B., & Martin, P. (2016). Regional Game Studies. *Game Studies*, *16*.

Lipkin, N. (2013). Examining Indie's Independence: The Meaning of "Indie" Games, the Politics of Production, and Mainstream Co-optation. *Loading. Journal of the Canadian Game Studies Association*, *7*(11), 8–24.

LKA. (2016). *The Town of Light* [Computer software].

LKA. (2022). *Martha is Dead* [Computer software].

Lorusso, S., Caleffi, I. B., Lovink, G., & Ventura, R. A. (2019). *Entreprecariat: Everyone is an entrepreneur, nobody is safe* (S. Lorusso, Ed.). Onomatopee.

Malazita, J., & O'Donnell, C. (2023). Introduction: Toward Critical Game Design. *Design Issues*, *39*(1), 4–13. https://doi.org/10.1162/desi_e_00702

Mathews, C. C., & Wearn, N. (2016). How Are Modern Video Games Marketed? *The Computer Games Journal*, *5*(1), 23–37. https://doi.org/10.1007/s40869-016-0023-2

Newzoo. (2022). *Global Game Market Report 2022*. https://app2top.ru/wp-content/uploads/2022/07/2022_Newzoo_Free_Global_Games_Market_Report.pdf

O'Donnell, C. (2012). This is not a Software Industry. In P. Zackariasson & T. L. Wilson (Eds.), *The Video Game Industry: Formation, Present State and Future* (pp. 17–33). Routledge.

Parrish, A. (2023). 2023's great games were overshadowed by a dark cloud of layoffs / Over 9,000 people are without jobs in one of the worst years for video game employment. *The Verge*.

Pilon, S., & Tremblay, D.-G. (2013). The Geography of Clusters: The Case of the Video Games Clusters in Montreal and in Los Angeles. *Urban Studies Research*, *2013*, e957630. https://doi.org/10.1155/2013/957630

Purchese, R. (2023). *You can't talk about 2023 in games without talking about layoffs*. Www.Eurogamer.Net. https://www.eurogamer.net/you-cant-talk-about-2023-in-games-without-talking-about-layoffs

Raffa, N., & Toniolo, F. (2021). *Guardare il passato, ai suoi margini: Sguardi microcomunitari nel vi- deogioco italiano*.

Ruffino, P. (2020). I Videogiochi Indipendenti in Italia: Significati, Narrative, Reti. In M. Benôit Carbone & R. Fassone (Eds.), *Il videogioco in Italia: Storie, rappresentazioni, contesti*. Mimesis.

Simulmondo. (1987). *Bocce* [Computer software].

Simulmondo. (1991). *I Play 3D Soccer* (Version Amiga) [Computer software].

Steinberg, S. (2007). *Videogame marketing and PR. 1: Playing to win: [top the charts; make headlines; earn better reviews]*. iUniverse.

Swalwell, M. (2021). Introduction: Game History and the Local. In M. Swalwell (Ed.), *Game History and the Local* (pp. 1–15). Springer International Publishing. https://doi.org/10.1007/978-3-030-66422-0_1

Tarantino, M., & Tosoni, S. (2017). *Breve storia del videogioco in Italia: Dal gettone alle app* (A. Grasso, Ed.; Vols 2-I media alla sfida della convergenza (1979-2012), pp. 235–244). Vita e Pensiero.

Tosoni, S., Tarantino, M., & Pachetti, A. (2020). "I NOMI SUI GIOCHI" Il Ruolo del Cracking nell'Industria Videoludica Italiana (1980-1990). In M. Benôit Carbone & R. Fassone (Eds.), *Il videogioco in Italia: Storie, rappresentazioni, contesti*. Mimesis.

Tsang, D. (2021). Innovation in the British Video Game Industry since 1978. *Business History Review*, *95*(3), 543–567. https://doi.org/10.1017/S0007680521000398

Wenger, E. (1998). *Communities of Practice: Learning, Meaning, and Identity* (1st ed.). Cambridge University Press. https://doi.org/10.1017/CBO9780511803932

Winkie, L. (2023, January 18). What It Takes to Build a Game in a War Zone | WIRED. *Wired*. https://www.wired.com/story/ukraine-stalker-2-gsc-game-world-development-war/

Wolf, M. J. P. (Ed.). (2015a). United States of America. In *Video games around the world*. MIT Press.

Wolf, M. J. P. (Ed.). (2015b). *Video games around the world*. MIT Press.

Woodcock, J. (2019). *Marx at the arcade. Consoles, Controllers, and Class Struggle*. Haymarket Books.

Woodcock, J. (2020). Organizing in the Game Industry: The Story of Game Workers Unite U.K. *New Labor Forum*, *29*(1), 50–57. https://doi.org/10.1177/1095796019893315

Wright, V., Philips, J., & Tomlinson, J. (2021). Defending the Right to Work: The 1983 Timex Workers' Occupation in Dundee. *Labour History Review*, *86*(1), 63–90. https://doi.org/10.3828/lhr.2021.4

4. A Map of the Political Economy of Play: Investigating Power Relations in Digital Play

4.1. Introduction: The overlapping spheres of digital play and digital economy

In Huizinga's classic *Homo Ludens*, play is conceived as a free act that happens in a separate and delimited dimension from that of ordinary life (Huizinga, 1939/2002). According to Huizinga, pure play is free economic interest. In his understanding, play is a cultural act associated with ritualistic form, and it is based on agonism and order. Play, game, and philosophy scholars have widely discussed and confronted Huizinga's conception of play, addressing several aspects of his conceptualization, such as that of the "magic circle" (Stenros, 2012). Notably, others have problematized the Western imperialist drive and the emphasis on competitiveness as the foundational mechanism of creation of culture through play (Lugones, 1987; Sicart, 2023). Everyday personal experience makes it evident that a pure separation between play, games and ordinary life is more conceptual than grounded in reality. The ubiquity of gamification strategies in the contemporary product-service system, for example, manifest that it is rather difficult to define a district separation – in time and space – between ordinary life activities play. A Romantic formulation of the concept of play, as a pure category that can only exist if separated from mundane interests, is challenged by the societal transformation brought by postmodernity and the financialization of everyday life (Goggin, 2012) that are conveyed by the neoliberal principles that organize social, power, and economic structures. As more human activities, including play, move into "synthetic worlds" – as Castronova defines computer generated networked environments – the pores of the ideal membrane that surrounds the "magic circle" of play become more visible. The social validation systems, like those of social networks and the other game-derived interaction mechanics create "value that is relevant on both sides of the boundary between the worlds" (Castronova & Knowles, 2015, p. 148). Moreover, the complexity of some contemporary games, such as Massive Multiplayer Online Role-Playing Games (MMORPGs), require players to delve into the documentation and paratexts of the game way before starting playing, showing how the concept of complete separation from everyday life is weakened by the networked structures of contemporary digital games (Consalvo, 2009). In their introduction to *Metagames* (2017), Boluk and LeMieux challenge Suits' definition of play, which implies a utopian condition represented by the existence of the magic circle. According to Suits, "playing a game is a voluntary attempt to overcome unnecessary obstacles" (Suits, 1978/2005, p. 55). In line with Huzinga tradition, such unnecessary obstacles imply the absence of any kind of interest and practical goal. However, Boluk and LeMieux argue that Suits' definition "constitutes the utopian horizon of game and play, not their phenomenal, material, historical, economic, or political practices" (Boluk & LeMieux, 2017, p. 7).

In contemporary society, as the chapter of this thesis argues, play matters to players as an activity that is meaningful on a social, political, and economic level. Players engage in games both for intrinsic and extrinsic motivations. In this chapter I'll discuss the political economy that characterize the power relationships mediated play and games (§4.3). I will then examine two paradigmatic phenomena – gamification (§4.4) and serious games (§4.5) – that are generally adopted by product and service designer, although their ethical implications are often overlooked. It appears, indeed, that the critical understanding of game-like structures in contemporary digital economy that have been developed by game scholars is still limitedly integrated within product and service design curricula. I will then introduce an analysis map (§4.6) to describe some emerging and notable phenomena.

4.2. Methodology and limits

The chapter uses both academic literature and phenomenological observation to frame the intersections between the economic sphere and that of play. Section 4.3 propose an introduction to the political economy of play as an analysis of the social relationships that characterize the production, distribution, and consumption (Mosco, 1996/2009) of the systems that embed the technologies of play to produce value. The following sections analyze gamification (§4.4) and serious games (§4.5) as two established forms that use digital technologies to intertwine playful and economic relationships. Through the discussion on gamification and serious games, the sections highlight the nuanced power relations in which players and organizations engage. It argues, however, that such two forms do not fully represent this relationship. Therefore, the chapter continues by proposing an interpretative diagram used to map other relevant economic phenomena in gameful and playful activities (§4.6). The map presents some key phenomena, case studies, and practices that are significant for the description of the current landscape of power, control, and relation systems mediated by modes that articulate financialized play and gamified finance (§4.7).

Figure 4.1 - Symposium on the Convergence of Gamification & Financialisation, Abertay University, Dundee, Scotland. May 31st - June 1st, 2024

A limit of the analysis developed in this chapter is represented by the number and typology of mapped phenomena that do not derive from a systematic review, which would have produced an unmanageable number of items within such a framework. The reported phenomena, therefore, have been selected among the ones that present significant and distinctive characteristics, most of which have been widely discussed in literature.

Part of the content of this chapter has been presented during the Symposium on the Convergence of Gamification & Financialisation (Fig. 4.1) that took place at Abertay University in Dundee, Scotland, between May 31st and June 1st, 2024[1]. Participation in this interdisciplinary symposium allowed me to share the preliminary observations that emerged from the research with the other participants, enabling further reflections, consideration and additions to the work.

1 https://marjz.net/blog/symposium

4.3. The Political Economy of Play

In his book, *The Political Economy of Communication* (Mosco, 1996/2009), Vincent Mosco adopts two definitions. In the first instance, political economy can be understood as the study of "the social relations, particularly the power relations, that mutually constitute the production, distribution, and consumption of resources" (1996/2009, p. 24). This first definition gives emphasis to the material process in which communication media go through, and on the power and control structures that define the relationships between producers and consumers. Mosco observes that this definition assumes a clear distinction between producer, distributor, and consumer roles. Mosco's second definition describes political economy as "the study of control and survival in social life" (1996/2009, p. 25). This definition uses *control* to describe the organizational individual and group systems, and *survival* to indicate the economic activities that society puts in the works to reproduce itself.

Going back to Mosco's first definition, the roles of producers and consumers can only exist as categories if, between them, there is the category of commodity (Celaschi, 2000). The model Celaschi proposes investigates the social relations that happen between producers and consumers from a designer perspective. This model conceptualizes a system in which commodities materialize the negotiation between use-value (needs) and symbolic-value (preferences). This negotiation happens in the in-between area of exchange. The model does not explicitly define the category of mediator as a separate actor in the producer-(mediator)-commodity-consumer model (Fig. 4.2). Nevertheless, the persuasion strategies adopted by mediators have a key role in shaping consumer's decisions. This simplification, however, preserves the model equilibrium since, in a market exchange system, mediation is not neutral in the system but is synergic with production. Rather, the model embeds the mediation within the commodities, highlighting their intrinsic communicative qualities: "mediation, in turn, is the commodity and no longer a tool intended to facilitate the exchange of commodities" (Celaschi, 2000, p. 14, Author's translation). Exchange is a place in space and time in which producers, commodities, and consumers play roles that cannot be defined either as passive or active only.

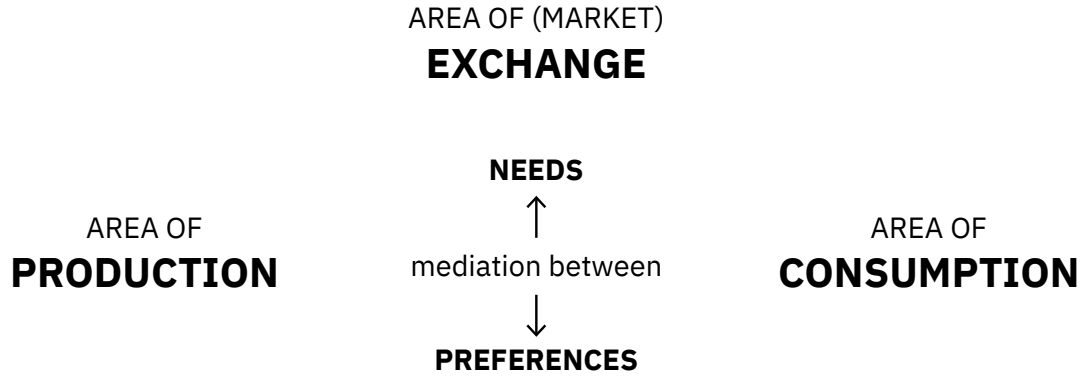


Figure 4.2 - The area of market exchange is where negotaitions between needs and preferenes happen.

If we consider contemporary production, exchange, and consumption processes, we can observe the significant and rapid transformations over the last decades. The linear production system that was characteristic of the Fordist model has been condensed, reframed, and subverted by the array of contemporary production models: continuous innovation, just-in-time production, overproduction, and so on. The linear process through which raw materials were extracted, transformed, and sold as finite products has been replaced by models in which products are constantly updated and transformed while already being consumed on the market. New technologies are explored by the so-called early adopters who act as beta testers to generate market information for companies. Digitalization introduced new production processes in which humans and computational agents cooperate. The actors that operate in these processes, indeed, are not only just humans. More and more frequently autonomous agents intervein in mixed human-nonhuman modalities of cooperation, negotiation and consumption processes.

Contemporary market exchange takes place in new spaces defined by digital and networked technologies. Digital interfaces mediate consumer decisions. The pervasiveness of digital technologies and the sensation of presence, given by the perceptual illusion of non-mediation (Lombard & Bolmarcich, 1997) of interface technology, redefine our Newtonian concept of reality, blurring the concepts of offline and online into an *onlife* experience (Floridi, 2014). With the interaction between the consumer society (Baudrillard, 1970/2022) and the information society (Castells & Himanen, 2002), we can observe the emergence of a range of processes defined as the digitalization of consumption (Lehdonvirta, 2012). In this process, the items being bought and sold are no longer physical objects purchased via e-commerce, or digital products (information goods), such as music and films, but are virtual products, such as clothes, weapons, furnishings, aesthetic ornaments, that can be used only in a virtual environment. The reasons why these goods are desirable are the same whether the items are physical, digital, or virtual; these reasons are: *functional* where the item solves a problem; *hedonistic* where the item brings personal satisfaction in terms of pleasure or excitement; and *social* where the item is the symbol of the buyer belonging to a given social class (Lehdonvirta & Castronova, 2014).

In such a landscape, digital play and games constitute a paradigmatic expression of the commodity form, the *Game Form* (cf. Ch.2), that actualizes the social relations investigated by contemporary political economy inquiry. Therefore, it emerges the need analyze how video games situate as commodities in the area of exchange, how they articulate the mediation between needs and preferences, and what kind of relationship they activate between the area of production and consumption. In Chapter 2, I have defined the *game-exchange* as the relationship model that gamified applications and games use to exchange pleasure, enjoyment, sense of achievement, instant gratification for users' time and data. Not only. Games fulfill representational, social, and cultural needs. As it will be discussed in Chapter 5, players can engage with games as a medium of expression, subverting their passive role of consumers.

As already mentioned, Mosco understands *survival* as the economic strategies adopted by actors of the market system. In order to survive, both ends of the production-consumption system need to find their own motivations. Motivation is, indeed, an essential element for survival and, being is closely connected to perception, feelings, and cognition, it operates as the driver of

behaviors and actions (Hodent, 2018). In the political economy, companies are primarily driven by economic motivations, which are translated in commercial strategies. Consumers' motivations, on the other hand, have complex and different roots[2], that consciously and unconsciously influence preferences and needs. To observe and describe the power and control structures and the survival strategies of contemporary economic and socio-political systems in which designers operate, a close reading of the political economy of play can provide relevant insights into the dynamics that drive production, exchange, and consumption of the *Game Form* as a commodity.

Studies on the political economy of video games are relatively recent, but they emerge as a growing field of research, given the game industry's growth and its intersections with other creative fields. It is possible to identify a number of trajectories in this field. Scholars are investigating the role of game platforms and systems in local industries, with a particular interest on historical evolution (Fassone, 2020; Montfort & Bogost, 2009). Other works focus on the contemporary development of the game industries within local cultural industries. For example, Lugo et al. (2002) identify the ways in which the video game industry in Latin America reproduces the models of dependence and reproduction of other industries both on a structural-economic level and at the superstructural-ideological level, with the potential, however, to liberate the forces of local creativity (Lugo et al., 2002). Using a theorization of the political economy of video games built on DeLanda's theory of assemblage (DeLanda, 2006), Joseph analyzes video game production in Toronto as the result of capital, bureaucracy, aesthetics and the urban space (Joseph, 2013). He has also investigated the role of video game distribution platforms (specifically Valve Corporation's Steam platform) as a structure of control over design, production, and use of digital games through monopolization, enclosure, online labour, and exchange among designers (Joseph, 2021).

A seminal book that introduced the critical analysis of the political economy of video games is Nick Dyer-Witheford and Greig de Peuter's *Games of Empire* (2009). Despite having been published over ten years ago, the book is still relevant for popularizing the critical political economy perspective on video games and their production and for providing a solid starting point for developing new analysis on the contemporary context (Hammar et al., 2021). The authors build their arguments on an adapted concept of *Empire* derived by Michael Hardt and Antonio Negri popular and highly debated homonym book (Hardt & Negri, 2000)[3]. Hardt and Negri conceive the *Empire* as an emergent globalized post-modern system of exploitation and control that differs from the earlier phenomenon of imperialism. Whereases imperialism was rooted in nation-states, the *Empire* is an entity in which a supra-national organization are joint "under a single logic or rule" with "no territorial center of power and does not rely on fixed boundaries or barriers" (Hardt & Negri, 2000, p. xii). In the *Empire*, immaterial labor (Lazzarato, 1996) is the central activity for both the production of new commodities and for the modes of managing their production and the communication system of advertisement. The concept of immaterial labor can be conceived as "the labor that produces the informational, cultural, or affective element of the commodity" (Virno & Hardt, 2010, p. 261). Another concept formulated by Hardt and Negri that is characteristic of the *Empire* is that of *multitude*, an activist revolutionary power of "all the exploited and subjugated [...] that is directly opposed to *Empire*, with no mediation between them" (Hardt & Negri, 2000, p. 392). Dyer-Witheford and de Peuter adopt from such conception of *Empire* the idea of

2 Celia Hodent proposes to classify motivations in four main categories: Implicit motivation and biological drives; environmental-shaped motivation and learned drives; intrinsic motivation and cognitive needs; personality and individual needs. (Hodent, 2018, p. 59)

3 A related concept is that of technocapitalism coined by Best and Kellner to "signal the new syntheses and modes of capital, science, and technology. In terms of political economy, the emerging postindustrial form of technocapitalism is characterized by the decline of the state and enlarged power for the market, accompanied by the growing strength of transnational corporations and governmental bodies and the decreased power of the nation-state and its institutions." (Best & Kellner, 2001, p. 272)

the emergence a new supra-national social formation structured around capital that they reframe in order to situate video games and their production.

> "By Empire, we mean the global capitalist ascendancy of the early twentyfirst century, a system administered and policed by a consortium of competitively collaborative neoliberal states, among whom the United States still clings, by virtue of its military might, to an increasingly dubious preeminence. This is a regime of biopower based on corporate exploitation of myriad types of labor, paid and unpaid, for the continuous enrichment of a planetary plutocracy." (Dyer-Witheford & De Peuter, 2009, p. xxiii)

In such context, the attention given by the authors to immaterial labor does not undermine the role of other kinds of exploitation, which are most often functional to the immaterial labor (such as raw material extraction for electronic components and the assembly lines of information devices[4]). However, immaterial labor in information communication systems is particularly relevant for its ability to influence intellectual and affective levels of subjectivity. Despite the rapid technological innovations and the transformative impact they had on society and economy, since the *Games of Empire* publication in 2009, the condition of precarity that characterized the *Empire* still persist and, in 2024, it has grown into a condition that has been defined *permacrisis* (Ingold, 2021). For Dyer-Witheford and de Peuter virtual games are the "exemplary media of Empire" (2009, p. xxix). As other media before have materialized the conflicts and the struggles of previous epochs, virtual games express the global hyper-capitalism of the twenty-first century because they originated, at least in North America, from the military industry through the new intellectual competencies of immaterial labor; they worked as a generational training tool in digital and network technologies; the game industry experimented strategies and methods for accumulation, outsourcing, and market globalization, cognitive exploitation; they extract values from consumers' activity and voluntary and non-paid labour; train flexible neoliberal subjects capable of adapting to the precarity of working condition; they represent an expensive commodity whose limited accessibility enlarge inequalities; and lastly they represent the *multitude* for the appropriative and alternative use of the medium for contestation and critique (cf. Ch.5).

Games of Empire brought attention to an emergent debate on games as part of a complex system of production, exchange, and consumption in which interlocking factors of power, control, and reaction materialize and perpetuate through the medium of video games. Ten years after its publication, Hammar et al. (2021) co-edited a special issue of Games and Culture to reflect on the questions raised by Dyer-Witheford and de Peuter recontextualized in contemporary video game cultural analysis and production (Hammar et al., 2021). Today's discussion on the critical analysis of the video-game sector from the perspective of political economy is characterized by a significant debate on the topic of racialized and masculine production culture (Bulut, 2021) diversity (Mejeur et al., 2021), the intersections between platform studies and feminist, race, and queer theories of technology (Malazita, 2024), activist and political use of games (Svelch, 2023), class struggles, conditions and unionization in contemporary game industry (Ruffino, 2022; Woodcock, 2019) and production models (Ruffino, 2021a).

This brief introduction to the evolution of political economy critique in game studies shows how, over the last decade, the vi-

4 On this topic, the work Kate Crawford and Vladan Joler maps the intricate and cross-global flux of human labor, data and planetary resources that are involved in the production and functioning of Amazon Echo smart speaker. https://anatomyof.ai

deo game industry has inflated its modes of production and its products with the operational logic of the system of power and control of contemporary capitalism. As *Games of Empire* argues, games are both a materialization of these structures, of the military, accumulative, exploitative, and racial logics of *Empire*. They are the instruments through which *Empire* reproduces and perpetuates itself, leveraging the immaterial labor of cognitive capitalism (Moulier Boutang, 2011) and the affective affordances of the medium. Stepping back and observing how the political economy of play situates in the broader context of the relations between games, economy, and finance, it can be noted how the logic of production and consumption of games mobilize and are mobilized by economic dynamics that involve value extraction not only from immaterial and material labour but also from speculative financial practices. The boundaries between game, economy and finance become increasingly difficult to define as the distinctive concept and language of each domain confound with the other in a "simultaneous financialization of play and gamification of finance" (Zeilinger, 2024).

Economic and financial markets enter the sphere of entertainment and, in reverse, play enters the domain of production becoming "as important in the cultural economy as work was in the industrial economy" (Rifkin, 2001, p. 263). Rifkin evaluates this kind of play as a lesser valuable activity compared to its ideal form that, in line with Huizinga, should be produced in a supposedly impermeable "cultural sphere". The pecuniary relationship of this productive kind of play, according to the economy theorist, alienates players from the social experience that should be activated by "pure play". It can be observed how, through these converging directions, the social bonds that are built through the activity of play intertwine with those established employing financial and productive exchange. Although documented forms of exploitation that leverage on the gamification of the workspace are adopted to improve productivity[5] accounts for a relevant role in framing the play-work relationship, the social dynamics mediated by economic interactions happening in play contexts are not fostering forms of social alienation only. In fact, in the consumer society, the exchange and trade of goods is a defining mode of relation and social bonding that can be established both by economic and social obligation (Lehdonvirta & Castronova, 2014). Such modalities range in a variety of forms that combine in a complex technological landscape where historical categories of play and labor keep mutating.

4.4. The Gamified Digital Society

As far as contemporary digital society is concerned, it could be argued that the Trojan horse that brought the economic dimension into the activity of play on a large scale has taken the name of gamification. In the neoliberal economy, gamification facilitated the introduction of models based on the quantification and evaluation of everyday activities, introducing economic paradigms in non-economic domains (Bittanti, 2016). If, on the one side, the economic models of game theory and behavioral economics have exposed game-related forms in their theoretical frameworks from which neoliberalism developed, it is through the cultural and technological development of games that gamification emerged as an ubiquitous model that permeates contemporary digital society (Jagoda, 2020a). Despite having, as a cultural and economic paradigm, its roots in the second half of the twentieth century, it is since the early 2010s that gamification has become a popular term in game and design literature and a diffused practice across many industries and contexts. In the field of game design and game studies, the term gamification is

5 https://www.theverge.com/2021/3/15/22331502/amazon-warehouse-gamification-program-expand-fc-games

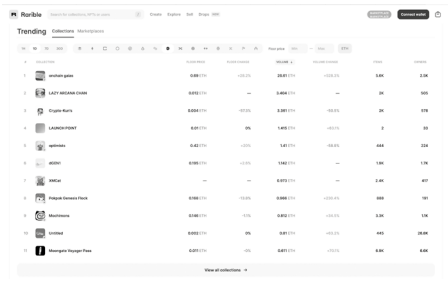


Figure 4.3 - Homepage of the *rarible.com* NFTs platform. The "Tranding Collection" section resembles that of crypto trading platfroms.

commonly associated with "the use of game design elements in non-game context" (Deterding et al., 2011). The definition provided by Deterding et al. situates gamification and gameful design as the complementary counterpart of playfulness and playful design. This definition is built upon previous formulation and notions tied to Caillois' distinction between *paidia* and *ludus*. As it will be discussed later, *paidia* and *ludus* are associated with two different attitudes of human engagement with the broad category of play. If *paidia* refers to a free, exploratory, even chaotic, attitude, *ludus* describes a different kind of activity that is goal-oriented and rule-based. In literature and design practices, the difference between *paidia* and *ludus* substantiates in the difference between play/playfulness and game/gamefulness which inherit the same characteristics. For Deterding et al. (2011), indeed, gamification is directly related to games and not to play, although they acknowledge that playful behaviors can emerge in gameful context as well (Barr, 2007). Following their definition, the authors argue that the strategy used by gamification to design gameful experience leverages on the extrapolation and adaptation of game design elements outside a game context. In their definition, game design elements can be considered as components that can be isolated from a ludic apparatus and described as autonomous entities. The Authors classify such game design elements on the basis of their level of complexity and abstraction, from single basic elements such as points, to game design specific methods and practices such as playtesting and playcentric design (Fullerton, 2004/2024). It can be observed that the first two levels – game interfaces and game design patterns and mechanics – are those most often implemented in gamified applications, both analog and digital. Detractors of gamification have criticized such aspect. The first level is that of the game interface pattern and is constituted by basic game components like badges, points, leaderboards. Point collection and scoring systems are largely used in loyalty programs. Leaderboards are used to incentivize participation, commitment, and consumption. For example, since early 2021, Non-Fungible Tokens (NFTs) have become largely popular and trading platform like *rarible.com* started including in their homepage the leaderboards of the most selling creators and higher spending buyers (Fig. 4.3). Being on top of a leaderboard can have a social value for demonstrating notable achievements or skills like in sports competition. It can also be representative, as in the case of NFTs trading platforms, of a particular economic status. The struggle to occupy the top positions of a leaderboard can be rewarded by giving access to exclusive benefits. The second level of game design elements introduces game design patterns and mechanics. These elements are constituted by rules that define constrains, resource collection, turns. In the case of NFTs trading platform, reward models that incentivize the use of the platforms have been rapidly transforming, following both the cryptocurrency and NFTs market and blockchain technological innovations. NTFs trading platforms often reward users with tokens that are assigned based on users' participation in bidding and trading, introducing new auction systems to increase participation and sales. Another common field of application for gamification is sports and physical activity. Consumer gadgets with tracking features saw a growing diffusion in the electronic market over the last decade. The low cost and ease of use of tracking sensors and devices facilitate the collection of personal data about physical activity and physiological parameters. Such practice is defined as "lifelogging", and it consists in tracking information for the user in a digital diary. Active and passive data collection generate "lively data" which are big quantities of information describing a wide variety of aspects of human life (Lupton, 2016). With multiple sensors in our devices continuo-

usly tracking our physiological data, every aspect of our life can be measured and "as long as it ca be measured, it can be gamified and improved" (Hon, 2022, p.12).

Over the last decade, gamification has polarized the debate about its role and efficacy in promoting positive transformation, and the social implication of unethical and exploitative use. Gamification has been considered as the tool that can save world's most complex problems (McGonigal, 2011) and also, in a philosophical sense, as "bullshit" (Bogost, 2014). Criticisms have been made to gamification as it suggests a methodology that claims to address complex issues adapting pre-made solution (Bogost, 2014). Gamified applications have no more in common with games and should be better defined as *exploitationware* (Bogost, 2011a). Some scholars have come to say that the underlying principles of gamification techniques used to push toward short-term goals in working context largely contributed to the 2008 financial crisis (Juul, 2011). Game scholar C. Thi Nguyen (2020) describes value capture as a phenomenon linked to explicit forms of gamification and systems designed around quantification and metrics (Nguyen, 2020). Value capture can be observed when the layers of complexity that describe one's values and motivations in engaging within an activity are substituted by simplified metrics that are introduced for the sake of measurability and comparability. The numerical synthetic and simplified representation of one's motivations – number of daily steps, H-Index, school grades – replace more articulated values and goals – wellbeing, knowledge creation, education – extrapolating them from the context. Value capture happens once such parameters becomes the reference systems of one's personal and professional success, instead of the more complex motivation and values they represent. Although the identification of simple metrics and standards do not necessarily represent a malicious activity per se, according to Nguyen (2020) value shifting from complex concepts in favor of their oversimplified version pushes the *quantified self* to chase immediate, and easy to achieve, satisfaction and, therefore, undermining autonomy and agency.

Game scholars argued that, more than a design approach, gamification describes the form of contemporary technocultural society and its economic system. As briefly introduced earlier, Jagoda (2020a) observes that games were introduced in economics sciences through game theory as fundamental blocks for understanding markets through rational thinking. Jagoda (2020a) continues observing how neoliberalism transforms the *descriptive* model of game theory into a *prescriptive* practice that an ideal neoliberal subject should adopt to maximize value through rational decision-making processes. According to this interpretation, games represent useful tools that describe a theoretical economic model and are the rational perspectives from which the neoliberal subject operates. The neoliberal subject, however, should act based on rational choices with no influences from emotional, personal or cultural biases and preferences. The development of behavioral economics during the 1980s shifted the focus from the subject, as the primary agents of economic activity, to smaller analysis units that represent the non-rational drivers behind market decisions. Such fundamental units include personals preferences, behaviors, desires, and attitudes. With the introduction of behavioral economics, it is understood that markets are not governed exclusively by rational choices, but market agents make their decision following emotional and, often, nonrational motivation. Therefore, decision making is a process that can be influenced by intervening of the irrational part of the equation that describe one's deci-

sion. According to Jagoda (2020), the model described by behavioral economics combines with the technological application of gamification to influence and nudge users toward a predefined goal. Whereases classic economics theory used games to simulate abstract market decision models, gamified applications are intentionally designed to influence behaviors and choices, manipulating, and addressing the non-rational and uncoherent aspects of economic subjects. According to game designer and author Alexander Hon, gamification techniques rely on human's cognitive and responsive mechanism not only to persuade and nudge towards positive or healthy attitudes, but also to exploit and influence users to organization's profit or social control (Hon, 2022). According to Jagoda (2020), gamification introduces a relevant innovation compared to the media forms of characteristics of the second half of the twentieth century – movies and television above all. Jagoda points out the distinction that emerges when comparing the concept of *spectacle* as described by Debord (1967/2008) in those years. For Debord, *spectacle* is "a social relationship between people mediated by images" (Debord, 1967/2008) that displayed the cultural and social expression of the late 1960s. Seemingly, games materializes the economic and socio-cultural dynamics of the twenty-first century (Jagoda, 2020b, p. 31). They represent, in Debord's words cited by Jagoda, "both the outcome and the goal of the dominant mode of production" (Jagoda, 2020a, p. 31). Compared to *spectacle*, games portraits contemporary society through networked technologies that are structurally different from those of television and cinema. If *spectacle* was broadcasted through a one-to-many communication that separated and hierarchized, contemporary communication systems are based on *pointcasting*, user-generated content, and many-to-many communication (Jagoda, 2020a). Moreover, games ask the audience to actively engage with the images on screen. If players do not take action, the game system does not progress. For movies and television there is no idle state. Images keep running on the screen without the need of viewers' participation. Passive media consumption characterizes both television, streaming services, and social media as well. Games, on the other end, need to develop design strategies to catch player attention and continuously engage them in challenges that require their active participation.

The process of digitalization of economic, social and productive activities that characterize the Information Age (Floridi, 2014) allowed the development of numerous gamified applications based on the computability of human behaviors. Starting from Mark Fisher's concept of capitalist realism and the realization that imagining and enacting an alternative to capitalism is not possible (Fisher, 2009/2018). Sicart argues that play and its technologies acquire an instrumental role in the perpetuation of capitalist paradigms of value extraction and exploitation (Sicart, 2021). For Fisher, the forms of capitalist control are only possible if the subjects are complicit with it. Consequently, accordingly to Sicart, in Playful Capitalism, play has been coopted by capitalism to make its propagation an enjoyable activity carried on by consumers themselves. The *atmosphere* of capitalist realism prevents both thoughts and actions (Fisher, 2009/2018). Participating in playful capitalism is not a voluntary activity – as classic theories of play argue – instead, in capitalist realism, it is the only available possibility (Sicart, 2021). For Sicart, video games are not the only medium that have been exploited by capitalism to extract values from entertaining and enjoyable activities: in contemporary data society, in which play constitutes a relational mode between humans and software agents (Sicart, 2023), all playable media can be used to extract users' information for corporations' profits.

If gamification has been used subtly but diffusely in a more significant number of working, control, and engagement contexts as an assemblage of game-like and game-derived elements, organizations and companies have also looked at video games as whole systems that can effectively be used to train, educate and prepare users to the "serious" life activities leveraging on the affective affordances of the game medium. Together with examples that develop an ethical non-exploitative use of this game form, the next section will present the primary reference literature about serious and applied games, discussing their role in the intersections between gameful technologies and the modalities through which contemporary capitalism trains and exploits its future human capital.

4.5. Applied Games: players at work

The contemporary interest in non-entertaining applications of play and games traces back to the pre-digital era. The role of play in children's development can be found in Plato's philosophy and later developed during the Enlightenment by Friedrich Schiller and Jean-Jacques Rousseau in which it is possible to recognize the contemporary understanding of play as an intrinsically purposeful activity (Wilkinson, 2016). As reconstructed by Wilkinson, the trajectories that through history lead to the contemporary applications of games in non-ludic contexts investigated the purposing of play in learning, with the seminal work of pedagogist Friedrich Fröbel and Maria Montessori (Cohen, 2007); in therapy with the client-centered approach by Carl Rogers (Rogers, 1951) developed by Virginia Axline as child-centered play therapy (Axline, 1950); and social control (Cohen, 2007; Sutton-Smith, 1997). Research has investigated how play and creativity relate to children's cognitive development (Cecil et al., 1985; Hughes, 1999) and how designing playful interaction can incentivize physical activity and social interactions among children (Bekker et al., 2010). Fewer studies have discussed adult playfulness concerning education (Holflod, 2023), creative tasks, and how to address its integration into designers' education (Lloudon et al., 2012).

The emergence of the field of research concerned explicitly with play as a purposeful activity can be associated to the publication of Clark C. Abt book *Serious Games* (1970). In this work, Abt defines serious games as "games [that] have an explicit and carefully thought-out educational purpose and are not intended to be played primarily for amusement". In Abt's definition, the term serious is used to contrapose amusement and entertainment to "the sense of study, relating to matters of great interest and importance" (1970, p.10). The use of the term "serious" has been widely discussed by scholars who have argued that games have an intrinsic seriousness for their demonstrated application in fields like healthcare and education (Djaouti, Alvarez, Jessel, et al., 2011). Others have criticized the use of the term serious for challenging the common understanding of the characteristic that are generally associated to games such as fun and challenge (Marsh, 2011). Djaouti et al. suggest that, looking at the evolution of the term in the game field, the terminology intentionally proposes an oxymoron (Djaouti, Alvarez, & Jessel, 2011). The term achieved even wider popularity with the publication of Sawyer and Rekeski white paper *Serious Games: Improving Public Policy through Game-based Learning and Simulation* (2002), which was, shortly after, followed by the foundation of the *Serious Games Initiative*[6], a consulting firm that aims at using games to engage the broader public in policy making. Sawyer proposed a definition specifically addressing the use of digital games and their technology. Sawyer defines serious games as "any meanin-

6 https://www.wilsoncenter.org/program/serious-games-initiative

gful use of computerized game/game industry resources whose chief mission is not entertainment" (Sawyer, 2007). Michael and Chen defined serious games as games that "do not have entertainment, enjoyment, or fun as their primary purpose" (Michael & Chen, 2006). This definition does not exclude the eventuality that such games may result in an enjoyable activity; however this is not the expected primary outcome of their use.

According to Djaouti et al., the persistence of the term serious game is due to the fact that the development of such kind of game, appealing to corporates and organizations, is sustained by a different business model (Djaouti, Alvarez, Jessel, et al., 2011). Whereases entertainment game copies are generally sold with a retail price directly to consumers (B2C model), serious games are often financed through a private investment of companies and organizations interested in the development of a specific product generally to be used within the organization (B2B model). However, the different kinds of economic models in commercial games, that are being experimented by game companies such as free-to-play and games as a service, make a great distinction subject to the video game industry evolutions. With the growth of research, experimental and commercial projects, instead of serious games, the definition of applied games has been proposed as a more comprehensive definition for facilitating cross-disciplinary research and, therefore, innovation in the design of such game forms (Schmidt et al., 2015). In literature, it is possible to find other nomenclatures that attempt to analyze the use of games in the same research domain as serious games. Some of these are games with a purpose (Von Ahn & Dabbish, 2008), educational games and game science (de Freitas, 2018). A synthetic schematization of the game forms that relate to this category can be found in chapter five.

Serious games have been developed for application in multiple areas, focusing on training and education. In the field of medical education and surgical training, for example, serious games are considered potentially valuable tools for their flexibility, operational cost, and accessibility, even if more standardized assessment are generally required for full implementation (Graafland et al., 2012; Wang et al., 2016). With the development of game technology, a growing number of applications are exploring the field of cultural heritage (Anderson et al., 2010; Mortara et al., 2014). Serious games have also been developed for training in other critical conditions, such as fire service training (Williams-Bell et al., 2015) and aviation. The growing interest for serious and applied games across many sectors resulted in a proliferation of games developed both for research purposes and for commissioned work by organizations and companies. This led to the development of taxonomies[7] for categorizing existing serious game projects based on application domains (Alvarez et al., 2007; Laamarti et al., 2014; Zyda, 2005) of the type of involved organization and specific use (Sawyer & Smith, 2008), Gameplay, Purpose and Scope (G/P/S) (Djaouti, Alvarez, & Jessel, 2011). A more comprehensive taxonomy has been proposed by De Lope and Medina-Medina (2017) with the aim to include previous criteria and significant features valid to analyze and design serious games.

As already mentioned, video game technologies developed, at least in North America, from the military environments. The capability to simulate critic scenarios and operations in a safe environment with high level of accuracy and sophistication, was a significant driver in the development of what have been later defined as serious games. However, the relationship between play and models of training and education precedes the digi-

7 The Serious Game Classification https://serious.game-classification.com/EN/index.html is a collaborative catalogue developed from an academic research project started by Julian Alvarez and Damien Djaouti in collaboration with I.R.I.T. and L.A.R.A. laboratories of Toulouse Universities II and III started in 2006. At the time of writing (June 24), lists 3437 games.

Figure 4.4 - America's Army: Prooving Grounds (United States Army, 2002-2022)

tal era and can already be observed across history. The militarist metaphor characteristic of classic games like chess and its Indian predecessor *Chaturgana* evolved and expanded through the technology digital games in advanced and pervasive systems such as *America's Army (2002)*, the extremely popular free-to-play game developed by the US Department of Defense (Wilkinson, 2016) for incentivizing and promoting enrolment in the military forces (Fig. 4.4). As reported by Djaouti et al. in a 2006 newspaper article Sawyer defined *America's Army* "the first successful and well-executed serious game that gained total public awareness" (2011). America's Army did, in fact, gain popular attention achieving several nominees from game industry critique, obtaining players appreciation, and breaking records for becoming the most downloaded war game in 2009[8]. Compared to other war games, America's Army was designed to make players experience how battle operations are realistically carried on in a combat scenario. Gameplay mechanics offered a slower pace compared to other war games and missions were designed to represent realistic ground operations and rules of engagement.

The development of digital game technologies enabled new affordances and forms of engagement improving the capability to reach a wider audience. When looking at *America's Army* as a serious game, with its educational purposes, rather than its practical military operation knowledge and skills, it appears to concern other aspects of military life, such as the sense of achievement, cooperation, and belonging (Zyda et al., 2003). For example, the game used a point system that included "honor" points to disincentivize the violation of the rules of engagement and chain of command. This mechanic directly links the U.S. Army social reality and value system in a "proceduralized" scoring system (Bogost, 2007, p. 77). *America's Army* operates a procedural rhetoric that "reinforce[s] the value system of the U.S. Army and the commutative nature of U.S. defense and military policy" (Bogost, 2007, p. 333). Games like *America's Army* can more effectively be understood as persuasive games; games that use the "art of persuasion through rule-based representations and interactions rather than the spoken word, writing, images, or moving pictures" (Bogost, 2007, p. ix). What differentiates America's Army from other B2B serious games is that it has been developed not as a training tool for specialized operators of the military forces, but as a B2C software whose primary goal was that of military recruitment. *Amerca's Army* is a pervasive technological cooptation tool that leverages on affection, competition and engagement to succeed in its aim. It exceeds the specific and closed domain of specialized (and informed) training to attract and gather people from outside, using the game medium's affordances and appeal. After twenty years of support and updates, in 2022 *America's Army* server maintenance was suspended. However, US Army use of games as tools for recruitment has not ended. Recently, military e-sports teams started hosting game tournaments for the most popular video games among teenagers. The U.S. Navy is reported to allocate 3-5% of its marketing budget to e-sport initiatives[9]. The homologies and convergence between the "technoculture," where ware games are commercialized for entertainment purposes and the "military technoscientific milieu", where high tech weapon systems are employed, represent what Patrick Crogan defined as the transition from the Military-Industrial Complex to the Military-Entertainment Complex (Crogan, 2011, p. 2).

The photorealistic audiovisual representations and the simulations capability of contemporary video games, allowed by technological advancement in hardware and software, are often

8 https://en.wikipedia.org/wiki/America%27s_Army

9 https://www.theguardian.com/us-news/2024/feb/14/us-military-recruiting-video-games-targeting-teenagers

maliciously used to produce audiovisual material for political propaganda. War games are used to record fake military operations[10]. The warfare technologies, like drones and remote-control weapons, establish distance layers between soldiers and the battleground that define clear resemblance with gaming interfaces. In a series of three articles published between January and March 1991 on the French newspaper *Libèration - La Guerre du Golfe N'aura Pas Lieu*, *La Guerre du Golfe a-T-elle vraiment Lieu?*, and *La Guerre du Golfe n'a pas eu lieu*[11] – Jean Baudrillard argues, in contradiction with the real events, that the Gulf war will not, is not, and has not taken place (Baudrillard, 1995). The overwhelming amount of military power deployed on the battleground, had for the first time ever, a real-time news coverage from CNN reporters which made the Philosopher argue that the Gulf War was not a war in the traditional sense (an opposition between aims of conquest or domination), but rather its simulacrum, a media event, a controlled spectacle serving political purposes. The remotely controlled weapons, which use was considered intelligent and surgical, the infra-red cameras used for night operations, defined a distance between the clean image of the war and the reality of destruction left on the battlefield.

The visual aid that supported military operations – night vision goggles, drone cameras - and their real-time broadcasting through television (and today through social media), are an exemplary manifestation of the Military-Entertainment Complex. However, such overlapping between ludic and non-ludic interfaces, which serious games embrace and take advantage of, is not limited to military applications. The contemporary workspace, in both the service and productive sectors, is largely based on computing, facilitating the introduction and adoption of game-derived strategies for optimization and workforce management. Such paradigm, based on criteria of efficiency and continuous improvement, spills over into other aspects of our daily life though product and services that inherit the values of the workspace (Gaver, 2002).

However, it appears that people – myself included – enjoy spending their time engaging with game simulation of real working activities. At the time of writing, the *Steam* catalogue lists over 34.826 games in the Simulation section. This broad category, include games like sport simulations and, which is more aligned with the scope of this chapter, games that simulate work-like activities: factory and farming management such as *Farming Simulator* (GIANTS Software, 2008–2023), plane piloting such as *Microsoft Flight Simulator* (Microsoft, 1982–2020) and commercial driving such as *Euro Truck Simulator* (SCS Software, 2008) (Fig. 4.5). Over the last years, the popularity of such games has grown also due to the level of accuracy, attention to details and sophistication that some simulators have reached. Microsoft's *Flight Simulator* uses the Azure cloud platform to provide an unprecedented level of detail of the areal views of the Earth (2021). Many of the world's most famous airports have been modelled with high level of accuracy and the same goes for the catalogue of available aircrafts. The game can be approached with different level of complexity in order to accommodate player ability and commitment in learning all the complex flight procedures. However, even professional pilots have expressed appreciation for the level of accuracy the game provides, especially if compared to older professional training simulation platforms, and for its commercial price. This game, such as other driving and piloting simulation games, can be better experienced when using a dedicated control interface that reproduce the vehicle's real controls. Such peripheral devices have been present as control interfaces since the early arcade machine and home consoles.

Figure 4.5 - Euro Truck Simulator (SCS Software, 2008)

10 https://www.bbc.com/news/blogs-news-from-elsewhere-43198324; https://www.reuters.com/fact-check/clip-shows-arma-3-gameplay-not-downed-israeli-helicopters-2023-10-12/

11 The Gulf War Did Not Take Place, The Gulf War: is it really taking place?, The Gulf War did not take place,

They have evolved over time, becoming more sophisticated and specialized. A particularly popular and growing sector is that of car racing simulation interfaces. From simple steering wheel to fully equipped six-degree-of-freedom simulator, the market saw a significant increase (DATA), accompanied by the growing popularity of sim-racing competition. During the pandemic from Covid-19, for example, both Formula 1 and NASCAR used virtual sim-racing to continue their activities on live streaming platforms helping to increase interest in this form of entertainment (Scacchi, 2021). The transposition of car racing into virtual competitions raises interesting considerations with respect to new dynamics of interaction between athletes' bodies and simulation interfaces. The athlete's body in eMotorSport is "in negotiation with algorithms and processes to quantify its movement. An assemblage that links human and nonhuman, matter and information" (Ruffino, 2021b, translation from Italian).

Over the last decade, it is possible to notice the growing popularity of the cozy game genre. Cozy games, rather than realistic simulations, build the play experience around usually tedious and repetitive tasks – such as cleaning dirt with a water gun in *PowerWash Simulator (Futurlab, 2022)* – that are crafted into mediative and relaxing experience (Fig. 4.6). The aesthetic quality of cozy games recalls nostalgic imaginary of the past and, compared to simulation games, they do not ask players to engage in challenging task. The simulation of physical working activities is dramatized in a slow-pacing meditative and relaxing activity, where the pressure of performative values of the capitalist society are left outside the game. The increasing popularity of *sim* games has been associated to the growing dissatisfaction of contemporary work (Williams, 2021), more and more immaterial and atomized, and nostalgic of a romanticized idea of the pre-digital industrial world labor. This form of affection for a one of tactile relationship with the means of production, that is evoked by *cozy* and *sim* games, is in contrast with the growing adoption of robotic and autonomous technologies particularly in *blue-collar* job duties.

Figure 4.6 - PowerWash Simulator (Futurlab, 2022)

The kind of activity players engage with simulation games, and more broadly with games that are built around some kind of working mechanics, might produce a laboring subjectivity that fits in the landscape of digital capitalism and the economic models that leverage on workers adaptability, flexibility, and self-management – as for example the gig economy. Serious games and simulation games prepare the working (and aspiring working) subjects to the immaterial labor that is needed by contemporary capitalism since immaterial labor "is less about the production of things and more about the production of the subjectivity, or better, about the way the production of subjectivity and things are in contemporary capitalism deeply intertwined" (Dyer-Witheford & De Peuter, 2009, p. 41). Under the lenses of capitalism, games prepare players to the various aspects of immaterial labor as it has been contextualized in game studies: the capability to interact with technological digital interfaces, the communicative and cooperative skills and the blurred relationship between labor and leisure. The necessary commitment workers need to have to learn how to navigate a new software to stay competitive, and the labor market can be compared, in terms of time and effort, to the one needed to master a video game. Kunzelman defines "potential labor" as a particular form of "mechanics of speculation". Mechanics of speculation, according to Kunzelman, are "moments of video game interaction that ask us to consider how the world might be different than it is" (Kunzelman, 2022, p. 55). As a mechanic of speculation, potential labor capture and represent forms of labor as interaction

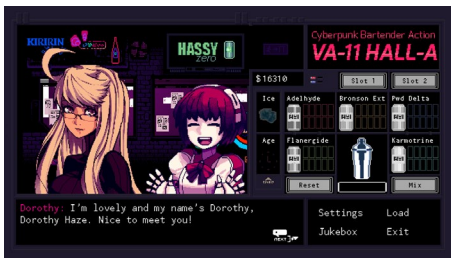


Figure 4.7 - VA-11 Hall-A: Cyberpunk Bartender Action (Sukeban Games, 2016)

mechanics that ask players to adopt the subjectivity of a specific worker, becoming a working subject that is more prepared for workspace predominantly based on digital interface manipulation. Kunzelmans uses *VA-11 Hall-A: Cyberpunk Bartender Action* (Sukeban Games, 2016) as a paradigmatical example in which the mechanic of speculation makes players engage in potential labor through the interface of the game (Figure 3.7). In *VA-11 Hall-A*, players take the role of Jill, the bartender of the dystopian science-fiction city Glitch City, who crafts drinks for the bar attendees through the digital interface of an automated mixing machine. Kunzelman argues that the kind of job that Jill and the player performs is actually the same:

> "The work being performed by myself and this fictional character is identical. While my narrative circumstances are different, and my world is real and hers is not, the actions that we are performing are perfect replications of one another. The work that she is performing in the same work that I am doing. I am completely aligned with her job. It is a bridge through time and worlds, the work of the present being the work of a potential future." (Kunzelman, 2022, p. 55)

Figure 4.8 - Paper, Please (Pope, 2013)

The mechanic of speculation and potential labor can be observed in other video games, highlighting different subjectivities and speculation on the future or alternative forms of work, and the relation between workers, the workplace and the social system in which it exists. For example, in *Paper, Please* (Pope, 2013), players are confronted with ethical decision within an altered moral and social systems recalling that of a fiction Eastern-European autocratic nation (Fig. 4.8). The player is asked to allow or deny access, to the fictional country of Astorzska, to migrants based on their documents and other available information. The player's decisions will determine who will be allowed to enter the country or not with the risk of letting terrorists with falsified passports in and rejecting innocent people who do not have the necessary or correct documentation. As it has been pointed out, the possibility of exploring different moral behaviors through deliberate ethical choices invites to develop a critical reflection on social values (Sicart, 2019). The interface of *Paper, Please* defines the limits of the user's agency to intervein in the system. Like in *VA-11 Hall-A*, the player performs the same actions of the fictional character: pushing buttons for calling people in line, sorting through the documents, check and double-check information, pushing a button to stamp a passport. The game interface translates the complex moral dilemmas raised by the narrative into a straightforward basic game mechanic: allow or deny access, push a button or one other. At the same time, it provides a diegetic element that materializes the frustration of an over-bureaucratized political system through the use of a control interface that, over time, clutters with documents, notes and manuals. With the game progression, players can choose to spend game money to pay for food, rent and medical assistance for their family, or to unlock keyboard shortcuts that facilitate and speed-up the working activity, improve productivity and earn more money. Such game mechanic reflects to a certain degree the way in which workers in the platform and gig economy – mostly freelancers in both creative and low-skilled professions – are responsible for the procurement and updates of their own means of production.

The investment of one's own resources in equipment and working tools bridges the domain of private life and leisure time with that of the workspace working life through economic con-

strains. The technological gadget that serves personal needs, gamify, quantify and capture one's social, health, cultural activities, transforming them in challenges of optimization of performances and achievements. The same technological gadgets are means of production of immaterial work, allowing the intrusive bleeding of work into personal time. Play is coopted by companies and organization to educate, train and prepare workers for their job. Players, at the same time, in their own private time, engage with games that simulate working activity – being them fictional, potential, or actual – that get them used to the skill requirement, of the contemporary labor market. As Kunzelman puts it:

> "In other words, if an educational game turns us into a subject who can better pass a test in the future and a military game allows us to be better soldiers, then what does a game that teaches us how to labor more effectively prepare us for? We perform labor now to prepare ourselves to be better workers in a world where interface manipulation is the process through which a substantial amount of labor occurs." (2022, p. 87)

The rest of the chapter presents an interpretative diagram that describes the nuanced ramification that evolves from the intersection between the domains of production and play.

4.6. Building a map of the intersections between play and economy

The growing inflation of game modalities in non-gaming contexts has been described as the "ludification of culture" (Raessens, 2012) and it has been put in relation with the opposite tension of shaping games and play for the artistic, economic, and social purposes in the revers process of "cultivation of ludus" (Walz & Deterding, 2014, p. 7). The problematization of specific aspects of these processes has led to associate positive or negative values to practices that adopt game elements in their design or that use games and play outside their original "cultural sphere". As commented by Walz and Deterding in their introduction to *The Gameful World* (Walz & Deterding, 2014), the discussion has often positioned gamification in opposition to other practices on the basis of moral standards. Such standards have generally connected positive values to gameful design and serious games, and negative ones to gamification, leading to the suggestion of naming definition like *exploitationware* (Bogost, 2011b). Rather, Walz and Deterding propose the concept of *gameful world* as a more encompassing and neutral way to describe what they observe as emerging phenomena arising from "the double movement of the ludification of culture and the cultivation of ludus" (Walz & Deterding, 2014, p. 7). The concept of the *gameful world* is built on previous schematization proposed by Deteriding et al., as they proposed to map the differences between the emergence, at the time in which the authors were writing, of gamification as a distinct phenomenon from the more established concepts of playfulness (Deterding et al., 2011).

After the introductive paragraphs that have presented the two broad and complex phenomena of gamification and serious games, this chapter aims at mapping the main trajectories that describe the tensions between games, play, labor and finance in contemporary digital capitalism. If on one side under gamification and serious games is possible to identify an articulated system of design strategies, application, and approaches, the

two terms do not allow to cover the wide range of economic and social dynamics that emerge from the interaction between the technologies of play and that of economics. In order to delineate the nuanced and mutating landscape of the political economy of play, an interpretation model is proposed (Fig. 4.9). The model is structured along two axes. The horizontal axe uses Caillois' distinction between *paidia* and *ludus* (Caillois, 1958/2001) to describe the gradient between open and unruled forms of play, on the one side, and structured, ruled and goal-oriented activities on the other. The dichotomy between *paidia*/*ludus*, translated with the English words *play* and *game*, has been introduced by the French sociologist Roger Caillois to identify two different forms of activities: one improvisational and freeform, *paidia*, and the other defined by rule systems and based on competitiveness, *ludus* (Caillois, 1958/2001). Form this original differentiation originally conceived for pre-digital activities, game studies derived their general understanding of game and play. With the introduction of digital systems and computation, game's rules are embedded into code structures allowing the automation and the self-regulation of the game.

The vertical axes contrapose labor and finance as two distinct modes of value production/extraction in the digital capitalist economy. Finance and financialization are understood as a distinctive systemic pattern of wealth definition, management and realization characteristics of contemporary capitalism (Braga et al., 2017) in respect to labor. For the sake of this analysis on the relationship between play, games and economic-related activities, finance is contraposed to labor and specifically to digital labor (Fuchs, 2014). In the context of this chapter, such contraposition aims to offer a possible interpretation for the observed tendences in the commodification of play/game activity. According to Fuchs's reading of Marx's definition, labor is "a necessarily alienated form of work, in which humans do not control and own the means and result of production" (Fuchs, 2014, p. 26). By contrast, work is a more general concept that deals with the use of technologies to transform nature and society to create goods and services that satisfy human's needs. Therefore, labor distinguishes from work as an organizational form of work characteristic of class societies. In the information age (Floridi, 2014), digital work is a specific form of work that uses human's body, mind and machines (or a combination of them) as instruments of work to create use-value that is objectified in digital media and, therefore, digital labor is alienated digital work: alienation of labor-power, object and instruments of labor and their product (Fuchs, 2014).

If the dichotomy *paidia*/*ludus* is commonly adopted by game and play scholars (Deterding et al., 2011; Walz & Deterding, 2014), and directly derives from the classic theory of play (Caillois, 1958/2001), the juxtaposition of labor and finance as two opposite comparison terms has no direct reference in literature. However, the adoption of such evaluation parameters is meant to highlight the different ways that are adopted for creating wealth. If financialization relies on the Money-Money circuit to generate new wealth (money are invested to gain more money), in Marxist terms, the creation of use-value through non-financial asset comes from the interaction between labor-power with the instruments of work that in this context are represented by game and play technologies. Therefore, although the opposition between labor and finance may appear arbitrary, its adoption is proposed to delineate and emphasize the underlying relationship of power/control between players, companies and platforms. Furthermore, it is worth specifying that the matrix construction follows a qualitative approach that does not propose

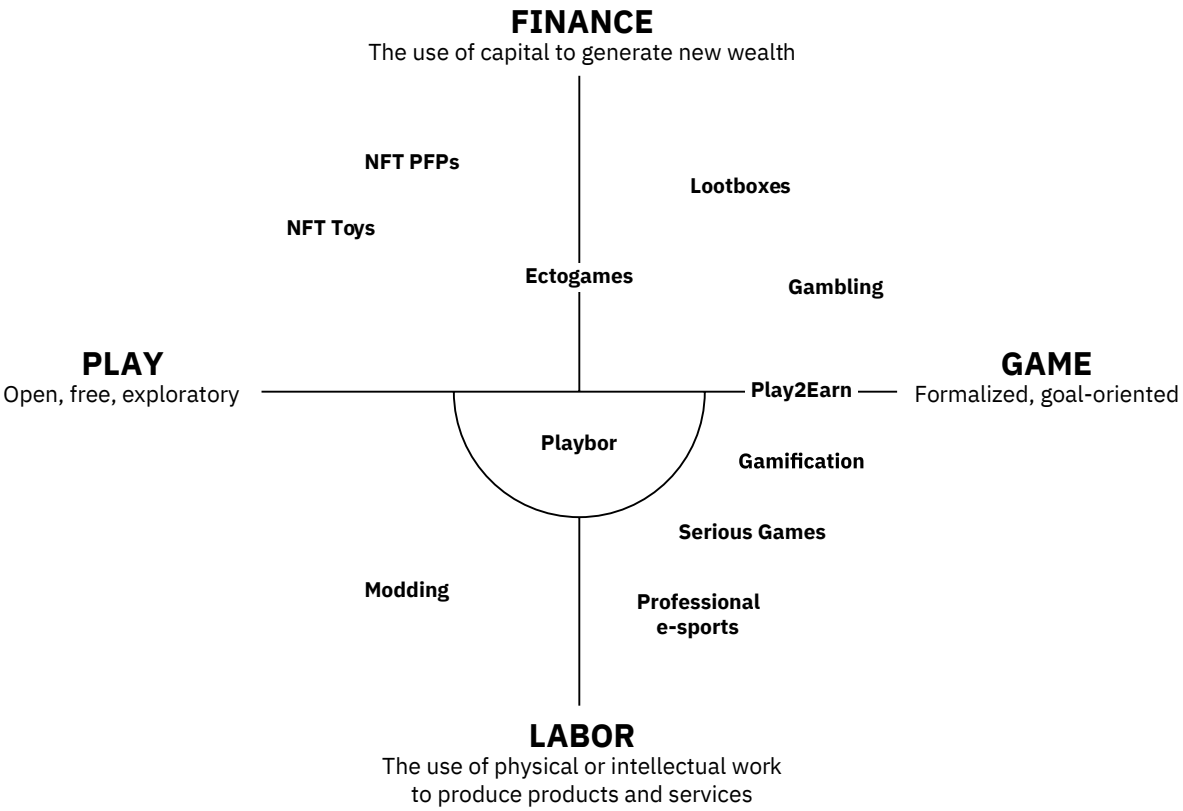


Figure 4.9 - Interpretation model of the power relations of the political economy of play.

a strict taxonomy but, on the contrary, aims to critically engage with possible inconsistencies and limits that such schematization may point out. The matrix aims to analyze how diverse traits of human activity, that involve game and play technologies, combine with labor and finance in the commodification processes.

4.7. Elements in the diagram: emerging phenomena, trajectories and future perspectives

The diagram presented in §4.6 proposes an interpretative model for situating and problematizing established and emerging phenomena that describe the articulated system of relations between ludic and productive activities. The interpretative model, as already mentioned, is not intended as a taxonomical classification tool. Positioning the elements in one of the quadrants, closer to one axis or the other, comes from a qualitative understanding and evaluation of the dominant characteristics observed in each specific case. Moreover, most of the elements located in the diagram are broad phenomena – such as gamification and serious games – or technologies, which nuances can't be fully described through this form of representation. However, this proposed interpretative tool can help to crystallize specific instantiations of broader phenomena according to a particular perspective and in a defined timeframe. For example, with the evolution and the diffusion of new technologies, such as blockchain and Artificial Intelligence based tools, the power relationships that are described in the diagram could be

altered and shifted. In addition, reading this map offers a different landscape, if it is observed from the perspective of appropriation and subversion practices that develop strategies to game the system through its own rules. This different reading appears to be predominantly exploitative and oppressive. Such landscape is explored in Chapter 5 and is constituted by forms of expression and reaction that adopt the technology of play and the game medium affordances to critically engage with contemporary socio-political issues.

In the following sections some of the elements in the diagram are described.

Ectogames

According to Kevin Buist (2021), Ectogames describe "NFT projects that offer elements of games – characters, gear, fictional settings, lore, strategy, and even player communities – but lack the organizing form of a game" (Buist, 2021). The prefix ecto-, meaning external from Ancient Greek, is used by Buist to signify that some of the elementsgenerally referred to games move in a new territory without a structured framework that systematize the gaming activity. Buist (2021) also argues that people, however, engage with ectogames according to defined participation roles like in canonic games. Ecotogamers contribute to form communities, develop fan art, claim loot, and generate content, despite the absence of a game structure. It could be argued, as Buist himself does, that ecotogamers share the same speculative interest in the emergence of a proper game structure around the sparse elements at play that will bring new values to the game asset they own.

The intrinsic nature of ectogames appears to be that of a meta-project which follow a recurring general scheme. The underlying technological infrastructure of blockchain and smart contract are adopted as the main procedural mechanisms that allow the flow of rules, logics, and processes, from token minting to participation in DAOs government. Echoing Bogost's formulation of procedural rhetoric (Bogost, 2007), there is a decentralized rhetoric that aims to persuade users about the yet undefined ludic opportunities enabled by the blockchain infrastructure, and the unconcealed expectation of future value gain. As for blockchain-based games, such as *The Sandbox*, *Axie Infinities*, and *Gods Unchained* which, however, present defined game rules and progression systems, the access to ectogame projects happens through token minting. Token availabilities are generally limited, and eventual rarity traits are randomly assigned. Tokens can be characterized through visual elements that recall popular game graphic styles like pixel art or stylized design or adopt a nonfigurative language like textual or abstract representations. Token's artificial scarcity, its speculative allure and its "fear of missing out" on a possible gain opportunity, make the whole system of project discovery, early buy-in, token collection, and trading, a gamified financial construct. As pointed out by Zeilinger (2024), although it can be argued that ectogames are not gamification per se, their success (or failure) depends on the mechanism of competitive collectability derived from tokenization and promoted by the rhetoric of blockchain trading opportunities (Zeilinger, 2024). The highly speculative appeal of some ectogames, as well as of other blockchain-based collectible series, is additionally demonstrated by the number of derivative projects that alter and repropose the distinctive traits of successful originals.

E-Sports

Competition in video games has played a major role since the era of arcade gaming machines. The arcade cabinets allowed asynchronous competition by recording the highest scores in the machine itself. The diffusion of home consoles and home computers contributed to competitive game in players' houses. However, it is with network technologies that e-sports gain traction and gradually became a worldwide phenomenon (Taylor, 2012). Today, e-sport competitions became participated event in many nations with rich prizes for winners[12]. Arenas are being built[13] to host competitive game tournaments and traditional sport teams are investing in their own e-sport counterpart.

When looking at the demanding commitments professional e-sports players invest, Taylor (2012) questions Caillois' contraposition between *play* and *work*. According to Taylor, the "messy nature of play, the way it can occupy a "both/and" relation to work" challenges the idea that play gets corrupted once it "*matters* to anything other than the play activity itself" (Taylor, 2012, p. 99). For other scholars like Brock (2017), the considerations that competitive gaming suggests regarding the nature of this activity does not require to reject the distinction between *play* and *work* as entities "but rather [as] an appreciation of the manner in which human agents *reflexively negotiate* the 'intrinsic' and 'extrinsic' rewards of both" (Brock, 2017, p. 12).

The demanding commitments that professional and non-professional e-sports players need to invest in this activity can be framed within the characteristics of the working conditions of the neoliberal labor market: auto procurement of the means of production, self-imposed working routines, no clear boundaries between working and personal time and space, precarity. Despite the dynamic conditions that characterize the field e-sports, in both terms of national regulations (Martinelli, 2018) and game and competition rules, players need to adhere to such normative system, I have opted to situate e-sports towards the game-end of the game/play axes. In such domain, the freedom of movement players have is restricted by tournament and game rules, and transgressing such rules can translate in the form of reaction, subversion or, when different kind of interests are involved, cheating[14].

Having positioned e-sports in the labor/gaming quadrant entails that the perspective adopted is that of the players. However, e-sports have become an interesting investment field for venture capitalists who are interested in financing: streaming services, events and tournaments, dedicated hardware and software, marketing activities, professional e-sports teams and bets (Niculaescu et al., 2023). Adopting such perspective would suggest moving professional e-sports in the finance/gaming quadrant. At the same time, another relevant perspective could be that of e-sports fan who actively participate in building the culture (and the economy) of competitive gaming[15]. Such perspective, in a more general setting, is described in the Modding sub-paragraph.

Modding

Game modification, known as mods, are user-made content (lines of code, 3D models, textures, environments) developed and publicly shared online for their implementation of commercial games. There are numerous modding communities, which have grown around popular games, that are particularly active in producing high qualitative content for popular video games. The skills involved in mod development range from highly specialized informatics knowledge to advanced organizational skills. Scholars have researched the motivations that animate such intensive endeavor identifying social dynamics that leverages the gift economy, hacker ethic, and exposure to the game industry (Postigo, 2007). Other motivations can linked to the will to expand the game features, express personal creativity, and share the development process with other modders (Sotamaa, 2010)with special focus on the forms and consequences of collaboration between hobbyists. The case discussed in the article is the shooter-game Operation Flashpoint

12 One of the most important events in the competitive game is the World Cyber Games. The WCG is a multi-game e-sport competition, started in the year 2000, that is also known as e-sports Olympics. The first event was promoted by Samsung and the South Korean government through the Ministry of Culture and Tourism and the Ministry of Information and Communications. In 2000, the total prize pool was $200.000. Since then, the event has been hosted in the US (2004, 2007, 2010), Singapore (2005), Italy (2006), Germany (2008), China (2009, 2012, 2013, 2019), and remotely due to Covid-19 restriction in 2020. After a 6-year interruption between 2014 and 2018, in 2019 the WCG were held in Xi'an, China, with a total prize pool of $612.000.

13 In 2020, the Dundee (Scotland) city council announced the plan to build a 4.000 seats capacity e-sport arena in partnership with Northen Lights Arean Eurpe Limited company on the city waterfront (https://www.digitaldundee.com/news/esports-arena-planned-dundee-waterfront). However, in an updated plan the initial capacity has been reduced to approximately 1.000 seats (https://www.scottishconstructionnow.com/articles/capacity-reduced-at-proposed-dundee-esports-arena)

14 During the pandemic crisis, both Formula 1 and NASCAR used virtual sim-racing to continue their competitions on live streaming platforms. The last race of the NASCAR competition was held in the virtual setting of iRacing, a realistic racing simulator, and it was the set of a series of intentionally provoked car crashes. For an in-depth analysis of this phenomeno, see Ruffino (2021b).

15 For the relationships between competitive sim-racing and its fanbase, see Scacchi (2018).

(OFP. The world famous fist-person-shooter Counter-Strike (Valve Corporation, 2000) was originally developed by Minh Le and Jess Cliffe in 1999 as a mod of the game Half-Life (Valve Corporation, 1998).

Copyright issues constitute a problematic relationship between the creative practices of the modding communities and game development and publishing companies (Kow & Nardi, 2010). Some commercial games have gained popularity and earned profits also because of their active and prolific modding community, although there was not a formal recognition of modders activity. Analyzing the modding community of The Elder Scrolls V: Skyrim (Bethesda Game Studios, 2011), which, within the first months from the game release, had developed over 800 mods, Hong argues that despite having significantly contributed to the game's playability, the developer company was able to extract unpaid prosumer labor through the neoliberal subjectivation of players (Hong, 2013).

This limited overview is not exhaustive, and it does not include the intricate dynamics that intervene in the power relationships between the mod creator communities and game development companies. It also leaves out the creative potential and opportunities that modding practices can have in design-oriented processes outside of the gaming environment. This aspect will be further explored in Chapters 6 and 7. The position of modding in the diagram is therefore defined considering it as an exploratory and creative activity, that is however influenced by an unbalanced power relationship characterized by forms of unpaid labor extraction.

Chapter Bibliography

Abt, C. C. (1970). *Serious Games*. Viking Press.

Alvarez, J., Rampnoux, O., Jessel, J.-P., & Méthel, G. (2007). Serious Game: Just a question of posture? *Artificial & Ambient Intelligence, AISB (ASAMi) 2007*, *7*, 420–423.

Anderson, E. F., McLoughlin, L., Liarokapis, F., Peters, C., Petridis, P., & de Freitas, S. (2010). Developing serious games for cultural heritage: A state-of-the-art review. *Virtual Reality*, *14*(4), 255–275. https://doi.org/10.1007/s10055-010-0177-3

Axline, V. M. (1950). Play therapy experiences as described by child participants. *Journal of Consulting Psychology*, *14*(1), 53–63. https://doi.org/10.1037/h0056179

Barr, P. (2007). *Video Game Values: Play as Human-Computer Interaction* [Doctoral Disseration, Victoria University of Wellington]. https://openaccess.wgtn.ac.nz/articles/thesis/Video_Game_Values_Play_as_Human-Computer_Interaction/16934770

Baudrillard, J. (1995). *The Gulf War did not take place*. Indiana Univ. Press.

Baudrillard, J. (2022). *La società dei consumi*. Il Mulino. (Original work published 1970)

Best, S., & Kellner, D. (2001). *The postmodern adventure: Science, technology, and cultural studies at the Third Millennium* (1. publ). Routledge.

Bethesda Game Studios. (2011). *The Elder Scrolls V: Skyrim* [Microsoft Windows, Playstation 3, Xbox 360].

Bittanti, M. (2016). Introduzione. In M. Bittanti & E. Zilio (Eds.), *Oltre il gioco*. Edizioni Unicopli.

Bogost, I. (2007). *Persuasive games: The expressive power of videogames*. MIT Press.

Bogost, I. (2011a). *Persuasive Games: Exploitationware*. https://www.gamedeveloper.com/design/persuasive-games-exploitationware

Bogost, I. (2011b). *Persuasive Games: Exploitationware*. https://www.gamedeveloper.com/design/persuasive-games-exploitationware

Bogost, I. (2014). Why gamification is bullshit. In S. P. Walz & S. Deterding (Eds.), *The Gameful World* (pp. 65–80). The MIT Press; JSTOR. http://www.jstor.org/stable/j.ctt1287hcd.7

Boluk, S., & LeMieux, P. (2017). *Metagaming: Playing, competing, spectating, cheating, trading, making, and breaking videogames*. University of Minnesota Press. https://manifold.umn.edu/projects/metagaming

Braga, J. C., Oliveira, G. C. de, Wolf, P. J. W., Palludeto, A. W. A., & Deos, S. S. de. (2017). For a political economy of financialization: Theory and evidence. *Economia e Sociedade*, *26*, 829–856. https://doi.org/10.1590/1982-3533.2017v26n4art1

Brock, T. (2017). Roger Caillois and E-Sports: On the Problems of Treating Play as Work. *Games and Culture*, *12*. https://doi.org/10.1177/1555412016686878

Buist, K. (2021). What's Their Game? *Outland*. https://outland.art/blitmap-loot-ectogames/

Bulut, E. (2021). White Masculinity, Creative Desires, and Production Ideology in Video Game Development. *Games and Culture*, *16*(3), 329–341. https://doi.org/10.1177/1555412020939873

Caillois, R. (2001). *Man, play, and games* (M. Barash, Trans.). University of Illinois Press. (Original work published 1958)

Castells, M., & Himanen, P. (2002). *The Information society and the welfare state. The Finnish model*. Oxford University Press.

Castronova, E., & Knowles, I. (2015). *Modding board games into serious games: The case of Climate Policy*. *2*(3).

Celaschi, F. (2000). *Il design della forma merce*. Il Sole 24 Ore.

Cohen, D. (2007). *The Development Of Play* (0 ed.). Routledge. https://doi.org/10.4324/9780203634295

Consalvo, M. (2009). There is No Magic Circle. *Games and Culture*, *4*(4), 408–417. https://doi.org/10.1177/1555412009343575

Crogan, P. (2011). *Gameplay mode: War, simulation, and technoculture*. University of Minnesota Press.

de Freitas, S. (2018). Are Games Effective Learning Tools? A Review of Educational Games. *Journal of Educational Technology & Society*, *21*(2), 74–84.

De Lope, R. P., & Medina-Medina, N. (2017). A Comprehensive Taxonomy for Serious Games. *Journal of Educational Computing Research*, *55*(5), 629–672. https://doi.org/10.1177/0735633116681301

Debord, G. (2008). *La società dello spettacolo*. Baldini Castoldi Dalai. (Original work published 1967)

DeLanda, M. (2006). *A New Philosophy of Society: Assemblage Theory and Social Complexity*. Continuum. https://doi.org/10.5040/9781350096769

Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: Defining 'gamification'. *Proceedings of the 15th International Academic MindTrek Conference on Envisioning Future Media Environments - MindTrek '11*, 9–15.

Djaouti, D., Alvarez, J., & Jessel, J.-P. (2011). Classifying Serious Games: The G/P/S model. In P. Felicia (Ed.), *Handbook of Research on Improving Learning and Motivation through Educational Games: Multidisciplinary Approaches*. IGI Global. https://doi.org/10.4018/978-1-60960-495-0

Djaouti, D., Alvarez, J., Jessel, J.-P., & Rampnoux, O. (2011). Origins of Serious Games. In M. Ma, A. Oikonomou, & L. C. Jain (Eds.), *Serious Games and Edutainment Applications* (pp. 25–43). Springer London. https://doi.org/10.1007/978-1-4471-2161-9_3

Dyer-Witheford, N., & De Peuter, G. (2009). *Games of empire: Global capitalism and video games*. University of Minnesota Press.

Fassone, R. (2020). Una presistoria del videogioco italiano. In *Il videogioco in Italia: Storie, rappresentazioni, contesti*. Mimesis.

Fisher, M. (with Mattioli, V.). (2018). *Realismo capitalista*. NERO. (Original work published 2009)

Floridi, L. (2014). *The Fourth Revolution. How the Infosphere is Reshaping Human Reality*. Oxford University Press.

Fuchs, C. (2014). *Digital labour and Karl Marx*. Routledge.

Fullerton, T. (2024). *Game Design Workshop: A Playcentric Approach to Creating Innovative Games* (5th ed.). A K Peters/CRC Press. 10.1201/9781003460268 (Original work published 2004)

Futurlab. (2022). *PowerWash Simulator* [Computer software].

Gaver, W. (2002). Designing for Homo Ludens. *I3 Magazine*, *12*, 9–11.

GIANTS Software. (2008–2023). *Farming Simulator* [Computer software].

Goggin, J. (2012). Regulating (Virtual) Subjects: Finance, entertainment and games. *Journal of Cultural Economy*, *5*(4), 441–456. https://doi.org/10.1080/17530350.2012.702121

Graafland, M., Schraagen, J. M., & Schijven, M. P. (2012). Systematic review of serious games for medical education and surgical skills training. *British Journal of Surgery*, *99*(10), 1322–1330. https://doi.org/10.1002/bjs.8819

Hammar, E. L., De Wildt, L., Mukherjee, S., & Pelletier, C. (2021). Politics of Production: Videogames 10 years after *Games of Empire*. *Games and Culture*, *16*(3), 287–293. https://doi.org/10.1177/1555412020954996

Hardt, M., & Negri, A. (2000). *Empire* (1. Harvard Univ. Press paperback ed., [Nachdr.]). Harvard Univ. Press.

Hodent, C. (2018). *The gamer's brain: How neuroscience and UX can impact video game design*. CRC Press, Taylor & Francis Group.

Hon, A. (2022). *You've Been Played. How Corporations, Governments, and Schools Use Games to Control Us All*. Basic Books.

Hong, R. (2013). Game Modding, Prosumerism and Neoliberal Labor Practices. *International Journal of Communication*, *7*, Article 0.

Huizinga, J. (2002). *Homo ludens*. Einaudi. (Original work published 1939)

Ingold, T. (2021). *Correspondences*. Polity.

Jagoda, P. (2020a). *Experimental Games: Critique, Play, and Design in the Age of Gamification*. University of Chicago Press. https://doi.org/10.7208/chicago/9780226630038.001.0001

Jagoda, P. (2020b). *Experimental Games. Critique, Play, and Design in the Age of Gamification*. The University of Chicago Press.

Joseph, D. (2013). The Toronto Indies: Some Assemblage Required. *Loading... The Journal of the Canadian Game Studies Association*, *7*(11), 92–105.

Joseph, D. (2021). *Distributing productive play: A materialist analysis of Steam* [Thesis, Toronto Metropolitan University]. https://doi.org/10.32920/ryerson.14654079.v1

Juul, J. (2011, February 10). *The Dangers of Games in the Workplace – The Ludologist*. https://www.jesperjuul.net/ludologist/2011/02/10/the-danger-of-games-in-the-workplace/

Kow, Y. M., & Nardi, B. (2010). Who owns the mods? *First Monday*, *15*(5). https://doi.org/10.5210/fm.v15i5.2971

Kunzelman, C. (2022). *The World Is Born From Zero: Understanding Speculation and Video Games*. De Gruyter. https://doi.org/10.1515/9783110719451

Laamarti, F., Eid, M., & El Saddik, A. (2014). An Overview of Serious Games. *International Journal of Computer Games Technology*, *2014*. https://doi.org/10.1155/2014/358152

Lazzarato, M. (1996). Immaterial Labor. In P. Virno & M. Hardt (Eds.), *Radical thought in Italy: A potential politics* (Nachdr., pp. 133–147). Univ. of Minnesota Press.

Lehdonvirta, V. (2012). *A History of the Digitalization of Consumer Culture: From Amazon Through Pirate Bay to Farmville* (SSRN Scholarly Paper No. ID 2501350). Social Science Research Network. https://papers.ssrn.com/abstract=2501350

Lehdonvirta, V., & Castronova, E. (2014). *Virtual economies: Design and analysis*. MIT Press.

Lombard, M., & Bolmarcich, T. (1997). At the Heart of It All: The Concept of Presence. *Journal of Computer-Mediated Communication*, *3*. https://doi.org/10.1111/j.1083-6101.1997.tb00072.x

Lugo, J., Sampson, T., & Lossada, M. (2002). Latin America's New Cultural Industries Still Play Old Games. From the Banana Republic to Donkey Kong. *Game Studies*, *2*(2). https://www.gamestudies.org/0202/lugo/

Lugones, M. (1987). Playfulness, "World"-Travelling, and Loving Perception. *Hypatia*, *2*(2), 3–19. https://doi.org/10.1111/j.1527-2001.1987.tb01062.x

Lupton, D. (2016). *The quantified self: A sociology of self-tracking*. Polity.

Malazita, J. (2024). *Enacting platforms: Feminist technoscience and the Unreal Engine*. The MIT Press.

Marsh, T. (2011). Serious games continuum: Between games for purpose and experiential environments for purpose. *Entertainment Computing*, *2*(2), 61–68. https://doi.org/10.1016/j.entcom.2010.12.004

Martinelli, J. (2018). The Challenges of Implementing a Governing Body for Regulating ESports. *University of Miami International and Comparative Law Review*, *26*(2), 499–524.

McGonigal, J. (2011). *Reality Is Broken: Why Games Make us Better and How they Can Change the World*. Penguin.

Mejeur, C., Butt, M.-A. R., & Cole, A. (2021). Feminist and Furious: Diversity Work(ers) Against Game Studies of Empire! *Games and Culture*, *16*(3), 342–356. https://doi.org/10.1177/1555412020963833

Michael, D., & Chen, S. (2006). *Serious games: Games that educate, train and inform*. Thomson Course Technology.

Microsoft. (1982–2020). *Microsoft Flight Simulator* [Computer software].

Microsoft Flight Simulator: The Future of Game Development. (2021). Microsoft Game Dev. https://developer.microsoft.com/en-us/games/articles/2021/07/microsoft-flight-simulator-the-future-of-game-development/

Montfort, N., & Bogost, I. (2009). *Racing the beam: The Atari Video computer system*. MIT Press.

Mortara, M., Catalano, C. E., Bellotti, F., Fiucci, G., Houry-Panchetti, M., & Petridis, P. (2014). Learning cultural heritage by serious games. *Journal of Cultural Heritage*, *15*(3), 318–325. https://doi.org/10.1016/j.culher.2013.04.004

Mosco, V. (2009). *The political economy of communication* (2. ed., reprinted). SAGE Publ. (Original work published 1996)

Moulier Boutang, Y. (2011). *Cognitive capitalism*. Polity Press.

Nguyen, C. T. (2020). *Games: Agency As Art* (1st ed.). Oxford University PressNew York. https://doi.org/10.1093/oso/9780190052089.001.0001

Niculaescu, C.-E., Sangiorgi, I., & Bell, A. R. (2023). Venture capital financing in the eSports industry. *Research in International Business and Finance*, *65*, 101951. https://doi.org/10.1016/j.ribaf.2023.101951

Pope, L. (2013). *Paper, Please* [Windows, Mac OS, Linux, iOS, PlayStation Vita, Android]. 3909 LLC.

Postigo, H. (2007). Of Mods and Modders. *Games and Culture*, *2*, 300–313. https://doi.org/10.1177/1555412007307955

Raessens, J. (2012). *Homo Ludens 2.0: The Ludic Turn in Media Theory*. Utrecht University.

Rifkin, J. (2001). *The age of access: The new culture of hypercapitalism, where all of life is a paid-for experience* (1.

paperback ed). Jeremy P. Tarcher/Putnam.

Rogers, C. (1951). *Client centered therapy: Its current practice, implications and theory*. ICON Group International.

Ruffino, P. (Ed.). (2021a). *Independent videogames: Cultures, networks, techniques and politics*. Routledge, Taylor & Francis Group.

Ruffino, P. (2021b). La mossa di Pagenaud: eSports tra postumanesimo e convergenze tecnologiche, economiche, culturali. *Eracle Journal of Sport and Social Sciences*, *4*(1), Article 1.

Ruffino, P. (2022). Seeking Deep Relations in a Precarious Industry: Addressing Mental Health through Independent Videogame Development. *Television & New Media*, *23*(7), 761–776. https://doi.org/10.1177/15274764211025623

Sawyer, B. (2007). *The 'Serious Games' Landscape*. Instructional & Research Technology Symposium for Arts, Humanities and Social Science, Camden, USA. https://slideplayer.com/slide/5179634/

Sawyer, B., & Rejeski, D. (2002). *Serious games: Improving public policy through game-based learning and simulation*. Woodrow WilsonInternational Center for Scholars.

Sawyer, B., & Smith, P. (2008). Serious games taxonomy. *Paper Presented at the Serious Games Summit at the Game Developers Conference, San Francisco, USA*, 23–27.

Scacchi, W. (2018). Autonomous eMotorsports racing games: Emerging practices as speculative fictions. *Journal of Gaming & Virtual Worlds*, *10*, 261–285. https://doi.org/10.1386/jgvw.10.3.261_1

Scacchi, W. (2021). Interactive Learning Environments for Motorsports Interactive Racing. In A. Hui & C. Wagner (Eds.), *Creative and Collaborative Learning through Immersion: Interdisciplinary and International Perspectives* (pp. 201–232). Springer International Publishing. https://doi.org/10.1007/978-3-030-72216-6_13

Schmidt, R., Emmerich, K., & Schmidt, B. (2015). Applied Games – In Search of a New Definition. In K. Chorianopoulos, M. Divitini, J. Baalsrud Hauge, L. Jaccheri, & R. Malaka (Eds.), *Entertainment Computing—ICEC 2015* (Vol. 9353, pp. 100–111). Springer International Publishing. https://doi.org/10.1007/978-3-319-24589-8_8

SCS Software. (2008). *Euro Truck Simulator* [Computer software].

Sicart, M. (2019). Paper, Please. Ethics. In M. T. Payne & N. Huntemann (Eds.), *How to play video games*. New York University Press.

Sicart, M. (2021). Playful Capitalism, or Play as an Instrument of Capital. *Contracampo – Brazilian Journal of Communication*, *40*(2).

Sicart, M. (2023). *Playing software: Homo ludens in computational culture*. The MIT Press.

Sotamaa, O. (2010). When the Game Is Not Enough: Motivations and Practices Among Computer Game Modding Culture. *Games and Culture*, *5*(3), 239–255. https://doi.org/10.1177/1555412009359765

Stenros, J. (2012). In Defence of a Magic Circle: The Social and Mental Boundaries of Play. *DiGRA Nordic '12: Proceedings of 2012 International DiGRA Nordic Conference*, *10*.

Suits, B. (2005). *The grasshopper: Games, life and utopia*. Broadview Press. (Original work published 1978)

Sukeban Games. (2016). *VA-11 Hall-A Cyberpunk Bartender Action* [Computer software].

Sutton-Smith, B. (1997). *The ambiguity of play* (2. printing, 1. Harvard Univ. Press paperback ed). Harvard Univ. Press.

Svelch, J. (2023). *Gaming the Iron Curtain: How teenagers and amateurs in communist czechoslovakia claimed... the medium of computer games*. MIT PRESS.

Taylor, T. L. (2012). *Raising the Stakes: E-Sports and the Professionalization of Computer Gaming*. The MIT Press. https://doi.org/10.7551/mitpress/8624.001.0001

U.S. Army. (2002). *America's Army* [Computer software].

Valve Corporation. (1998). *Half-Life* (Version Microsoft Windows) [Computer software].

Valve Corporation. (2000). *Counter-Strike* (Version Microsoft Windows) [Computer software].

Virno, P., & Hardt, M. (Eds.). (2010). *Radical thought in Italy: A potential politics* (Nachdr.). Univ. of Minnesota Press.

Von Ahn, L., & Dabbish, L. (2008). Designing games with a purpose. *Communications of the ACM*, *51*(8), 58–67. https://doi.org/10.1145/1378704.1378719

Walz, S. P., & Deterding, S. (Eds.). (2014). *The gameful world: Approaches, issues, applications*. MIT Press.

Wang, R., DeMaria, S. J., Goldberg, A., & Katz, D. (2016). A Systematic Review of Serious Games in Training Health Care Professionals. *Simulation in Healthcare*, *11*(1), 41. https://doi.org/10.1097/SIH.0000000000000118

Wilkinson, P. (2016). A Brief History of Serious Games. In R. Dörner, S. Göbel, M. Kickmeier-Rust, M. Masuch, & K. Zweig (Eds.), *Entertainment Computing and Serious Games* (Vol. 9970, pp. 17–41). Springer International Publishing. https://doi.org/10.1007/978-3-319-46152-6_2

Williams, I. (2021). *Rise of the Simulations: Why We Play At Hard Work*. Paste Magazine. https://www.pastemagazine.com/games/simulation-games/rise-of-the-simulations-why-we-play-at-hard-work-1

Williams-Bell, F. M., Kapralos, B., Hogue, A., Murphy, B. M., & Weckman, E. J. (2015). Using Serious Games and Virtual Simulation for Training in the Fire Service: A Review. *Fire Technology*, 51(3), 553–584. https://doi.org/10.1007/s10694-014-0398-1

Woodcock, J. (2019). *Marx at the arcade. Consoles, Controllers, and Class Struggle*. Haymarket Books.

Zeilinger, M. (2024). Financialized Play on the Blockchain. *Outland.Art.* https://outland.art/financialized-play-on-the-blockchain/

Zyda, M. (2005). From visual simulation to virtual reality to games. *Computer*, 38(9), 25–32. https://doi.org/10.1109/MC.2005.297

Zyda, M., Hiles, J., Mayberry, A., Wardynski, C., Capps, M., Osborn, B., Shilling, R., Robaszewski, M., & Davis, M. (2003). Entertainment R&D for Defense. *IEEE Computer Graphics and Applications*, 23, 28–36. https://doi.org/10.1109/MCG.2003.1159611

5. A Map of Video Games in Technoculture: Exploring Video Games as Technocultural Artifacts

5.1. Introduction

This chapter aims to map and present the artistic practices and expressive forms that situate video games as the elective medium of contemporary technoculture. The research shows a large variety and heterogeneity of creative, critical, and artistic interventions around the video game medium. For the scope of this thesis, it emerges the need for a systematization that is functional to building both interpretative and applicative tools. Therefore, the objectives of this chapter are two: i) provide an overview of the relevant trajectories that artists and creative practitioners are exploring through the medium-specific affordances and the networked nature of video games; ii) identify clusters of practices that are emerging from the artistic and creative use of the game medium.

After describing the adopted methodology, in §5.3, I frame the meaning of technoculture in the context of analysis. In §5.4, I situate video games in the cultural and creative industries, briefly describing how they emerged as a recognized and institutionalized cultural form. Section 5.5 presents the results of the literature and case study review that led to the definitions of the Clusters of Practice and Creative Strategies. In conclusion, the last two sections offer a focus on two of these practices.

5.2. Methodology and limits

The research limits are defined by analyzing artistic practices characterized by their distinctive use of the video game medium. I situate these practices into the socio-cultural concept of technoculture.

I built the review process presented in section 5.5 from cross-referencing literature and case studies. Without the intent to provide a comprehensive and exhaustive collection of references and case studies, data collection has been done extensively during the whole research period utilizing both direct and indirect sources. I use this schematic approach to present the results to systematize a portion of this growing body of work and provide readers with a synthetic overview of this relevant phenomenon inside the analysis context. Subsequently, I use these results to develop the arguments of the following chapters.

5.3. Defying technoculture

> "During the mechanical ages we had extended our bodies in space. Today, after more than a century of electric technology, we have extended our central nervous system itself in a global embrace, abolishing both space and time as far as our planet is concerned." (McLuhan 1994, 3)

The matter of the relationships between culture and technology is broad and has been explored from different perspecti-

ves, both philosophical and artistic. It concerns both cognitive aspects (Hayles 1993, 2012) and the human body's physicality (Haraway 1995; Stiegler 1998). It problematizes the concept of reality itself (Baudrillard 1994). It would not be reasonable, within the limits of a paragraph, to provide a comprehensive review of numerous contributions to the subject, even restricting it to the problematic field of this chapter. Therefore, in the following paragraph, I introduce the critical position that facilitated me navigate the theoretical framework that situates video games in technoculture.

In writing this chapter, the term technoculture has been adopted to synthetically describe today's cultural environment in which digital technologies mediate the production, distribution, and fruition of contemporary and past cultural and expressive forms. The relationships between technology and culture translate in "patterns of social life, economic structures, politics, art, literature, and popular culture" (Shaw 2008, 4). Such patterns traverse and manifest in the video game medium according to characteristics affordances, expressive forms, and social-political bonds.

The term technoculture connects with other definitions, such as cyberculture, and the literary genre of science-fiction and cyberpunk. Indeed, Science fiction plays a significant role in shaping people's opinions about new and emerging technologies and their impact on social, political and economic dynamics. Isaac Asimov, considered one of the seminal authors of the genre, considers science fiction novels a form of response to the transformations happening in technology and society (Asimov, 1982). From a critical design point of view, the analysis of future-oriented narrative artifacts offers the opportunity to reflect on emerging attitudes toward technological and cultural transformations. Science fiction, through its narrative forms, solicits readers, viewers, and players'[1] imagination and critical reasoning about their future and, more urgently, about their present condition: "Science fiction is never really about the future but it makes use of the future to extrapolate from the cultural conditions of the author's time and place" (Shaw 2008, 2).

Despite the imaginative power of science fiction, making sense of contemporary transformation is a complex endeavor that concerns individuals, organizations, and governments. The speed of transformations in the social, cultural, and ecological domains influence and are influenced by technological advancements. In the opening chapter of *Game Cultures. Computer Games as New Media* (Dovey and Kennedy 2006), Jon Dovey and Hele W. Kennedy discuss two opposite interpretative models of the relationship between technology and society. The first is built on the idea that society shapes technological development (Williams 2003), and the second is that technology influences society (McLuhan 1994). As Dovey and Kennedy argue, new-media studies address this issue through the idea that the social and the technological systems, rather than being one dependent on the other, are intertwined through feedback loops like those of cybernetic systems. The concept of a cybernetic loop of influences between technology and society invites to reflect on the designers' contribution in the changing domain of human-computer interaction and, at the same time, to analyze how designers' practice adapts and evolves under the influence of the technological environment.

In this context, interactive virtual worlds are often considered the key cultural form that succeeded to twentieth-century cinema in contemporary media landscape (Manovich 2001, 89). Vir-

1 The peculiarity of science fiction video games, compared to other game genres and other mediums, has been observed in their capability to "convey a more active sense of futurity" (Frelik, 2014, p. 230). Moreover, as a medium, games reach a vast and diverse audience, making the ideas and concepts of science fiction more accessible. Frelik identifies four intersections between the medium of video games and the mode of science fiction: video games "as narratives of space [...]"; "as integral elements of distributed narratives spanning multiple media and forms"; "as instanced of visual science fictions invested in the pictorial portrayal of futurity"; and "as performative simulation, conveying a sense of malleability of the future" (Frelik, 2014, p. 230).

2 On the topic see: Art Form for the Digital Age (Jenkis, 2001); Why Game Studies Now? Video Games: A New Art Form (Gee, 2006), The Art of Videogames (Tavinor, 2009). For a curated selection of Game Art example see: (Bittanti, 2009) and the related website: https://www.gamescenes.org/about-1.html

tual worlds offer a space in which "culture naturalizes the ways in which we think and play with technology" (Schrank 2014, 4). As I have discussed in the previous chapter (cf. Chap.3), video games and video game technologies developed from specialized technical and military environments. However, they managed to emerge as a creative media capable of networking across different cultural and social domains. As of today, that of video games is one of the world's biggest industries (cf. Ch.3), led by multinational tech corporations. At the same time, video games have become an expressive medium for independent artists and a platform for political contestation. The rest of the chapter discusses the emergence of video games as a recognized cultural form, as well as the practices and strategies that artists have developed to creatively engage with the video game medium.

5.4. The Emergence of Video Games as a Cultural Form

The scope of this chapter is not arguing whether video games can be considered a form of art[2]. Neither is that to prove that video games should not be treated as a corrupting form of entertainment for teenagers. I would argue that, as of today, the former theoretical debate, despite being intellectually engaging, exceeds the scope of this thesis and can be taken as give. Video games can be considered as artistic expression. Instead, I am situating video games in technoculture through some relevant examples of the use of the medium in creative and expressive practices. On the other hand, the latter argument, should be problematized within a more articulated framing (cf. Ch.4), not limited to the topic of violence[3]. Therefore, the paragraph briefly highlights the characteristics that situate video games within the creative cultural industries, reporting some of the relevant initiatives, institutional activities, and artistic and theoretical contributions that are representative of the contemporary use of the video game medium in expressive and artistic practices.

The term cultural industry was coined by Frankfurt School's philosophers, Theodor Adorno and Max Horkheimer, as a critique of popular culture produced by the mass communication media of the time (Horkheimer and Adorno 2010). According to Adorno and Horkheimer, the entertainment provided by television and radio programs relegates the population to passive spectators of standardized commodities. The production of entertainment products is driven by the dominant ideology of economic interests. During the second half of the twentieth century, cultural industries rapidly grew thanks to the convergence of several factors that included the wealth and literacy increase in the global North, more leisure time, the commercial diffusion of televisions and personal computers (Hesmondhalgh 2013). Over the years, the term *cultural* industry has often been used interchangeably with *creative* industry. The difference between the two has been discussed by Cunningham, who argued that the development of digital technology and the opportunities of the "new economy" defined an "historical shift from subsidized 'public arts' and broadcast era media, towards new and broader applications of creativity" (Cunningham 2002, 6).

Contemporary cultural and creative industries are profoundly influenced by new hardware and software technologies such as social networks, extended reality, and streaming services, to name a few. Video games are a big part of the contemporary cultural industry production (cf. Ch.3). According to Kerr (2006), there are three significant aspects that have been identified by a political economy that characterize cultural industries, and that can be recognized in digital game production as well (Kerr

3 Playing violent video games makes you a violent person? This debate turns periodically relevant in conjunctions with the release of video games with explicit violent content, and when news reports associations between violent incidents and video games. For example, after the mass shooting at Columbine High School on April 20th 1999 in which 12 students and a teacher were killed by two older students, the public debate was largely commenting their passion for the first-person-shooter game Doom (id Software 1993) and the physiological influences it presumably had (Campbell 2018). Although it has been observed an increase of aggressive behaviors in child in a short period of time after playing a video game with violent contents (Bensley and Van Eenwyk 2001), no evidence have been found that link violent video game publishing and crime raise (Suziedelyte 2021). On the other side, video game publisher often leverages on media clamor to gain exposure (Kohler 2012).

2006, 45). First is the high economic risk involved in cultural production. As previously discussed, digital game production requires significant upfront investments. They can range from technology acquisition, specialized labor costs, long production timelines, and intellectual property licensing. Such investments are generally self-funded, in the case of smaller independent productions, financed by publishers. The difficulty developers face in accessing public and private financing has already been discussed. One of the reasons for the lack of financing opportunity is connected to the highly saturated market of digital games. According to *SteamDB.info*, a website that collects data from Steam (the largest digital distribution platform for computer games), over 14.400 games have been published for sale[4] in 2023. Although the number of players is growing, the digital game market remains highly competitive. The second aspect that characterizes cultural industries are the lower reproduction costs compared to that of production. This is generally true for digital games. Thanks to digital distribution there is no longer needed to produce physical copies. Those are eventually only manufactured in limited edition for collectors for successful products and address different market logics dependent to scarcity and uniqueness. However, even if lower, compared to physical distribution, cost of platform distribution still accounts for a noticeable part of the whole production costs. Online game and game as a service monetization strategy, however, generally require ongoing investment for updates and maintenance. Porting on other gaming platforms and the development of new downloadable contents (DCL), can be done with low expenses and provide an opportunity to extract additional values from the original investment. The third aspect that is typical of cultural industry is that its products and services have a semi-public nature. As Kerr (2006) pointed out the need to protect authors' and producers' return on investment led to the development of laws on intellectual property rights. As discussed in Chapter 3, piracy largely affected the video game industry to the extent that in the Italian context it assumed an identarian industrial and cultural trait (Fassone 2018; Tosoni, Tarantino, and Pachetti 2020).

The interest in cultural and creative industries has grown both in academia and among policy makers[5]. In the thesis, I review European and Italian policies on video games within the context of creative industries (cf. §.3.5, §3.6, §APX.1.3) The interest in video games as a cultural artifact, however, is demonstrated by the growing number of initiatives in which the game medium is in dialogue with other established cultural modes in a process of representation, critique, and production of the contemporary technoculture. For Henry Jenkins[6], games

> "represent a new lively art, one as appropriate for the digital age as those earlier media were for the machine age. They open up new aesthetic experiences and transform the computer screen into a realm of experimentation and innovation that is broadly accessible." (Jenkins 2006, 24)

At the same time, however, Jenkins is concerned with the consideration that art curators have in regard to the legitimacy of the game medium to be an artistic medium in its own right: "Calling videogames art matters because it helps expand our notion of art and not because it allows curators to colonize some new space" (Jenkins 2005). The attitude that Jenkins critiques is that of art curators who look at the use of video games in art as an extravagant detouring from proper artistic practice. Despite lazy or unmindful curation and buzzworthy attempts, however, it is possible to observe the emergence of Art Games and, more

4 https://steamdb.info/stats/releases/, retrieved March 23, 2024

5 For a review and critique of the use of the different notions of creative and cultural industries in policy making see (Galloway and Dunlop 2007) and (Hesmondhalgh and Pratt 2005). Cultural and Creative industries in European policies: https://single-market-economy.ec.europa.eu/sectors/cultural-and-creative-industries_en

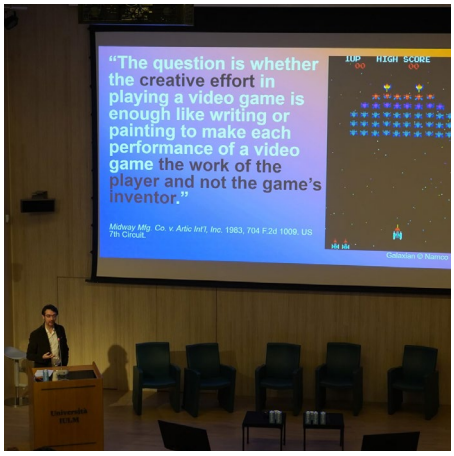
6 Jenkins uses Gilbert Seldes' argument that American contribution to art was through – at the time we he was writing – emerging and popular expressive forms such as jazz music, musical, cinema, comics, radio. According to Seldes, these forms of democratic art were capturing the dynamism and vitality of contemporary life. Cf. (Seldes 1924)

generally, of creative use of the video games that engage with expressive possibility of the game medium. Such growing interest, and evolution in terms of maturity of the medium and the artworld is documented by numerous artistic and theoretical contributions. Moreover, both novel and established cultural institutions show greater awareness of the role of games and game art in shaping today's cultural panorama. The list that follows presents a selection of initiatives that contributed to institutionalize game artistic culture, several of which I had the opportunity to engage with directly.

Gamescenes.org [Online Platform]

The website, curated by Matteo Bittanti, was released in 2006 together the publication of Gamescenes. Art in the Age of Videogames (Bittanti, 2009) and the exhibition GameScapes. Videogame Landscapes hosted at the Civic Galley in Monza, Italy. It provides a platform for documenting the new expressive form that emerges from the symbiotic relationship between video games and the traditional art world. The aim is to challenge traditional understanding of art, exploring creativity in the digital age.

https://www.gamescenes.org/gamescapes.html



Milan Machinima Festival [Festival]

Since 2018, the festival showcases machinima and directors who use game and game-tech to make short and feature-length movies. Started by Matteo Bittanti, the festival is organized in collaboration with IULM University in Milan. Since 2020, the festival is complemented by VRAL digital platform, where is possible to stream a curated machinima selection. In 2024, MMF was held in conjunction with the First Italian Conference on In-Game Photography.

https://milanmachinimafestival.org

https://milanmachinimafestival.org/vral-about

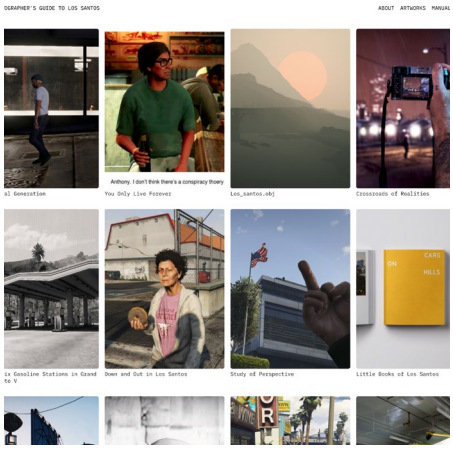
https://milanmachinimafestival.org/fotoludica

GAME - FOTO / INDUSTRIA 2023 [Art biennale]

The 2023 edition of the photographic biennale was dedicated to the industry of game. The exhibitions explored the production of ludic artifacts, from children's toys to amusement park and video game production. In particular, the exhibition Automated Photography was based on a search project developed during the Master of Photography at ECAL/University of Art and Design Lausanne. It explored the automated production of digital images by machines form machines.

https://www.fotoindustria.it

https://www.fotoindustria.it/en/exhibitions/automated-photography/



The Photographer's Guide to Los Santos [Online Platform]

The platform goes along with the eponymous exhibition held at Fotofestival Lenzburg between May and June 2024. It is a curated collection of the most relevant artistic work made with the Grand Theft Auto game series. Also, it serves as a learning platform for in-game photography (cf. 4.8) and media art students.

https://gta5.photography/artworks

Game On: The History and Culture of Video Game [Exhibition]

Hosted between May and September 2002 at the Barbican Center in London, the exhibition drew the evolution of the game medium over the last forty years. The exhibition showcased 125 playable games. In 2010, the exhibition was later re-curated as Game On 2.0 and was exhibited in several location. In Italy, Game On 2.0 was displayed at Spazio Eventi Tirso in Rome between March 4th and June 6th, 2017.

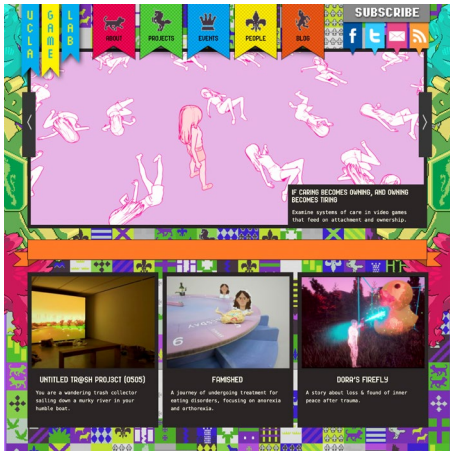
https://www.barbican.org.uk/whats-on/2002/event/game-on-the-history-and-culture-of-video-games#:~:text=The%20History%20and%20Culture%20of%20Video%20Games&text=Game%20On%20was%20the%20first,40%20years%20of%20gaming%20history

Small Wars and CD_ROMS [Exhibition]

Held at Dundee Contemporary Art between July and September 2016, the exhibition took place in coincidence with the first joint International Conference of the Digital Game Research Association (DiGRA) and the Foundation of Digital Games (FDG) at Abertay University. Curated by Prof. William Huber, the exhibition explored the cultural impact of computer games. It featured playable installations made by Eddo Stern and Theresa Duncan.

https://www.dca.org.uk/exhibition-archive/eddo-stern/

https://www.dca.org.uk/exhibition-archive/theresa-duncan/



UCLA Game Lab [University Lab]

Directed by artist Eddo Stern, the Lab conducts research on conceptual and experimental use of game to develop new modes of expression. Between 2011 and 2017 it organized the UCLA Game Art Festival which showcased a curated selection of experimental games and game-based art.

https://games.ucla.edu

5.5. Video Games in Contemporary Arts: Clusters of Practice and Creative Strategies

This paragraph reviews modalities and strategies used to creatively engage with the video game medium within artistic and creative practices. The discussion begins with the identification of three main categories that describe the relationship between video games and art. Drawing from Bittanti's introduction to *GameScene* (Bittanti 2009), such categories are: *Art Games*, *Game Art*, *Applied game art*. Subsequently, for each of these categories, I identify a cluster of practices that express similar artistic intents, formal qualities, type of resulting experience. The identified clusters are listed in Table 5.1 for *Art Games*, in Table 5.2 for *Game Art*, in Table 5.3 for *Applied game art*. In the table, I propose a working definition to both the categories and the clusters of practices. To complement the working definition, I provide theoretical or case studies references for each analyzed item. This classification is functional to the scope of this chapter, which is to frame video games inside the contemporary technocultural production. Some of the listed practices, in fact, will be analyzed and recategorized in the semi-systematic literature review presented in chapter 6. For the sake of brevity, reference to items that are analyzed in greater detail in other sections are redirected accordingly.

Table 5.1 – Art Games - Clusters of practices

Art Games		Video games that are specifically designed for the purposes of being experienced or considered artistic works by art critique (cf. Ch.6)	
		Working Definition	**References**
CLUSTER OF PRACTICES	**Artistic Gameplay**	Games that experiment game mechanics for an aesthetics experience of gameplay.	*Gameplay Aesthetics* - "that merger of interaction with the aesthetics (story, visuals, animation, music, sound, engagement, fun). It is in this 'artful' combination that we find the fundamental mechanics that drive gameplay" (Garvey, 2014)[19] *Gameplay Experimental* - Games uses "mechanics to make sensible the affective experimentation that gamers experience as subjects who simultaneously experiment and are experimented upon" (Jagoda, 2020, p. 125)
	Avant-Gard Games	Formal or political games that differ from commercial ones for challenging how players experience the medium itself, or socio-political issues through the medium.	Cf. Chapter 5
	Spatial Art Games	Games whose main aesthetic experience derives from the spatial exploration of their virtual environments and architectures.	"the new digital environments are characterized by their power to represent navigable space" (Murray, 1997/2016, p. 79). "When an environment is very deep and detailed, we feel as if we are enclosed by it and it has a special holding power over us as an alternate to the disordered actual world of everyday experience. This is true of noninteractive environments, but it is especially powerful in environments we can navigate through with freedom of action" (1997/2016, p. 91). "Perhaps, we should consider another starting point, viewing games as a spatial art with its roots in architecture, landscape painting, sculpture, gardening, or amusement park design". "Games have always been an art of contested spaces; computer and digital games have pushed that art to a new level of aesthetic accomplishment" (Squire & Jenkins, 2002). "Perhaps the best definition of architecture in digital games is that it is a digital capriccio (pl. capricci) that locates itself within a long-standing tradition of 'virtual' architecture created to amuse and enthral rather than to be actually built". (Aroni, 2022, p. 2)
	Experimental Art Game	Games that build their gameplay mechanics around the experience of an artistic vision.	"As opposed to the focus on "fun" that traditional game design uses as a benchmark, the learning-based goals set by "serious" games, or even the high-lvel experience goals set by our own playcentric method, we believe we are on a path to discovering how aesthetic goals and the "voice" of a particular artist may be integrated into a game design through a collaborative, iterative process" (Fullerton, 2009). The Night Journey, Bill Viola, 2007-2018, https://www.thenightjourney.com

Table 5.2 – Game Art - Clusters of practices

Game Art		Game Art is the use of video games or video game technology for the creation of artistic work which can be later experienced trough any kind of other medium, both digital and physical (cf. Ch. 6)	
		Working Definition	**References**
CLUSTER OF PRACTICES	**Machinima**	Audiovisual representation made using video games or video game engine, often in combination with video-editing software. Machinima can be fictional narratives, visual essay, documentaries.	cf. §5.8
	In-Game Photography	Photographic works made within video games or video game engines. In-game photos can be made with a variety of techniques, from virtual cameras to screen shooting.	cf. §5.7
	Performative Art	The use of video game or videogame technology to conduct and/or stage an artistic performance.[21]	*Desert Rain*, Blast Theory and Mixed Reality Lab, University of Nottingham, 1999 https://www.blasttheory.co.uk/projects/desert-rain/ *dead-in-iraq*, Joseph DeLappe, 2006-20 https://www.delappe.net/dead-in-iraq *The Salt Satyagraha Online: Gandhi's March to Dandi in Second Life*, Joseph DeLappe, 2008 https://www.delappe.net/gandhisecondlife
	Demoscene	Development of demo software or hacking projects that showcase advanced technical skills.	
	Interactive Art	Interactive artistic works that use game technologies to be experienced by the audience.	
	Glitch Art	Artistic works that engage with game software errors (glitches) for aesthetic purposes.	*Miracle*, Miltos Manetas, 1996
	Art Mods	Game modifications that use game software or hardware of artistic purposes.	"Artistic computer game modification involves the creative reuse of a pre-existing piece of computer game software and/or hardware for a specifically artistic outcome." (Cannon, 2007)
	Video Game Essay	Essays presented in a video format made using games or game technologies.	*Blindspot*, spekWork, 2021

Table 5.3 – Applied game art - Clusters of practices

Applied Game Art		Applied Game Art produce artistic works that are used as resources to produce video games. Video game production requires a large number of visuals[20] and sound assets. In large game studios, it is possible to find highly specialized professions that go under the definition of artist: art direction, environmental artists, character artist, concept artist, sound artist, technical artists.	
		Working Definition	**References**
CLUSTER OF PRACTICES	**Art Direction**	Supervision activity that direct the producion of a consistent and coherent creative production.	--
	Environmnetal Art	Production of visual assets and their assaemblage into indoor and outdoor game locations.	--
	Sound Art	Production of music and sound effects	--
	Character Art	Development of visual representations of game characters.	--
	Concept Art	Development of visuals for conveying ideas about the artistic style, mood, tone of a video game.	--
	Technical Art	Management of the technical aspect involved in asset production.	--
	Other applied game art are: animation, character rigging, 3D sculpting, texture art, narrative design, voice acting, visual effects art.		

After the definition of the cluster of practices, I identify the main creative strategies used by artists and creatives. According to the same methodology I adopted for the classification of the clusters of practices, I provide a working definition and list of supporting references to literature and case studies for each observed strategy (Table 5.4). Observing the items in Table 5.4, it is possible to observe how the identified creative strategies represent the conjunction nodes between the video game medium and other established cultural forms. For example, strategies of appropriation have been largely used by artists like Andy Warhol and Marcel Duchamp who, in their artistic works, have introduced mondain object and symbols from the worlds of commerce, production and branding. Duchamp introduced the concept of Ready-made to describe the practice of making artworks from the assemblage of mass-production objects. Avant-garde practices like that of subversion are routed in the cultural tradition of Situationist International (Fantacci 2023), the libertarian Marxist artistic and philosophical movement founded, among others, by Guy Debord in 1957. Re-mediation is a recursive phenomenon and practice that can be observed in the process of adoption and evolution of any new expressive medium.

Table 5.4 – Creative strategies

		Working Definition	References
CREATIVE STRATEGIES	**Re-mediation**	The incorporation of one or multiple media within a different one.	"the "content" of any medium is always another medium." (McLuhan, 1964/1994, p. 8) "the formal logic by which new media refashion prior media forms. Along with immediacy and hypermediacy, remediation is one of the three traits of our genealogy of new media." (Bolter & Grusin, 1999, p. 272) *hypermediacy* – "A style of visual representation whose goal is to remind the viewer of the medium. One of the two strategies of remediation; the other is (transparent) immediacy." (1999, p. 272) *Immediacy (or transparent immediacy)* – "A style of visual representation whose goal is to make the viewer forget the presence of the medium (canvas, photographic film, cinema, and so on) and believe that he is in the presence of the objects of representation." (1999, p. 272) "as one of the most popular representational modes of the new media, video games can be defined by their capacity for, and dependency on, remediation." (Corbett, 2009, p. 11) "if adaptation is typically concerned with the transposition of content across what we might think of as media "envelopes", remediation is concerned with the transposition and incorporation of one media "envelope" within another." (Corbett, 2009, p. 11)
	Re-functionalization	The use of an artifact or a technology for a different purpose originally conceived.	For a theoretical analysis of the re-functionalization of play spaces see *situationist play (Fantacci, 2023).*
	Appropriation	The introduction of alien cultural symbols or practices into new context.	"Reinventing a digital medium "ofte sn consists in the appropriation of technologies of delivery – such as video game platforms and in their conversion into technologies of cultural production" (Quaranta, 2009, p. 21). "For better or worse, most Game Art tends to be parasitic (...) as it appropriates and repurposes existing technology for its own goals. It also elevates that appropriation to the status of a radical gesture." (Bittanti, 2009, p. 10) For examples and discussion on artistic appropriation of video games see: (Pichlmair, 2006; Stalker, 2005)
	Subversion	A radical act that aims to alter the ordinary condition of a system.	"A subversion is an action, plan, or activity intended to undermine an institution, event, or object." (Flanagan, 2009/2013, p. 10) For Flanagan subversion represent a creative act rather than a destructive one, in continuity with Negri's use of the term (Hardt & Negri, 2000).
	Adaptation	The transfer from one medium, genre, narrative perspective or context to another.	"an announced and extensive transposition of a particular work or works. This "transcoding" can involve a shift of medium (a poem to a film) or genre (an epic to a novel), or a change of frame and therefore context" (Hutcheon & O'Flynn, 2013, p. 7) "In short, adaptation can be described as the following: • An acknowledged transposition of a recognizable other work or works • A creative and an interpretive act of appropriation/salvaging • An extended intertextual engagement with the adapted work" (2013, p. 8).

Figure 5.1 - Installation view *How to Win at Photography - Image-Making as Play*, Fotomuseum Winterthur © Fotomuseum Winterthur /Conradin Frei

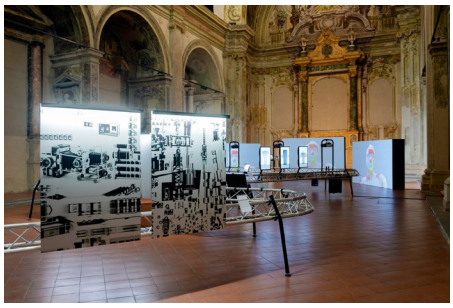


Figure 5.2 - Automated Photography, Fotoindustria 2023 Exposition in Bologna © Image ECAL/Taje Giotto Mahalia

However, it can be noted that these practices represent connecting bridges towards the Arts, but they are also shared by cultures of design. For example, the *appropriation* and *assemblage* of off-the-shelves products is strategy that has been extensively adopted in industrial design as well -for example, in the ready-made works of Achille and Pier Giacomo Castiglioni. The use of narrative media, such as movies and novels, in design fiction as a practice of *re-functionalization* of the medium. A growing number of technologies and tools that are used in product and service design were initially developed for other sectors, as for example that of entertainment. *Adapting* forms and geometries observed in the natural world is a defining strategy of biophilic design, and more generally, of extreme design. This observation allows to draw a network of creative strategies connecting video games, arts and design cultures that is further discussed and expanded in the next chapters.

5.6. A focus on In-Game Photography

There is a growing number of initiatives that contribute to the diffusion and institutionalization of in-game photography, because of its duality as an established informal practice inside game communities and as an evolving artistic practice. The creative strategies that are indeed explored through in-game photography, as it discussed in the following, are varied and address several photographic approaches to the virtual game world. For example, as one of the applicative case studies, I'll present an experimentation in which I develop a practical strategy for documenting virtual world using photogrammetry techniques (cf. Ch.8, APX.7)[7].

In 2015, Marco De Mutiis curated the open call *SITUATION #6: In-Game Outsiders* for the *Fotomuseum Winterthur*, Switzerland[8]. The call resulted in an online exhibition of screenshot and in-game photography and a panel discussion on photography and videogames. In 2021, the same gallery hosted the group exhibition *How to Win at Photography – Image-Making as Play* (Fig. 5.1), curated by Matteo Bittanti and Marco De Mutiis that explored the relationship between photography and play. In 2023, the sixth edition of the Biennale Fotoindustria[9], titled *Game. The Game Industry in Photography* presented the exhibition *Automated Photography* displaying the research project of the master's in photography at ECAL/University of Art and Design Lausanne (Fig. 5.2). The exhibition displayed works that explored the mechanism and the instruments of contemporary image production and the interplay between human and computational creativity. In the same year, the *PhMuseum*[10] organized an exhibition in Bologna with a curated selection of work on the topic of human-machine relationship. The in-game photographic work *West of Here*[11] by Leonardo Magrelli (2020-2021) and the machinima *Flyin' High*[12] by the *Cool Couple* (2021) were featured during the exhibiton.

With the growing attention of curators for in-game photography, it can be observed a similar growing interest for the relationship between image production, photography and games in academic research. In 2024, Matteo Bittanti and Marco De Mutiis curated *Fotoludica*, the first Italian conference on in-game photography[13], which explored both the emergence of in-game photography as an art form and the legal issues related to the reproduction of game content. In the curated book of essays *Screen Images. In-Game Photograph, Screenshot, Screencast* (Gerling, Möring, and De Mutiis 2023b) the contributors analyze the different forms of screen images in relation to the photographic medium and explore their significance as artistic and cultural

7 The experimental case study has been accepted as a short paper and will be presented at the 30th International Symposium on Electronic/ Emerging Art, ISEA2025 in Seoul, South Korea. http://isea2025.isea-international.org

8 https://www.fotomuseum.ch/en/situations-post/in-game-outsiders/

9 https://www.fotoindustria.it

10 https://phmuseum.com

11 https://phmuseumdays.it/2023/exhibitions/west-of-here

12 https://phmuseumdays.com/2023/exhibitions/flyin-high

13 https://milanmachinimafestival.org/fotoludica

practices. From the game studies perspective, scholars have discussed the photography in digital games in terms of remediation (Poremba 2007) and as evolution and development of an emerging photographic aesthetics in the post-digital era (Giddings 2013). A photographic practice that can be framed in what Barbara Grespi and Federica Villa define *postfotografico* (Grespi and Villa 2024). *Postfotografico* is the esthetic quality of contemporary photography, but it also encompasses the complex inter-medial context in which they are produced[14].

Discussing the relationship between in-game/virtual photography and traditional photography, artist Eron Rauch identifies four categories to which traditional photographic practices can be ascribed: *vernacular* (photos of everyday and mundane activities, family pictures), *artisan* (professionally made pictures, generally made for commercial purposes), *amateur* (photos taken by people for the love of photography itself), *art* (photography that enter and engage in the critical art discussion) (Rauch 2012). As argued by Rauch (2012), in-game photography has its own versions of these category, which overlap and combine with each other. Therefore, when analyzing in-game photography it is important to consider their specific context of production, use and their target audience. For example, as a *vernacular* activity, in-game photography is used as documentation of touristic travel of virtual worlds (Book 2003). Citing 1961 Roland Barthes' *Camera Lucida* (Barthes 2000), Poremba (2007) suggests how screenshots serve the same documenting purposes of physical world photography, by citing 1961 Roland Barthes' *Camera Lucida* (Barthes 2000) (in Poremba 2007).

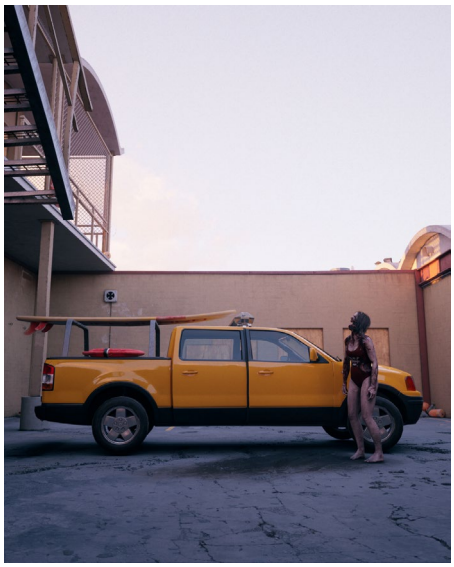


Figure 5.3 - Dead Island 2 (Dambuster Studios 2023) © Petri Levälahti. Retreived at https://www.berdu.org

In-game photography has evolved in a professional – *artisanal* – activity as well. For example, in-game photographers are being enrolled by game company to produce advertising materials. In this case they perform photography as artisans who use the in-game photographic medium as a commodity in the market system. Photographers like Duncan Harris and Petri Levälahti (whose website bio proudly states "Screenshot Capture Artist. Yes, it's a real job"[15]) produce advertising material for popular high-budget game productions (Fig. 5.3). Such images showcase game scenes from dramatic angles that highlight the game world, its atmospheres, and the technical and visual achievement of the graphic engine. The professionalization of this practice, so far considered relatively limited within gaming communities as a vernacular activity, concurs to the institutionalization process of in-game photography. On this aspect, it is worth recalling the overview that the Italian photographer Luigi Ghirri gave during his 1989-1990 lectures about the most common pathways that photographer generally undertook to enter the professional world of photography (Ghirri 2010). According to Ghirri (2010), until the late Eighties most people approached professional photography through studio and atelier internships. Photojournalism was another common pathway that, as well as Italian studio practice, suffered a form of isolation from the cultural context. Such isolation grew into a crisis with the diffusion of television and the availability of almost live documentation of news. A third, less common, path was that of author's photography. Amateurs usually take photos for the sake of it, often spending most of their free time and available economic resources in learning, acquiring equipment and actually taking photos. However, whether for the lack of professional opportunities or lack of a clear will of becoming a professional photographer, amateurship only occasionally turns into artisanal. Without photography schools, that in Italy only started appearing mid Seventies, according to Ghirri, professional photographer training has been profoundly "artisanal, rudimentary and archaic"

14 The concept of postfotografico is built on top of Rosalind Krauss's concept of photographic (Krauss 1985).

15 https://www.berdu.org/about, retrieved March 20, 2024.

(Ghirri, 2010, p. 15, Author's Translation (Italian to English). Associating the words "rudimentary" and "archaic", here Ghirri seems to convey to "artisanal" the meaning of improvised and chaotic. Such description clearly reflects into earlier, and even more contemporary, forms of in-game photography. In fact, vernacular, artisan, amateur and art photography are often the result of escamotages and workarounds adopted for the lack of proper in-game tools or consolidated practices. To date, if we exclude the already mentioned recent initiatives and few academic courses[16], the vibrant landscape of in-game photography appears to be nurtured, in a greater degree, by partitioners' ingenuity rather than formal and institutional training.

Although the current debate on in-game photography contributes to its definition as an autonomous practice respect to digital photography, or at least as a subcategory (Girina 2020), professional in-game photography suggests a medium-specific framing of the product photographer profession. Professional in-game photography has been compared to still photography in movie production (Sigl 2012) for the high-gloss look of commercial shots like those of Duncan Harris. However, I would argue that professional in-game photography shows a parallel with product photography. The commercial aim, in in-game photography, is to showcase the feature of upcoming videogames. For example, the model details, the texture quality and the realistic visual effects. Contemporary product photography is heavily digitally post-produced and it is increasingly substituted by computer generated images (CGI). If on one side, in-game photography proposes a form of simulacral representation of world without any reference to the real (Baudrillard 1994; Bittanti 2020), it also captures the actual commodity that players will consume. A paradigm of this opposite tension is how game commercials use "actual gameplay footage" as a feature to be advertised, whereases product photography often disclaims that "product images are for illustration purposes only".

Diverse strategies can be adopted or are architected by games to capture screen images. A first strategy is that of using a physical (digital or analog) camera to shoot what is being played on the screen. This method uses additional hardware to the one needed to run the game software and could be classified as an on screen image capture (Gerling, Möring, and De Mutiis 2023a). Photographing television and computer monitor screens is adopted both as creative strategy and as a mean for documenting a live performance. In fact, for live performances that involve screens or projections, most often the only documentation of the artistic work is represented by photographs or videos. The origin of screen photography can be traced back to its practical use as a documentation tool in technical and scientific application in substitution of more expansive supports and as a way to rapidly keep track of progresses (Gerling, Möring, and De Mutiis 2023a). On a practical level, screen photography involves the transposition of the materiality of the viewing device into the image layered with the light information coming from the display. The scene is acquired through the optics of the camera which additionally transforms the final image. The characteristic materiality of screen photography and the physical interaction between the environment, lights, frame rates, reflective surfaces, optics, film or sensors, camera parameters, imply the combination of numerous variables that concur to the final image. This aspect can introduce glitches, unexpected outcomes and can be used as an expressive paradigm. An example, that extends beyond video games photography but that is representative of the expressive potential of playing with the materiality of screen photography, is that of the Theaters series by Japanese

16 One example is the Master in Algorithmic and Networked Photography at ELISAVA. https://www.elisava.net/en/masters/master-in-cgi-photography/, retrieved March 21, 2024.

photographer Hiroshi Sugimoto. Sugimoto uses a 4x5 camera to expose a full-length movie in one single picture, resulting in a bright white screen lighting the theater architecture.

Considering methods that do not involve physical photographic equipment, Möring and De Mutiis identify four different types of in-game photography: simulated photography as core part of the gameplay, simulated photo mode that suspend gameplay condition, artistic screenshotting, and photo mod(ification)s (Möring and De Mutiis 2019).

One of the first popular video game that introduced a simulated camera as a central gameplay element is *Pokémon Snap* (HAL Laboratory 1999) originally published for *Nintendo 64*. The core mechanic involves the player using a simulated camera to collect Pokémon pictures following the assigned tasks. The photos are evaluated according to quantifiable parameters, such as subject framing, size, pose, and the player is given a score. It can be observed how such strict system of rules restrict players' freedom, imposing a visual regime to which players have to conform if they want to "win at photography" (De Mutiis 2023). Moreover, De Mutiis (2023) argues that photo games like *Pokémon Snap*, *Afrika* (Rhino Studios 2008) and Safari Guns (Infogrames Europe SA 1989) in which *Pokémon* are replaced by wild animals, and *Paparazzi* (HuneX 2005), in which the photographic subjects are sexualized female models, are representative of a monodirectional photographic practice which implies that the subject has no opportunity to resist player's actions and can only surrender. According to this reading, NPCs have no chance to escape the colonialist, neoliberal, sexist structure encoded in the game mechanics. Arguably, the players must also surrender to such systems if they want to win the game and survive the game over. The result is that players' survival is inevitably fated to propagate the intrinsic game values. Such argument, far for being only limited to photo games, can be extended to understand the concept of survival inside game world, and the strategies that can be adopted to transform survival in a critical tool capable to highlight the problematics of a socio-political and cultural system (Zeilinger 2019).

A more recent game, *Umurangi Generation* (Origame Digital 2020), proposes a critical exploration of a decadent neoliberal urban environment, transformed and consumed by climate change, political violence, colonialism and late capitalist economy. The game leverages on environmental storytelling and to photographic mechanic to encourage the players to navigate the world and creatively engage with it through photography. Players are given initial directions on the objects and situation to be photographed and on occasional requirement, such as camera lenses to use, but they have creative freedom on image composition and editing.

Games can integrate simulated photography in gameplay as complementary mechanics. In the Italian production *Martha is Dead* (LKA 2022), photos play a diegetic key role in the story progression. During the game, players are introduced to a simplified version of the development process of analog photos that are gamified though simple timed mechanics. Exploring the game world, player can find different lens filters and films that can be used both to achieve game objectives and to experiment with creative compositions. Beside the game section that require photography, the camera can be used to take and develop pictures freely, to explore and to document the Tuscan countryside during Nazi occupation.

A growing number of video games, regardless of the genre, have an additional photo mode that can be activated during gameplay. Racing games such as the *Forza Horizon* series (Playground Games 2012–2021), an open world environment inspired to real world locations[17], features comprehensive photo modes. Other examples are the photo modes of triple A games such as *Death Stranding* (Kojima Productions 2019) and *The Last of Us Part II* (Naughty Dog 2020).

Generally, photo modes allow to control photographic parameters like exposures, ISO, and shutter speed, extrapolating them into a non-diegetic user interface. Shooting parameters can be controlled though sliders and camera position can be controlled freely or within some spatial restrictions. During photo mode gameplay can be either suspended or not. The increasing visual polishing and reactiveness of game environment and characters allow players to elaborate gameplay strategies to art direct the scene and achieve original compositions. In game photographers can, for example, take advantage of the visual effects generated by specific weapons and tools to stage environmental effects. Players can auto inflict damage to the playable characters to portray suffering and pain or have them run, get dirty or wet by interacting with the surrounding environment. Such workarounds are similar to those often adopted in machinima in order to direct scene cuts. As reported by Kelland, machinimators using *Battlefied* games adopt the "five in the foot" escamotage, where "five" are the revolver bullets that are shot behind the scene to a character to make sure the next hit will provoke his or her death as required by the script (Kelland 2011).

Screenshots are an immediate way to instantly capture the on-display image by pressing a key on the keyboard or a combination of buttons on the smartphone. This function is embedded in most computers and mobile devices. Screenshot are used to capture glitches, stunts, unexpected events, gameplay achievements, memorable instants. As noted by Gerling et al. (2023a), screenshots are much closer to photograms – the instant capture of the temporary state of the programs running on the machine – rather than photography (Gerling, Möring, and De Mutiis 2023a). Screenshots do not operate a transformation from the tridimensional space into a bidimensional projection like camera photography does, but they encapsulate in an image the visual data on display at a specific instant. Artistic screenshot photography, compared to the use of in-game photo modes, forces even more photographers to engage and negotiate with the persistent in-game events, revealing the specifics of the video game medium in relations to other media and human interactions (Möring and De Mutiis 2019).

More articulated image capturing strategies involve codes and, sometimes, hardware modifications (mods). An example is that of Kent Sheely's work *Grand Theft Photo*[18] (2007), in which the Artist propose a subversion of the violent environment of the game *Grand Theft Auto: San Andreas* (Rockstar North 2004). Modifying the game code and the input controller into a camera, Sheely restricted players' agency only allowing them to move and take photos of the game world. While taking photos, players were exposed to the perilous game environment. The concept of using in-game photography for playing an alternative role in games, has been explored by Sheely in other works such as *DoD: A World War II Photo Essay* (2011), in which the Artist engage with – or arguably, against – the game performing as a photojournalist documenting in-game war events.

17 For an in-dept reading of the representation of Italy in Forza Horizon 2 refer to (Bittanti 2020)

18 https://www.kentsheely.com/grand-theft-photo/index.html

19 In 2014 the ACM SIGGRAPH DICITAL ARTS COMMINITY (DCA) organized an online game art show with the aim to curate a selection of indie digital games that "are uniquely creative in putting together striking and distinctive aesthetics with engaging gameplay". Games can be played here: http://gameart-show.siggraph.org/gas/

20 It is esteemed that the production of visual content, both 2D and 3D, accounts for almost half of the development costs. For more information see: https://www.youtube.com/watch?v=tEf6g8UhIk8, https://arstechnica.com/gaming/2006/12/8479/

21 This definition may be extended to streaming performances as well. Colbert argues that, if we shift the perspective from the player or the players involved in their activity and we focus of their audience, "game spectatorship is comparable to theatrical spectatorship"(Corbett, 2009, p. 12). It worths highlighting that watching video games being played, both in competitive (e-sport) and non-competitive settings, is an established form of entertainment. Bittanti and Gandolfi aknowledge that Game Video Content (GVC), in their multiple formats, represent a "new cultural industry, a social phenomenon and a digital aesthetic" (Bittanti & Gandolfi, 2018, p. 7) [writer's translation from Italian].

5.7. Notes on Machinima

The term Machinima has been coined by Paul Marino and Hugh Hancock in 2000. The historical roots of machinima can be told from two different but intersecting perspectives. A first narrative traces the origin of machinima back to the most extreme gaming communities, observing how their production and distribution only involved specific niches of gamers (Kelland 2011). Often mentioned examples are Quake (id Software 1996) demos, such as *Diary of a Camper* (Diary of a Camper 1996), that were automated gameplay recordings that could be rendered and played only through the game software. From a technical standpoint, the production and distribution of self-playing demo software for showcasing in-game actions mirrored the methods adopted by the creative practice of the demoscene (Harwood and Grussi 2021). Demoscene creators used auto playing demo software to present creative works achieved by pushing the hardware's technical boundaries to produce extreme graphic and audio effects.

Another narrative is the one proposed by scholars such as Matteo Bittanti, who observes the emerging of early form of machinima in the work of media artist such as Miltos Manetas and Eddo Stern who were experimenting with visual and digital media (Bittanti 2017). An example that is contemporary to *Quake* demos is Manetas' *Miracle* (Manetas 1996). Presented at the New York *Basilico Gallery*, *Miracle* is a video installation that shows a fighter jet sliding on water. Manetas encountered this glitch while playing *F/A-18 Hornet* (Graphic Simulations 1996) and recorded it using a video camera. Whereases the first genealogy derives from the world of hardcore gaming and hacking community, emphasizing the technical aspects of machinima production; the second one sees machinima as an expression of the artworld and its interest in the diffusion and the creative potential of the video game medium.

If we follow the technical history of machinima, *Quad God* (Quad God 2000) represents a significant landmark since it is accounted to be the first feature-length machinima made with *Quake III* that did not need the game software to be viewed (Kelland 2011). *Quad God* is 45-minutes movie produced by editing footage from the camera recording of the screen that was distributed in a video format easily accessible to viewers even outside the gaming community. Kelland observes how until 2004, despite becoming more technically accessible, the majority of machinima were still coming from gamer niches involved in game modding and were mainly targeting gamer communities. Popular production such as *Red vs. Blue* (Red vs. Blue 2003), a web series that uses the *Halo* games (343 Industries et al. 2001) to shoot comedy machinima in a science-fiction setting, are appealing and fully comprehensible only to *Halo* enthusiasts. However, development of more accessible production tools such as the embedded recording mode of *The Sims 2* (Maxis 2004) and the extension of the gamer community to a broader and more diverse audience thanks to the spread of nonviolent content, contributed to the diffusion of machinima also in educational and cultural promotion contexts (Kelland 2011).

Chapter Bibliography

343 Industries, Bungie, Creative Assembly, and Ensemble Studios. 2001. 'Halo Series'.

Aroni, Gabriele. 2022. *The Semiotics of Architecture in Video Games*. London, UK: Bloomsbury Academic.

Barthes, Roland. 2000. *Camera Lucida: Reflections on Photography*. London: Vintage Books.

Baudrillard, Jean. 1994. *Simulacra and Simulation*. Ann Arbor, Michigan, USA: University of Michigan Press.

Bensley, Lillian, and Juliet Van Eenwyk. 2001. 'Video Games and Real-Life Aggression: Review of the Literature'. *Journal of Adolescent Health* 29(4): 244–57. doi:10.1016/S1054-139X(01)00239-7.

Bittanti, Matteo. 2009. 'Game Art. (This Is Not) A Manifesto. (This Is) A Disclaimer'. In *GameScenes*, eds. Matteo Bittanti and Domenico Quaranta. Milano, Italy: Johan & Levi Editore.

Bittanti, Matteo. 2017. 'Introduzione'. In *Machinima: dal videogioco alla videoarte*, Eterotopie, ed. Matteo Bittanti. Milano Udine: Mimesis.

Bittanti, Matteo. 2020. 'Siete in un Paese Meraviglioso. La guida simulata nell'Italia di Forza Horizon 2'. In *Il videogioco in Italia: storie, rappresentazioni, contesti*, Cinergie, eds. Marco Benôit Carbone and Riccardo Fassone. Milano: Mimesis, 129–48.

Bittanti, Matteo, and Enrico Gandolfi, eds. 2018. *Giochi Video: Performance, Spettacolo, Streaming*. Milano: Mimesis.

Bolter, J. David, and Richard A. Grusin. 1999. *Remediation: Understanding New Media*. Cambridge, MA, USA: MIT Press.

Book, Betsy. 2003. 'Traveling through Cyberspace: Tourism and Photography in Virtual Worlds'. *SSRN Electronic Journal*. doi:10.2139/ssrn.538182.

Campbell, Colin. 2018. 'A Brief History of Blaming Video Games for Mass Murder'. *Polygon*. https://www.polygon.com/2018/3/10/17101232/a-brief-history-of-video-game-violence-blame (July 13, 2024).

Cannon, Rebecca. 2007. 'Meltdown'. In *Videogames and Art*, eds. Andy Clarke and Grethe Mitchell. Intellect Books, 47–66. doi:10.2307/j.ctv36xvrh9.

Corbett, Natalie. 2009. 'Digital Performance, Live Technology: Video Games and the Remediation of Theatrical Spectatorship'. In *Performing Adaptations: Essays and Conversations on the Theory and Practice of Adaptation*, eds. Michelle MacArthur, Lydia Wilkinson, and Keren Zaiontz. Newcastle upon Tyne, UK: Cambridge Scholars Publishing, 11–23.

Cunningham, Stuart. 2002. 'From Cultural to Creative Industries: Theory, Industry and Policy Implications'. *Media International Australia* 102(1): 54–65. doi:10.1177/1329878X0210200107.

De Mutiis, Marco. 2023. 'How to Win at Photography - How Games Teach Us to See'. In *Screen Images. In-Game Photography, Screenshot, Screencast*, eds. Winfried Gerling, Sebastian Möring, and Marco De Mutiis. Kulturverlag Kadmos Berlin. Wolfram Burckhardt. doi:10.55309/c3ie61k5.

Diary of a Camper. 1996. United Rangers Films.

Dovey, Jon, and Helen W. Kennedy. 2006. *Game Cultures: Computer Games as New Media*. Maidenhead, Berkshire, England ; New York, NY: Open University Press.

Fantacci, Gemma. 2023. 'Sovversioni Videoludiche. Dalle Avanguardie Alle Pratiche Performative in-Game'. *G|A|M|E Games as Art, Media, Entertainment* 1(10): 147–63.

Fassone, Riccardo. 2018. 'Cammelli and Attack of the Mutant Camels. A Variantology of Italian Video Games of the 1980s'.

Flanagan, Mary. 2013. *Critical Play. Radical Game Design*. Cambridge, MA, USA: MIT Press.

Fullerton, Tracy. 2009. 'Reflections on The Night Journey: An Experimental Video Game'. *Kritische Berichte: The Ludic society—The relevance of videogames.* http://www.tracyfullerton.com/assets/ReflectionsonTheNightJourney_tfullerton.pdf (July 18, 2024).

Galloway, Susan, and Stewart Dunlop. 2007. 'A Critique of Definitions of the Cultural and Creative Industries in Public Policy'. *International Journal of Cultural Policy* 13(1): 17–31. doi:10.1080/10286630701201657.

Garvey, Greg. 2014. 'Curator's Statement | The Aesthetics of Gameplay'. http://gameartshow.siggraph.org/gas/curators-statement/ (July 18, 2024).

Gerling, Winfried, Sebastian Möring, and Marco De Mutiis. 2023a. 'Introduction'. In *Screen Images. In-Game Photography, Screenshot, Screencast*, eds. Winfried Gerling, Sebastian Möring, and Marco De Mutiis. Kulturverlag Kadmos Berlin. Wolfram Burckhardt. doi:10.55309/c3ie61k5.

Gerling, Winfried, Sebastian Möring, and Marco De Mutiis, eds. 2023b. *Screen Images. In-Game Photography, Screenshot, Screencast*. Kulturverlag Kadmos Berlin. Wolfram Burckhardt. doi:10.55309/c3ie61k5.

Ghirri, Luigi. 2010. *Lezioni Di Fotografia*. eds. Giulio Bizzarri and Paolo Barbaro. Quodlibet.

Giddings, Seth. 2013. 'Drawing without Light'. In *The Photographic Image in Digital Culture*, ed. Martin Lister. London ; New York: Routledge, Taylor & Francis Group.

Girina, Ivan. 2020. 'Framing Video Game Agency: Down and Out in Los Santos and In-Game Photography as Subversive Play'. In *Moving Pictures, Living Machines: Automation, Animation, and the Imitation of Life in Cinema and Media*, eds. Greta Plaitano and Paolo Villa. Milano, Italy: Mimesi.

Graphic Simulations. 1996. 'F/A-18 Hornet 2.0'.

Grespi, Barbara, and Federica Villa, eds. 2024. *Il postfotografico: dal selfie alla fotogrammetria digitale*. Torino: Einaudi.

HAL Laboratory. 1999. 'Pokémon Snap'.

Haraway, Donna J. 1995. *Manifesto Cyborg. Donne, Tecnologie e Biopolitiche Del Corpo*. 2018th ed. Feltrinelli.

Hardt, Michael, and Antonio Negri. 2000. *Empire*. 1. Harvard Univ. Press paperback ed., [Nachdr.]. Cambridge, Mass.: Harvard Univ. Press.

Harwood, Tracy, and Ben Grussi. 2021. 'In the Beginning: Diary of a Camper'. In *Pioneers in Machinima: The Grassroots of Virtual Production*, Vernon Press.

Hayles, N. Katherine. 1993. 'The Materiality of Informatics'. *Configurations* 1(1): 147–70. doi:10.1353/con.1993.0003.

Hayles, N. Katherine. 2012. *How We Think: Digital Media and Contemporary Technogenesis*. Chicago ; London: The University of Chicago Press.

Hesmondhalgh, David. 2013. *The Cultural Industries (3rd Ed.)*. 3rd ed. London, UK: SAGE.

Hesmondhalgh, David, and Andy Pratt. 2005. 'Cultural Industries and Cultural Policy'. *International Journal of Cultural Policy* 11: 1–13. doi:10.1080/10286630500067598.

Horkheimer, Max, and Theodor Adorno. 2010. *Dialettica Dell'Illuminismo*. Torino, Italy: Einaudi.

HuneX. 2005. ‘Paparazzi’.

Hutcheon, Linda, and Siobhan O’Flynn. 2013. *A Theory of Adaptation*. 2nd ed. London, UK ; New York, NY, USA: Routledge.

id Software. 1993. ‘Doom’.

id Software. 1996. ‘Quake’.

Infogrames Europe SA. 1989. ‘Safari Guns’.

Jagoda, Patrick. 2020. *Experimental Games: Critique, Play, and Design in the Age of Gamification*. University of Chicago Press. doi:10.7208/chicago/9780226630038.001.0001.

Jenkins, Henry. 2005. ‘Preface’. In *Video Game Art*, New York, NY: Assouline.

Jenkins, Henry. 2006. ‘Games, the New Lively Art’. In *The Wow Climax*, New York, NY, USA: New York University Press, 19–40. https://www.degruyter.com/document/doi/10.18574/nyu/9780814743706.003.0005/html (July 16, 2024).

Kelland, Matt. 2011. ‘From Game Mod to Low-Budget Film: The Evolution of Machinima’. In *The Machinima Reader*, eds. Henry Lowood and Michael Nitsche. The MIT Press, 0. doi:10.7551/mitpress/9780262015332.003.0003.

Kerr, Aphra. 2006. *The Business and Culture of Digital Games: Gamework/Gameplay*. 1 Oliver’s Yard, 55 City Road, London EC1Y 1SP United Kingdom: SAGE Publications Ltd. doi:10.4135/9781446211410.

Kohler, Chris. 2012. ‘How Grand Theft Auto Jacked the House of Lords’. *Wired*. https://www.wired.com/2012/03/grand-theft-auto-jacked/ (July 13, 2024).

Kojima Productions. 2019. ‘Death Stranding’.

Krauss, Rosalind E. 1985. *The Originality of the Avant-Garde and Other Modernist Myths*. 12. print. Cambridge, Mass.: The MIT Press.

LKA. 2022. ‘Martha Is Dead’.

Manetas, Miltos. 1996. *Miracle*.

Manovich, Lev. 2001. *The Language of New Media*. 8. print. Cambridge, Mass.: MIT Press.

Maxis. 2004. ‘The Sims 2’.

McLuhan, Marshall. 1994. *Understanding Media*. MIT Press. Cambridge, MA, USA.

Möring, Sebastian, and Marco De Mutiis. 2019. ‘Camera Ludica: Reflections on Photography in Video Games’. In *Intermedia Games—Games Inter Media: Video Games and Intermediality*, eds. Michael Fuchs and Jeff Thoss. Bloomsbury Academic. doi:10.5040/9781501330520.

Murray, Janet Horowitz. 2016. *Hamlet on the Holodeck: The Future of Narrative in Cyberspace*. Updated edition. Cambridge, Massachusetts: The MIT Press.

Naughty Dog. 2020. ‘The Last of Us Part II’.

Origame Digital. 2020. ‘Umurangi Generation’.

Pichlmair, Martin. 2006. ‘Pwned - 10 Tales of Appropriation in Video Games’. In *GAMING REALITIES: A Challenge for Digital Culture*, ed. Manthos Santorineos. Athens, Greece, 218–25. http://hdl.handle.net/20.500.12708/51740.

Playground Games. 2012–2021. ‘Forza Horizon (Series)’.

Poremba, Cindy. 2007. ‘Point and Shoot: Remediating Photography in Gamespace’. *Games and Culture* 2(1): 49–58. doi:10.1177/1555412006295397.

Quad God. 2000. Tritin Films.

Quaranta, Domenico. 2009. ‘Playlist: A Reader’. In *Playing Games, Music, Art*, Gijón, Spain: LaBoral, 20–24.

Rauch, Eron. 2012. ‘Virtual Light: Exploring In-Game Photography And Photo History’. *videogametourism.at*. https://videogametourism.at/content/virtual-light-exploring-game-photography-and-photo-history (March 18, 2024).

‘Red vs. Blue’. 2003.

Rhino Studios. 2008. ‘Afrika’.

Rockstar North. 2004. ‘Grand Theft Auto: San Andreas’.

Schrank, Brian. 2014. *Avant-Garde Videogames. Playing with Technoculture*. Cambridge, Massachusetts; London, England: MIT Press. https://doi.org/10.7551/mitpress/8132.001.0001 (September 24, 2023).

Seldes, Gilbert. 1924. *The 7 Lively Arts*. New York, NY, USA: Harper & Brothers. https://www.gutenberg.org/cache/epub/66294/pg66294-images.html.

Shaw, Debra Benita. 2008. *Technoculture: The Key Concepts*. English ed. Oxford ; New York: Berg.

Sigl, Rainer. 2012. ‘The Art of In-Game Photography’. *videogametourism.at*. https://videogametourism.at/content/art-game-photography (March 21, 2024).

Squire, Kurt, and Henry Jenkins. 2002. ‘The Art of Contested Spaces’. In *Game On*, eds. Lucian King and Conrad Bain. London, UK: Barbican.

Stalker, Phillipa Jane. 2005. ‘Gaming in Art: A Case Study of Two Examples of the Artistic Appropriation of Computer Games and The Mapping of Historical Trajectories of “Art Games” Versus Mainstream Computer Games’. University of the Witwatersrand. http://hdl.handle.net/10539/1749.

Stiegler, Bernard. 1998. 1 *Technics and Time, 1. The Fault of Epimetheus*. Stanford, California: Stanford University Press.

Suziedelyte, Agne. 2021. ‘Is It Only a Game? Video Games and Violence’. *Journal of Economic Behavior & Organization* 188: 105–25. doi:10.1016/j.jebo.2021.05.014.

Tosoni, Simone, Matteo Tarantino, and Andrea Pachetti. 2020. ‘“I NOMI SUI GIOCHI” Il Ruolo del Cracking nell’Industria Videoludica Italiana (1980-1990)’. In *Il videogioco in Italia: storie, rappresentazioni, contesti*, Cinergie, eds. Marco Benôit Carbone and Riccardo Fassone. Milano: Mimesis.

Williams, Raymond. 2003. *Television. Technology and Cultural Form*. London, England: Routledge.

Zeilinger, Martin. 2019. ‘Survival Interventions in GTA: On the Limits of Performance in Virtual Environments’. *Videogame Art Reader* 2(1): 15–27.

6. Game-forms

6.1. Introduction

In the previous chapter, I have introduced the *Game Form* as the paradigmatic materialization of the commodity form in the contemporary product-service system, characterized by digital capitalist global market and technocultural society. I have highlighted two coexisting aspects that characterized the *Game Form*: the consumption dimension – which makes the *Game Form* a commodity, meaning a good that can be traded through a market system; and the epistemic dimension – that understands the *Game Form* as a knowledge artifact which epistemic potential lies in the multiple modes of engagements with its possibility space (cf. Ch.7).

In this chapter, I introduce the *game-forms* as specific instantiation of *Game Form* which articulate the double dimension of games as commodities in contemporary market systems, and as epistemic and creative instruments. For the scope of this research, the *game-forms* I am primarily concerned with are those which enable modes of knowledge production and transmission in design research.

Game-forms emerged during the literature and case study review I developed for the definition of the problematic field. In fact, as discussed in the following sections, the classification of the *game-forms* was triggered by the continuous encounters with attributes and definitions used to characterized different kinds of video games.

6.2. Methodology and limits

As illustrated in Figure 6.1, the methodology I have adopted to collect the research items follows a semi-systematic review. While reviewing literature and case studies, I encountered several modifier attributes used to connotate formal, cultural, critical, and use qualities of specific video games. Such modifiers (such as *serious*, *applied*, *slow*, *fictional*) seemed not to falling under a general umbrella term, making it not possible collecting them systematically thorough literature review. Therefore, while sourcing and collating references, I made note of each new modifier I encountered. I collected over 110 items among game forms, game design methodologies and frameworks. For each item I collected the original source reference, definition and relevant example mentioned by the Author(s). I kept recording each new definition I encountered over the course of the whole three years of research. After the initial collection, the items that I considered more relevant for the scope of this research, underwent a semi-systematic literature review. I did so through the *Web of Science*, *Scopus*, and *Google Scholar* databases. When the number of results were too high to manage (approximately over 50 results) the search was limited by querying "*search item name* definition".

The discovery flux driven by the nesting of references has eventually widened the research focus to methodologies, approaches and theories which have, in some cases, stepped into other disciplinary fields such as that of economics and psychology.

Understandably, the list of items and reference does not pretend to be exhaustive. Both the adopted methodology and the growing number of publications dealing with game and play hinder any claim of completeness. However, this extended review has been designed to facilitate scalability and will serve as grounding work for future vertical investigations.

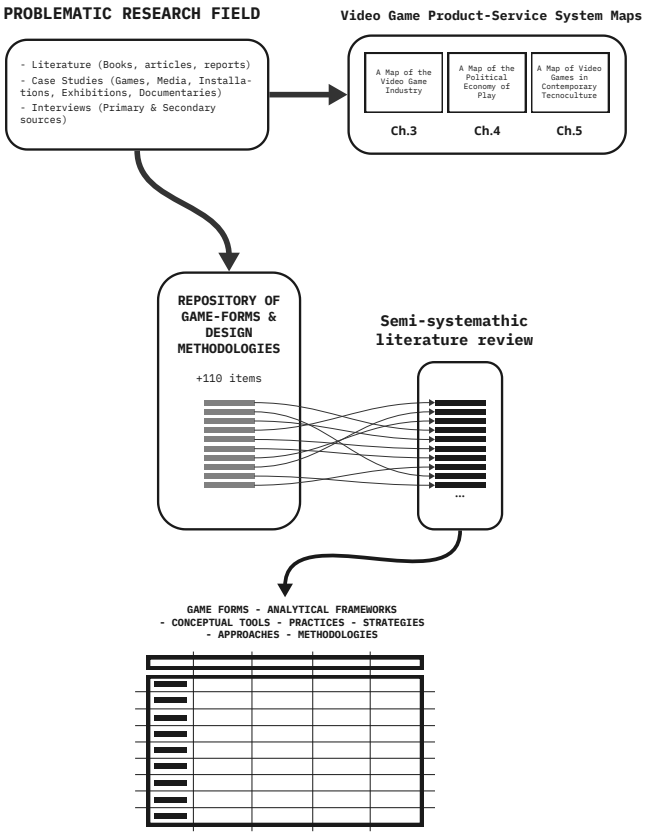


Figure 6.1 - Diagram of adopted research methodology

6.3. Game-forms

The characteristics that constitute games and our relationship with them has been largely discussed by scholars from various disciplines, from linguistics (Huizinga, 1939/2002), philosophy (Fink, 1957/2008; Suits, 1978/2005; Wittgenstein, 1953), anthropology (Caillois, 1958/2001), economics (Von Neumann & Morgenstern, 1944/2007), to name a few. Game and play studies have expanded and questioned such interpretations, proposing new understandings, also solicited by the widespread diffusion of digital technologies.

Stenros has reviewed the definitions proposed since 1930s by scholars and designers, providing over 60 examples (Stenros, 2017). In his review, Sternos classifies these definitions according to different types of conceptual approaches: *Dictionary Definitions*, *Essential Definitions* (attempting at capturing the essence of what constitutes a game), *Definitions as Language Games*, *Ostensive Definition* (using example instead of games), *Persuasive Definitions* (with the goal of influencing opinions and attitudes), *Cluster Accounts* (providing a synthesis of previous definitions), *Messy Definitions* (that embrace the messiness of ambiguity if games themselves). An extract from Stenros's review is provided in Table 6.1.

1 In linguistics a modifier is element that modifies – that is, gives information – about the meaning of another element. Modifiers are usually adjectives or adverbs. For example, "the strangeness of this state of affairs is elided by making it simply a variation on received ideas about Capital.20 Just add a modifier to it: surveillance capitalism, platform capitalism, neoliberal capitalism, postfordist capitalism, and so on." (Wark, 2021, p. 10)

2 Kirsh and Maglio (Kirsh & Maglio, 1994) proposed to "distinguish pragmatic actions – actions performed to bring one physically closer to a goal – from epistemic actions – actions performed to uncover information that is hidden or hard to compute mentally". Drawing from such distinction and from Zhng and Patel's distributed view of affordances (Zhang & Patel, 2006), Markauskaite and Goodyear define epistemic affordances as "relations between the epistemic abilities of humans – to engage in certain kinds of knowledge activities – and epistemic features of the environment that afford those kinds of epistemic actions" (Markauskaite & Goodyear, 2017, p. 186). It worths noticing that to define the distinction between pragmatic and epistemic actions, Kirsh and Maglio used *Tetris* video game.

3 Some of the mentioned definitions consider games and play connected.

Table 6.1 - Definitions of “Game” as classified by Stenros (2017)

Dictionary Definitions	
“amusement or a pastime”	dictionary.com
as in “children’s games”, it is “an activity or sport usually involving skill, knowledge, or chance, in which you follow fixed rules and try to win against an opponent or to solve a puzzle”	HarperCollins
Essential Definitions	
Games as activities[3]	
Play activity is characterized by six characteristics: 1) ***free***, not obligatory, 2) ***separate*** in time and space, 3) ***uncertain***, 4) ***unproductive***, 5) ***governed by rules*** 6) ***make-believe***	(Caillois, 1958/2001)
[Play is] a free activity standing quite consciously outside "ordinary" life as being "not serious", but at the same time absorbing the player intensely and utterly. It is an activity connected with no material interest, and no profit can be gained by it. It proceeds within its own proper boundaries of time and space according to fixed rules and in an orderly manner. It promotes the formation of social groupings, which tend to surround themselves with secrecy and to stress their difference from the common world by disguise or other means.	(Huizinga, 1939/2002)
Reduced to its formal essence, a game is an ***activity*** among two or more independent ***decision-makers*** seeking to achieve their ***objectives*** in some ***limiting context***.	(Abt, 1970, pp. 5–7, emphasis in original)
“attempt to achieve a specific state of affairs [prelusory goal], using only means permitted by rules, where the rules [lusory means] prohibit use of more efficient in favor of less efficient means [constitutive rules], and where the rules are accepted just because they make possible such activity [lusory attitude].” “playing a game is a voluntary attempt to overcome unnecessary obstacles”	(Suits, 1978/2005, p. 34)
Games as systems	
The rules of the game [...] are absolute commands. If they are ever infringed, then the whole transaction by definition ceases to be the game described by those rules.	(von Neumann & Morgenstern, 1944, p. 49)
By 'closed' I mean that the game is complete and self sufficient as a structure. The model world created by the game is internally complete; no reference need be made to agents outside of the game.	(Crawford, 1984, p. 7)
At its most elementary level then we can define a game as an exercise of voluntary control systems in which there is an opposition between forces, confined by a procedure and rules in order to produce a disequilibrial outcome.	(Avedon & Sutton-Smith, 1971, p. 7)
Definitions as Language Games	
Definitions of games viewed in terms of family resemblance. The way a particular concept is understood by different groups of language users.	See (Arjoranta, 2014) about Wittgenstein
Ostensive Definition	
or us a “game” is whatever is labelled a game in common parlance. [...] We exclude the games without formal rules that very small children play (e.g., “playing house” or swinging); we include most sports, even those such as footraces where the label “game” is not generally used, and we include activities like crossword puzzles that we find not fundamentally different from, say, card solitaire or Minesweeper.	(Elias et al., 2012, p. 6)
Persuasive Definitions	
A game is a series of interesting choices.	Sid Maier quoted in (Rollings & Morris, 2004, p. 61)
Cluster Accounts	
A game is a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome.	(Salen & Zimmerman, 2004, p. 81)
[...] a game is 1. a rule-based formal system; 2. with variable and quantifiable outcomes; 3. where different outcomes are assigned different values; 4. where the player exerts effort in order to influence the outcome; 5. the player feels emotionally attached to the outcome; 6. and the consequences of the activity are optional and negotiable.	(Juul, 2005, p. 36)
Messy Definitions	
Games, and their play, are constituted by the interrelations between (to name just a few) technological systems and software (including the imagined player embedded in them), the material world (including our bodies at the keyboard), the online space of the game (if any), game genre, and its histories, the social worlds that infuse the game and situate us outside of it, the emergent practices of communities, our interior lives, personal histories, and aesthetic experience, institutional structures that shape the game and our activity as players, legal structures, and indeed the broader culture around us with its conceptual frames and tropes.	(Taylor, 2009, p. 332)

Together with ontological definitions, game classifications have been proposed in literature to improve the ways games can be designed and studied. Crawford prosed a taxonomy based on two broad category of *skill-and-action* and *strategy* games (Crawford, 1984). His taxonomy is primarily focused on commercial entertainment games and is mainly concerned with video game design. Aarseth, Smedstad, and Sunnanå proposed a multi-dimensional typology for games structured on fifteen dimensions grouped in five principal categories: space, time, player-structure, control and rules (Aarseth et al., 2003; Elverdam & Aarseth, 2007). Other scholars, like Schiniz, have argued that a video game genres taxonomy is impossible, since they are mutable and multidimensional concepts in which aesthetic practice, mechanic interventions, and social interaction dynamically combine (Schniz, 2020).

Since the preliminary research for the definition of the problematic field, it became evident quite early that the development of my argument needed a prior systematization of the multitude of game- and play- related concepts that I encountered in literature. In the context of this research, the need of such systematization is not addressing the ontological discourse about what video games are. Rather, the multiplicity of modifiers[1], interpretation, and application of the (video) game object suggests that the form of a game is mutable and undergoes continuous redefinitions in the hands of players, observers, and designers. Therefore, by describing the elasticity of the form of games, I aim to define a dynamic possibility space for the experimentation of alternative modes of knowledge production in design research that leverages on game's specific affordances[2].

I define *game-forms* as specific instantiation of *Game Form* which articulate the double dimension of games as commodity forms, and as epistemic and creative instruments. I have introduced and discussed some of these forms and their application in the previous chapters. For example, in section §4.5, I have discussed how *applied games* are adopted for training and simulation in critical scenarios, reflecting on the convergence of working and gaming interfaces in contemporary digital working and leisure environments. Another example is that of *Art mods*, which have been presented in Chapter 5. *Art mods* are used by artist and creatives to re-functionalize the gaming environment for expressive, political, and aesthetic purposes.

Game-forms are different from game genres. Although some of them directly refer to games characterized by mechanics and settings which are commonly associated to a specific video game genre, the focus of *game-forms* is on the affordances they offer and the creative and epistemic practices they enable. For example, although *walking simulators* constitute a video game genre, I have listed them among *game-forms* because they emphasize a different mode of engagement with the game environment which allow forms of reflection about the experience of moving through artificial (digital and physical) spaces.

Some *game-forms* are not specifically codified as video games. *Suggestive media* and *tactical media*, for example, are labeled as media but they both are proposed as tools for encouraging ludic, creative, and critical modes of interaction.

The forms that I investigate in this review are those that scholars and game designers have defined by observing and using video games in ways which are not primarily concerned with entertainment. Commercial entertainment games, however, are not excluded from the case studies. In reviewing literature and case studies, in fact, it emerged that a wide range of commercial

games can be understood according to perspectives which, despite not rejecting fun and amusement as an integral part of the experience, solicit critical and experimental attitudes. Therefore, the *game-forms* I am investigating, rather than being immutable categories, are culturally and critically situated by the designers' intention and users' reception. That is, in other words, the dynamic articulation of the consumption and epistemic dimensions of the *Game Form* that instantiates in a *game-form*.

To better clarify the difference between the *Game Form* and the *game-forms*: I use the capitalized *Game Form* to refer to the understanding of video games as the paradigmatic contemporary commodity form (cf. Par.5.2), while *game-forms* are specific manifestation of the *Game Form* that describe how it materializes in particular context and by how it is experienced or consumed by different users.

6.4. Item Characterization

The goal of this review is to identify game forms, theoretical tools and practical applications that can be used, or that are already being used, in design research and practice. The question I am driven by during this review is whether these forms are flexible enough for extending their use in design inquiry, if there is the need to introduce new modifiers and therefore to codify new forms, and to understand how these forms can be combined in a dynamic creative model for the design research field.

The review provided over 110 items. Out of these, 86 were selected and classified into groups:

- 54 *game-forms* (Table 6.2)
- 14 *Analytical Frameworks* (Table 6.3)
- 4 *Conceptual Tools* (Table 6.4)
- 7 *Practices* (Table 6.5)
- 7 *Game Design Strategies, Approaches and Methodologies* (Table 6.6)

For each of these items, the tables provide the literature definition(s), the relative reference(s), examples or applications mentioned by the Author(s). Together with *game-forms* I have also identified analytical frameworks, conceptual tools, practices, and game design strategies, approaches and methodologies.

Analytical frameworks and conceptual tools offer different theoretical instruments which enable further reflections and understanding of the act of engaging with game and play technologies. They help highlighting and investigating social, political and cultural aspect that intertwine in the gaming experience. Some of them focus on the social and relational sphere, such as *metagaming*, whereas others are more concerned with subjectivity and individual transformations, such as *idiogames*. The observation standpoints offered by such theoretical tools can be applied to analyze *game-forms* in use and research settings, and to provide theoretical foundation for the development of novel forms of inquiry. Such tools have been mainly developed for the analysis of games and players behaviors. The aim of this research is, as for the other analyzed items, to extend their application field toward design disciplines.

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Table 6.2 - Game Forms

Form	Definition
Activist Games See also: Critical Play/Critical Games	"[...] I use the terms activist game and activist game design. Activist games can be characterized by their emphasis on social issues, education, and, occasionally, intervention. In other words, they are not purely conceptual exercises, but rather, games that engage in a social issue through, most commonly, themes, narratives, roles, settings, goals, and characters; and less commonly, through game mechanics, play paradigms, interactions, or win states to benefit an intended outcome beyond a game's entertainment or experiential value alone. This is not to say that activist games cannot, or should not, be "fun," though this has been a critique of many activist games to date. The term "activist game," however, is meant to specify the game theme and sometimes-desired outcomes for playing the game, and only one of the desired outcomes would be entertainment." (Flanagan, 2009/2013, p. 13)
Advergames	a "form of branded entertainment that feature[s] advertising messages, logos, and trade characters in a game format" (Mallinckrodt & Mizerski, 2007, p.87) "game whose main purpose is to boost sales of a product or service, whether through increased brand recognition, increased linking or other methods" (Smith & Just, 2009, p.54) "a videogame financed by an advertiser and created for a product or brand with an advertising intention" (Ruiz, 2009, p. 151) "an advergame is a digital game specifically designed for a brand with the aim of conveying an advertising message." (De La Hera Conde-Pumpido, 2019, p. 31)
Altered Reality Games (ARG) see also: Pervasive Games	"Alternate Reality Games take the substance of everyday life and weave it into narratives that layer additional meaning, depth, and interaction upon the real world. The contents of these narratives constantly intersect with actuality, but play fast Larps based on The Masquerade that took to the streets almost accidentally gave birth to the pervasive larp genre. This picture is from a staged photoshoot of Helsingin Camarilla, a vampire chronicle that ran in Finland from and loose with fact, sometimes departing entirely from the actual or grossly warping it—yet remain inescapably interwoven. Twenty-four hours a day, seven days a week, everyone in the country can access these narratives through every available medium—at home, in the office, on the phones; in words, in images, in sound. Modern society contains many managed narratives relating to everything from celebrity marriages to brands to political parties, which are constantly disseminated through all media for our perusal, but ARGs turn these into interactive games. Generally, the enabling condition to [it] is technology, with the internet and modern cheap communication making such interactivity affordable for the game developers. It's the kind of thing that societies have been doing for thousands of years, but more so. Much more so." (Martin et al., 2006, p. 6) "ARGs can be broadly understood as digitallymediated games that transpire within the "real," physical world." (Garcia & Niemeyer, 2017, p. 10) "[...] modern concerns with regards to the scholarship of ARGs can be understood in terms of their relationship with the digital media and platforms on which much of the play is enacted, the role of player communities and education, and the relationship between narrative and participant agency." (2017, p. 11) Compared to Epistemic Games, ARGs are more "concerned with using gaming devices, mechanics, and modes of interaction to situate the learners in meaningful learning experiences that prepare them for participating in twenty-first-century society. Specifically, they seek to immerse players in complex problem-solving spaces in which they must think creatively and collaboratively with a suite of digital tools." (Squire, 2008, p. 169) "These games seek to place learners in roles in which they confront authentic challenges central to the domain, providing them access to authentic resources and tools that extend their cognition. All tools and resources are situated within game-play mechanics designed to produce collaboration that scaffolds and supports scientific thinking. In these games, for example, players might try to ascertain the cause of a mysterious death of a friend thought to be caused by environmental health problems, or try to solve a contemporary fictional urban planning dilemma by traveling back in time to interview residents of a neighborhood" (2008, p. 169) See also: (Jagoda et al., 2022)

Reference	Example
Flanagan, M. (2013). Critical Play. Radical game design. MIT Press. (Original work published 2009)	See Critical Play/Critical Games
Mallinckrodt, V., & Mizerski, D. (2007). The Effects of Playing an Advergame on Young Children's Perceptions, Preferences, and Requests. Journal of Advertising, 36(2), 87–100. https://doi.org/10.2753/JOA0091-3367360206	
Smith, J. H., & Just, S. N. (2009). Playful Persuasion: The Rhetorical Potential of Advergames. Nordicom Review, 30(2), 53–68. https://doi.org/10.1515/nor-2017-0151	
Ruiz, D. S. (2009). El videojuego como herramienta de comunicación publicitaria: Una aproximación al concepto de. Comunicación, 1(7), 141–166. http://hdl.handle.net/11441/13009	
De La Hera Conde-Pumpido, T. (2019). Advergames: A Definition. In T. De La Hera Conde-Pumpido, Digital Gaming and the Advertising Landscape (pp. 27–46). Amsterdam University Press. https://doi.org/10.1515/9789048538676-004	**Advergames as Procedural Environments:** "An example of how advergames can make use of procedural rhetoric to convey advertising messages is ***Hit it Pure*** (Hello Design, 2009), an online game that allows players to hit pure shots with two Callaway Golf drivers, the FT-iQ and the FT-9. (De La Hera Conde-Pumpido, 2019, p. 35) **Advergames as Spatial Environments:** "[...] it can also be used as a strategy to increase the retention of players, who can be motivated to return to the game to explore the uncharted territory. An example [...] is the advergame ***OCB Blackthinking*** (Medusateam, Inocua the Sign, Physalia & Nitsnets, 2010)." (2019, p. 36) **Advergames as Interactive Environments:** "Furthermore, advergames have the potential to allow the player to interact with the advertised product in its natural environment. That interactivity occurs in terms of immediacy, but at the same time it is also confined by the narrow specification of the digital device on which the game is being played. A good example of the latter is FMX (Valentin & Byhr, Normal Inc., & Lucky Punk, 2010)" (2019, pp. 37–38) **Advergames as Encyclopedic Environments**: "An example of how advergames can store large amounts of information and reveal it selectively during play can be seen in Get the Glass! (North Kingdom, 2007), an advergame developed for the Milk Processor Board of California." (2019, p. 39) **Advergames as Networked Environments:** "Examples of how social features can be used within advergames to increase player acquisition, retention, and virality can be found in the advergame Pleasure Hunt 2 (Lowe Brindfords, B-Reel, & Plan8, 2012)." (2019, p. 41)
Martin, A., Thompson, B., & Chatfield, T. (Eds.). (2006). Alternate Reality Games White Paper. The International Game Developers Association (IGDA) Alternate Reality Games SIG. http://org/arg/resources/IGDA-AlternateRealityGames-Whitepaper-2006.Pdf	Catching the Wish, Dave Szulborski, 2006, http://www.chasingthewish.net/ EDOC Laundry, EDOC Laundry, 2006-2008, http://www.edoclaundry.com/ Last Call Poker, 42 Entertainment, 2005, http://www.lastcallpoker.com/ The LOST Experience, ABC, 2006, http://www.insidetheexperience.com Ocular Effect, Xenophile Media, Matt Wolf, 2006, http://www.ocularеffect.com Omnifam, 2005, http://www.omnifam.org/ Orbital Colony, 2005-2006, http://www.orbitalcolony.com/ Perplex City, 2005-2006, Mind Candy, http://www.perplexcity.com ReGenesis, Xenophile Media, 2006, http://www.regenesistv.com/ Studio Cyphers, Studio Cyphers, LLC, 2006, http://www.studiocyphers.com/ Who Is Benjamin Stove, Campbell-Ewald & GMD Studios, 2006, http://www.whoisbenjaminstove.com/
Garcia, A., & Niemeyer, G. (Eds.). (2017). Alternate reality games and the cusp of digital gameplay. Bloomsbury Academic	
Squire, K. (2008). Open-Ended Video Games: A Model for Developing Learning for the Interactive Age. In K. Salen (Ed.), The Ecology of Games: Connecting Youth, Games, and Learning. MIT Press.	Augmented reality role-playing games—such as ***Pirates*** (a game played on cell phones in which players seek to raid one another's ships by positioning themselves effectively in space) and ***MAD Countdown*** (a game created by Steffen Walz and colleagues in which players try to locate a bomb hidden in London)—offer an additional spin on the professional roleplaying games [...].

2/8 > Table 6.2 - Game Forms

Form	Definition
Art Games	"On the basis of shared essential, characteristics: “category, genre, or mode within the larger field of indie games” which are commonly characterized by common features, such as: “a distinctive or highly stylized audiovisual aesthetic; small (or entirely individual) development teams with identifiable author figures; and an existential-poetic ‘point’ or ‘message’ that the player is intended to discover and ponder, however obscure or ambiguous”. (Parker, 2013) On the base of the intention behind it: "a discursively constructed site of struggle and cooperation over meaning and value" (Parker, 2013)
	"an interactive work, usually humorous, by a visual artist that does one or more of the following: challenges cultural stereotypes, offers meaningful social or historical critique, or tells a story in a novel manner. To be more specific, art games contain at least two of the following: a defined way to win or experience success in a mental challenge, passage through a series of levels (that may or may not be hierarchical), or a central character or icon that represents the player." (Holmes, 2003) "Art games are decidedly noncommercial in that they function primarily as single-use, or even disposable experiences due to their limited playability." (Holmes, 2003)
	Comparing Art Games to Art Mods: "Art games may be made in a variety of media, sometimes from scratch without the use of a prior existing game. They always comprise an entire, (to some degree) playable game. [...] The issue of playability, integral to a successful game, remains important to art games. [...] Many art mods are not interactive; art games always are. [...] art games explore the game format primarily as a new mode for structuring narrative and/or cultural critique [...]" (Cannon, 2007, p. 52) See also: Art mods
	See also: (Bittanti, 2009; Castaño Díaz & Tungtjitcharoen, 2015; Maizels & Jagoda, 2016; Stalker, 2005)
Art Mods	"artist mods tend to consider video games as nothing more than game technologies, and thus most artist-made video game mods to date are mods of game technologies (whether at the visual level or the physics level), not mods of actual gameplay." [...] contemporary artist-made game mods tend to approach either the visual design of the game (option 1) or the underlying game engine (option 3). Mods of actual gameplay (option 2) are less common, and in fact gameplay is often neglected to the point of disappearance in most artist game mods." (A. Galloway, 2006, p. 108) "there exists a symbiotic relationship between mod artists and the industry in a way not seen in previous avant-garde movements." (2006, p. 113)
	"Artistic computer game modification involves the creative reuse of a pre-existing piece of computer game software and/or hardware for a specifically artistic outcome." "Art mods always modify or reuse an existing computer game but they only rarely include reward systems, and if so, only when of thematic relevance." Under the definition of Art Mod, Cannon identifyes these sub-categories: machinima, sonichima, art game mods, political game mods, generative art mods, performative interventions, site-specific installations and site-relative mods, real-time performance instruemnts. (Cannon, 2007, p. 49)
Applied Games see also: Serious Games	"Applied Game Design is the user-centric transfer and implementation of design concepts from the game world, in order to confer their individual, social and procedural qualities to a subject of interest, within its situated context, in order to pursue a defined goal." "Applied games are the result of an applied game design process. They are an implementation of a subject, inspired by and designed along a context- and user-centric transfer of design concepts and qualities from the game world. Applied games consist of multimedia, digital and/or non-digital artefacts that constitute an individual and/or social experience for their respective users."(Schmidt et al., 2015)
Avant-garde games	"Avant-garde games are distinguished from mainstream ones because they show how the medium can manifest a greater diversity of gameplay and be creatively engaged in more kinds of ways by more kinds of people. They redefine the medium, breaking apart and expanding how we make, think, and play with games. The avant-garde democratizes games, and makes the medium more plastic and liquid." (Schrank, 2014, p. 3) "Avant-garde games are distinguished from mainstream ones because they show how the medium can manifest a greater diversity of gameplay and be creatively engaged in more kinds of ways by more kinds of people. They redefine the medium, breaking apart and expanding how we make, think, and play with games. The avant-garde democratizes games, and makes the medium more plastic and liquid." (2014, p. 3) Schrank argues that it is possible to evaluate the avant-garde according to how it opens up the experience of games (formal art) or the experience of being in the world (political art). He examines these strategies and the artists who deploy them, looking closely at four varieties of avant-garde games: ***radical formal***, which breaks up the flow of the game so players can engage with its materiality, sensuality, and conventionality; ***radical political***, which plays with art and politics as well as fictions and everyday life; ***complicit formal***, which treats videogames as a resource (like any other art medium) for contemporary art; ***complicit political***, which uses populist methods to blend life, art, play, and reality—as in alternate reality games, which adapt Situationist strategies for a mass audience.

Reference	Example
Parker, F. (2013). An Art World for Artgames. Loading..., 7(11), Article 11. https://journals.sfu.ca/loading/index.php/loading/article/view/119	Passage (PC, Mac, Linux, iOS, 2007); The Marriage (PC, 2007); The Graveyard (PC, Mac, iOS, 2008); Braid (Xbox 360, PS3, PC, Mac, Linux, 2008); Flower (PS3, 2009); Every Day the Same Dream (PC, 2009)
Holmes, T. (2003). Arcade Classics Spawn Art? Current Trends in the Art Game Genre. Proceedings of the 5th International Digital Arts & Culture Conference. 5th International Digital Arts & Culture Conference, Melbourne, Australia.	
Cannon, R. (2007). Meltdown. In A. Clarke & G. Mitchell (Eds.), Videogames and Art (1st ed., pp. 47–66). Intellect Books. https://doi.org/10.2307/j.ctv36xvrh9	
	Moondust, Jaron Lanier, 1983, Comodore 64 - Generative music game considered the first art video game
Galloway, A. (2006). Gaming. Essays on Algorithmic Culture. University of Minnesota Press.	Adam Killer, Brody Condon, (1999), [Half-Life mod]; untitled game, Jodi (1996-2001). "Jodi's untitled game follows this contradictory logic when it ignores all possibility of gameplay in Quake and propels the game into fits of abstract modernism. Brody Condon's Adam Killer does something similar, transforming what was once fluid gameplay into the brute art of red blood on white clothes and shotgun shells soaring in the air." (Galloway, 2006, p.107)
Cannon, R. (2007). Meltdown. In A. Clarke & G. Mitchell (Eds.), Videogames and Art (1st ed., pp. 47–66). Intellect Books. https://doi.org/10.2307/j.ctv36xvrh9	"AIUEONN Six Features, Takahiko Iimura, 1993. "AIUEONN Six Features, unlike many, later art mods, did not specifically address the nature of gaming, nor the nature of gaming technology, despite its appropriation of this technology." (Cannon, 2007, p.49) Velvet-Strike, Anne-Marie Schleiner, 2002, "Velvet-Strike does not alter the normal mechanics of Counter-Strike gameplay. It is rather a tactical vehicle for creative expression, which exploits two elements of the game format of Counter-Strike: its networkedness and the function of uploading personal graffiti sprays."(Cannon, 2017, p.53)
Schmidt, R., Emmerich, K., & Schmidt, B. (2015). Applied Games – In Search of a New Definition. In K. Chorianopoulos, M. Divitini, J. Baalsrud Hauge, L. Jaccheri, & R. Malaka (Eds.), Entertainment Computing—ICEC 2015 (Vol. 9353, pp. 100–111). Springer International Publishing. https://doi.org/10.1007/978-3-319-24589-8_8	See also: Applied Game Lab https://innovationforgames.com/theappliedgameslab/ Utrecht University Game Research: https://www.uu.nl/en/research/game-research/about-us
Schrank, B. (2014). Avant-garde Videogames. Playing with Technoculture. MIT Press. https://doi.org/10.7551/mitpress/8132.001.0001	**Radical Formal:** Space Giraffe, Llamasoft (Jeff Minter), 2007 - "Like modernist painting, Space Giraffe breaks conventions in ways that encourage players to reflect on the medium and fixed-shooter genre as they play" (2014, p. 39) Untitled Game, Jodi, 1999 - "Jodi refers to game engines as "perspective engines," which promote a way of seeing and thinking about space as well as organize player behavior to dominate that space, all via Euclidean mathematics. In Untitled Game, Jodi cuts the medium apart by deconstructing its perspectival engine." (2014, p. 41) **Radical Political:** Super Columbine Massacre RPG!, Danny Ledonne, 2005 - "Super Columbine is politically avant-garde because its subject is inappropriate for games according to a mainstream perspective. Columbine mingles gameplay and spectacular tragedy in an incredibly ambivalent experience. The material it brings into the magic circle is disturbing" (2014, p. 74) Toywar, etoy, 1999 - "Toywar was an MMO game, but the objective was to drive down the actual price of eToys's stock on the NASDAQ market" (2014, p. 75) **Complicit Formal:** Domestic Tension, Wafaa Bilal, 2007. The Iraqui-American Artist "locked himself in a gallery for a month in 2007 to be bombarded with paintballs from a webcam-mounted gun operated by online players" (Shrnack, 2014, p.90). "By inviting players to target him as if they were playing a game, Bilal incited aggression as well as empathy" (2014, p. 91) [giantJoystick], Mary Flanagan, 2006. "is a work that fosters spontaneous collaboration instead of strife with strangers" (2014, p. 92) Cockfight Arena, Eddo Stern, Mark Allen, Jessica Hutchins, Karen Lofgren, 2001. "Dueling players physically gesticulate in garish, plumaged costumes and beaked hats to battle virtual roosters on-screen behind them" (2014, p. 92) **Complicit Political:** BorderXing Guide (2002-2003), Heath Bunting, Kayle Brandon. "The game BorderXing Guide [...] asks players to cross the borders of European countries illegally, surreptitiously, and without papers. An online database, accessible only in tactical geographic locations, outlines successful procedures for crossing undetected by customs, police, and military" (2014, p. 118) dead-in-iraq, Joseph DeLappe, (2006–). The artist logs-in America's Army game servers and texts the names of every US soldier killed in Iraq.

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Table 6.2 - Game Forms

Form	Definition
Conceptual Video Games see also: Conceptual Algorithms	"games are platforms for generating combinations of moves, affects, tactics, strategies, rule variations, mods, and indeed concepts that did not exist prior to play" (Jagoda, 2018a, p. 131) "video games not only as a technological medium or artistic form but also as machines for constructing new concepts in the early twenty-first century." (2018a, p. 136) "it is simultaneously possible to think of designers such as Anna Anthropy, Hideo Kojima, and Alexander D. Ocias as using programming languages and design techniques to generate new concepts.[...] game designers might be said to seduce us into ways of being and acting as they discover a language of video games that is inextricably intertwined with the problems of the digital and networked present." (2018a, p. 136) "If, as Hayles suggests, computational media carry with them the potential for change, they also have the capacity to generate new concepts. Concepts can operate as constructivist mechanics—in the specialist sense of "game mechanics," the verbs or actions that a player enacts and experiments with in order to participate in and alter the state of play." (Jagoda, 2020, pp. 33–34) In their interplay between rationality and affect, as well as science and art, digital games are a medium that instantiates an action-oriented and experiential mode of thought that enables both concept generation and experimental practice. (2020, p. 92) "targeted games (i.e., games focused around particular concepts) might be used to create conceptual change [...] We felt that, although successful, at its core ***Supercharged!*** was still a targeted conceptual game, designed to teach students a very specific way of thinking about physics." (Squire, 2008) See Also: (Squire et al., 2004)
Critical Games	"Critical play means to create or occupy play environments and activities that represent one or more questions about aspects of human life. These questions can be abstract, such as rethinking cooperation, or winning, or losing; or concrete, involved with content issues such as looking at the U.S. military actions in Cambodia in the early 1970s. Criticality in play can be fostered in order to question an aspect of a game's "content," or an aspect of a play scenario's function that might otherwise be considered a given or necessary." (Flanagan, 2009/2013, p. 6) See also: (Grace, 2014)
Citizen Science Games See also: Knowledge Games and Game With A Purpose	"games of citizen science entice players to get involved with cutting-edge research, promising that exploring data sets and simulation algorithms will be good fun. More recently, a number of citizen science projects have crafted fictional narratives to enhance player engagement." (Milburn et al., 2023, p. 70)
Crouwd Science Games	See Knowledge Games and Game With A Purpose
Curious Games	A different attitute in making games. "curious" means inquisitive activity in opposition to a static aesthetic perspective or conventional interactions. (Barr, 2012) "When you're listening, the stuff games are made of is not quiet, not transparent, and not just there to be used. It's a close companion, offering up its own ideas about game design all along the way." (Barr, 2023, p. 5) See also: https://vimeo.com/37296318
Deep Games See also: Existential Games	"games that make salient aspects of the human experience tangible to players; that enable insightful aha moments and make players see themselves, others, and life with fresh eyes; and that have transformative potential—deep games, if you so will." (Rusch, 2017, p. xix)
Demakes	"Demakes are retro-inspired reimaginings of modern games, as if they had been created on earlier hardware. Demakes are not necessarily created to run on older machines, but their design and behavior are constrained by the real or perceived constraints of vintage systems." (Bogost, 2010b) See also: (Gilbert, 2015)
Documentary Games	"These new games – if we can still call them games – simulate historical events as tragic and momentous as the Japanese attack on Pearl Harbor, the assassination of John F. Kennedy and the September 11 attack on the World Trade Center, and as infamous and topical as the tragedy at the Waco complex of the Branch Davidians, the 1999 Columbine High School shootings in Littleton, Colorado, and John Kerry's Silver Star mission in Vietnam." (Fullerton, 2008, p. 215) See also: (D. Galloway et al., 2007; Poremba, 2011; Raessens, 2006)

Reference	Example
Jagoda, P. (2018). Introduction: Conceptual Games, or the Language of Video Games. Critical Inquiry, 45(1), 130–136. https://doi.org/10.1086/699584	***Passage***, ***Dys4ia***, (Wardip-Fruin, 2019) "introduces concepts that he calls "operational logics and playable models" as a way of bringing together three elements of computational processes, representation, and affordances of play within a gamespace." (2018a, p. 134) See also: (Wardrip-Fruin, 2018) ***Metal Gear Solid V: The Phanotm Pain***. (Murray, 2018) "examines the world-making capacities of video games. She turns attention from the avatar or player character that might be the focus of conventional identity politics and focuses instead on the less frequently studied spaces and landscapes of video games." (Jagoda, 2018a, p. 135) Jason Nelson's Game, Game, Game, and again Game (2007) and Alexander D. Ocias's Loved (2010). See: (Jagoda, 2018b)
Jagoda, P. (2020). Experimental Games: Critique, Play, and Design in the Age of Gamification. University of Chicago Press. https://doi.org/10.7208/chicago/9780226630038.001.0001	
Squire, K. (2008). Open-Ended Video Games: A Model for Developing Learning for the Interactive Age. In K. Salen (Ed.), The Ecology of Games: Connecting Youth, Games, and Learning. MIT Press.	
Flanagan, M. (2013). Critical Play. Radical game design. MIT Press. (Original work published 2009	The Intruder, Natalie Bookchin, (1998–1999), https://bookchin.net/projects/the-intruder/ "The Intruder positions users in a precarious and uncomfortable place, rather than the typical "command post" position of power most computer gaming examples provide for players." (Flanagan, 2009/2013, p. 230) Metapet, Natalie Bookchin, (2002), https://bookchin.net/projects/metapet/ "In Metapet, players are constantly reminded of the ubiquitous presence of the network and of the constant upkeep they themselves do at terminals throughout the day." (2009/2013, p. 232) September 12th: A Toy World, Gonzalo Frasca and Newsgaming.com, 2003, "September 12th possesses many qualities of both a game and an artwork: it has a clearly defined set of cause-and-effect actions the player can choose to pursue, and the world thoughtfully models a problematic situation that might also classify it as a game for social change." (2009/2013, p. 240)
Milburn, C., Buse, K., Dhaliwal, R. S., Wills, M., Aldosari, R., Camarador, P., Miller, J. A., & Siegel, J. (2023). Join the Fold: Video Games, Science Fiction, and the Refolding of Citizen Science. Design Issues, 39(1), 70–87. https://doi.org/10.1162/desi_a_00707	***Foldit: First Contact***, "This is why the core thread of the ***Foldit: First Contact*** story, wrapped around protein puzzles that teach players how to participate in computational biochemistry, thematizes self-reflection: recognizing the impacts of one's own actions as a researcher, an innovator, a designer, a gamer, or a member of a high-tech civilization." (Milburn et al., 2023, p. 80) "The science fiction story reframes the meanings of these gameplay mechanics, encouraging players to extend their tactile, sculptural vision beyond the frame of the simulation." (2023, p. 86) See also: https://citizensciencegames.com
Barr, P. (2012). Curious Games. https://vimeo.com/37296318 Barr, P. (2023). The stuff games are made of. The MIT Press.	***The Artist Is Present***, Pippin Bar, 2011; ***Safety Instructions***, Pippin Bar, 2012 more at: https://pippinbarr.com
Rusch, D. C. (2017). Making deep games: Designing games with meaning and purpose. CRC Press, Taylor & Francis Group, an Informa business.	Brenda romero (Train, Siochan Leat), Jason rohrer (Passage, Creativity), Anna Anthropy (Dys4ia), Zoe Quinn (Depression Quest), Mattie Brice (Mainichi), Ed McMillan (Binding of Isaac, Super Meat Boy), Jonathan Blow (Braid), Team Ico (Ico, Shadow of the Colossus), thatgamecompany (Journey), and Minority Media (Papo & Yo, Spirits of Spring)
Bogost, I. (2010). Atari Hacks, Remakes, and Demakes. Special Topics in Game Design and Analysis, Spring 2010. Bogost.Com. http://bogost.com/teaching/atari_hacks_remakes_and_demake/	***Halo 2600***, Ed Fries, 2010
Fullerton, T. (2008). Documentary Games: Putting the Player in the Path of History. In Z. Whalen & L. N. Taylor (Eds.), Playing the Past: History and Nostalgia in Video Games (pp. 215–238). Vanderbilt University Press. https://doi.org/10.2307/j.ctv16759mn	***JFK: Reloaded.*** Traffic. (PC). Glasgow, Scotland: Traffic, 2004; Ledonne, Danny. Super Columbine Massacre RPG Website. <http://www.columbinegame.com/>

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Table 6.2 - Game Forms

Form	Definition
Ectogames	"NFTs have become the basis for novel combinations of art and play that could be called “ectogames,” ecto- here meaning outer, external. Ectogames are NFT projects that offer elements of gamescharacters, gear, fictional settings, lore, strategy, and even player communities—but lack the organizing form of a game." (Buist, 2021)
	"In this type of play, different value systems are conflated and muddled together. Here, it doesn’t matter whether we’re dealing with a recognizable game structure, narrative, or rules, because there’s always also the option of profit-based “winning.” The behaviors inspired by ***Loot*** and ***Lost Poets*** bear all the hallmarks of financialized play, including its reliance on the gamification techniques characteristic of mainstream blockchain culture." (Zeilinger, 2024)
Educational Games	"applications using the characteristics of video and computer games to create engaging and immersive learning experiences for delivering specified learning goals, outcomes and experiences." (de Freitas et al., 2006, p. 9)
	"there are many different types and “degrees” of learning games, so that any such categorization must encompass a loosely structured family of meanings where learning games can be grouped along this continuum and seen to possess some, but not always all, of the same traits." (Richards et al., 2013, p. 12)
	Framework of ten desirable characteristics of games: competition, challenge, exploration, fantasy, goals, interaction, outcomes, people, rules, and safety. (Whitton, 2009)
	"an artefact is defined as an EVG if it meets the following criteria: It is an artefact exclusively in the visual digital medium, used as an object of education through the following: (a) Rule-based gameplay [...]; (b) Variable and quantifiable outcomes, influenced by player effort [...]; (c) Fulfillment of learning outcomes in an educational context. and needs to include at least one of the following: (d) Elements of fantasy or role-playing [...]; (e) Elements of conflict or challenge[...]; (f) Interactions with others [...].” (Cole et al., 2023)
	See also: (Gee, 2005; Prensky, 2001; Shaffer, 2005; Squire, 2002)
Epistemic Games	"a simulation that preserves the connections between knowing and doing central to the epistemic frame—a form of simulation that I refer to as an epistemic game. [...] In play, we participate in a simulation of a world we want to inhabit, and epistemic play is participation in a thickly authentic simulation that gives learners access to the epistemic frame of a community of practice." (Shaffer, 2005) See also: (Shaffer, 2006a)
Exergames	"videogames that encourage physical activity in their players, arguing that the most sophisticated examples of these games attempt to translate the rhetoric of the personal trainer without simply reproducing the figure of the trainer." (Bogost, 2007, p. x)
Existential Games See also: Deep Games	"video games that focus on at least one of the four existential concerns (death, freedom, isolation, and meaninglessness), and are designed to encourage users to reflect about the considered concern (s)." (Chittaro & Sioni, 2018, p. 61) On Existential Ludology see: (Leino, 2012, 2019)
Fictional Games	"With ‘fictional games’ I refer to playful activities and ludic artefacts that exist within fictional worlds. These games are meant to trigger the imagination, and cannot be – or at least were not originally meant to be – actually played." (Gualeni, 2021, p. 189) See also: (Gualeni & Fassone, 2022)

Reference	Example
Buist, K. (2021). What's Their Game? Outland. https://outland.art/blitmap-loot-ectogames/	"In some cases ectogames are works in progress, like ***Blitmap***, a "community crafted sci-fantasy universe," that began with on-chain pixel art that then expanded into collectable characters called Blitnauts. ***Loot (for Adventurers)*** consists of eight thousand NFTs, each a randomized list of fantasy gear. Starting from this deceptively simple series of collectables—black squares with white text listing the sort of items in a Dungeons & Dragons character's inventory—users built words around it, complete with art, lore, and dozens of compatible spin-off projects." (Buist, 2021) "***Lost Poets*** by Pak is a stillevolving NFT collectible and strategy ectogame forming over a series of acts. ***Forgotten Runes Wizard Cult*** by Elf and Dotta is a collection of ten thousand pixel art wizards, buoyed by a community that's feverishly writing lore and roleplaying adventures in chat rooms. Casting the parameters of ectogames a bit wider, we could claim that all profile picture (PFP) NFT series—such as ***Cryptopunks***, ***Bored Apes***, and ***Cryptoadz***—also resemble these boundless games" (Buist, 2021)
Zeilinger, M. (2024). Financialized Play on the Blockchain. Outland.Art. https://outland.art/financialized-play-on-the-blockchain/	
de Freitas, S., Savill-Smith, C., & Attewell, J. (2006). Computer games and simulations for adult learning: Case studies from practice. Learning and Skills Network.	
Richards, R., Stebbins, L., & Moellering, K. (2013). Games for a Digital Age: K 12 Market Map and Investment Analysis. In Joan Ganz Cooney Center at Sesame Workshop, New York. The Joan Ganz Cooney Center at Sesame Workshop.	***Food Force***, UN World Food Program, 2005
Whitton, N. (2009). Learning with Digital Games (0 ed.). Routledge. https://doi.org/10.4324/9780203872987	
Cole, C., Parada, R. H., & Mackenzie, E. (2023). Why and How to Define Educational Video Games? Games and Culture, 15554120231183495. https://doi.org/10.1177/15554120231183495	
Shaffer, D. W. (2005). Epistemic Games. Innovate: Journal of Online Education, 1(6). https://nsuworks.nova.edu/innovate/vol1/iss6/2	"In ***Madison 2200***, high school students learned about urban ecology by working as urban planners to redesign State Street, a downtown pedestrian mall popular with young people in Madison. [...] Data collected in pre- and post-interviews show that in playing this game, students began to develop ways of thinking and doing characteristic of urban planners: they formed—or started to form—an epistemic frame of urban planning."
Bogost, I. (2007). Persuasive games: The expressive power of videogames. MIT Press.	Dance Aerobics; Eye Toy: Play; Video Jogger; Yourself! Fitness; Dance Dance Revolution
Chittaro, L., & Sioni, R. (2018). Existential video games: Proposal and evaluation of an interactive reflection about death. Entertainment Computing, 26, 59–77. https://doi.org/10.1016/j.entcom.2018.01.004	**Death:** Tale of Tales, The Graveyard, 2008. http://tale-of-tales.com/TheGraveyard/ Meaninglessness, freedom: Molleindustria, Every Day the Same Dream, 2009.http://www.molleindustria.org/everydaythesamedream/everydaythesamedream.html **Death, freedom:** D. Moynihan, One chance, 2010. http://awkwardsilence.co.uk/released.html Death, Isolation, Meaninglessness: M. Molinari, C. Howe, The End of Us, 2011. http://www.the-end-of-us.com/ **Freedom:** M. Persson, Drowning in Problems, 2014. http://game.notch.net/drowning/ **Death:** Numinous Games, That Dragon, Cancer, 2016. http://www.thatdragoncancer.com
Gualeni, S. (2021). Fictional games and utopia. Science Fiction Film & Television, 14, 187–207. https://doi.org/10.3828/sfftv.2021.13	***Dejarik*** (also known as ***Holochess***); ***Damage*** from the novel ***Consider Phlebas*** (Banks, 2012); ***Kepesh-Yakshi*** from the video game ***Mass Effect 3; Quidditch*** from the ***Harry Potter*** series

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Table 6.2 - Game Forms

Form	Definition
Funware See also: Gamification	"Funware: the application of game mechanics to everyday situations." (Zichermann & Linder, 2010, p. 14) "The core premise of Funware for marketers is its ability to drive user behavior in a predictable, overt, and focused way. Put another way: Funware is the art and science of turning your customers' everyday interactions into ''games'' that serve your business purposes." (2010, p. 20)
Game Essays See also: Machinima	"an interactive audio-visual work that embodies and questions games and play." (de Smale, 2016, p. 12)
Games for Change	"An important distinction is that with games for change, the player may learn about an issue, and even understand how to take action or learn how to solve a problem related to it, but the action or problem solving can take place outside of the game." (Schrier, 2016, p. 7) See also: (Antle et al., 2014; Ndulue & Orji, 2023)
Game Mods	"software packages created by fan-programmers for games generally as addons" (Postigo, 2007, p. 301) "Among computer games, ''mod'' is originally short for ''modify'' or ''modification'' and refers to player-made alterations and additions to preexisting games." (Sotamaa, 2010, p. 240) See also: (Hong, 2013; Kücklich, 2005)
Game Poems see also: Slow Games	"A Slow Year is a collection of four games, one for each season, about the experience of observing things. These games are neither action nor strategy: each of them requires a different kind of sedate observation and methodical input. The game attempts to embrace maximum expressive constraint and representational condensation. I want to call them game poems. The set comprises a little collection, a kind of videogame chapbook." (Bogost, 2010a)
Game Science See also: educational games, knowledge games	""game science" is emerging as a new term to replace "serious games" which has been a significant term for the game studies research community for the last ten years. Similar to "serious games", the new term aims to link game studies to a greater scientific capability which has the potential to help us model and better understand: the learning behaviours of individuals and groups in game environments, learning design through the metaphor of game design and how games and play work to help people learn." (de Freitas, 2018, p. 74) While it is difficult to be too prescriptive with the time periods, the research does seem to fall broadly into four broad disciplinary categories: education science including theory and practice studies and using elements of pedagogy and psychology, game science contextualised through technology enhanced learning, neuroscience that have focused upon brain-function and plasticity and information science-driven studies that focus more upon data analytics and behavioural modelling. (de Freitas, 2018, p. 76)
Games with a Purpose see also: Citizen Science Games; Knowledge games	"[...] a class of games we call "games with a purpose," or GWAPs, in which people, as a side effect of playing, perform tasks computers are unable to perform." (Von Ahn & Dabbish, 2008, p. 58) See also: (von Ahn, 2006) "The concept of GWAPs is based on the idea of harnessing human skills for purposes of research and/or data production, whether destined *to support programs to progress in their understanding of the world* or more simply to use home computers to increase the computing power at the service of a research project." (Lafourcade et al., 2015, p. xiv) "In summary, we can say that GWAPs are games, useful games, but essentially games. They are useful for the community; these are games for players. The designers of GWAPs must not ignore this duality, incurring the risk of either obtaining very few resources (if the players get tired too quickly) or of obtaining low-quality resources (if the ludic aspect is developed at the expense of the utility aspect)." (Lafourcade et al., 2015, p. xvii)
Photography Game	In category (a), photography is remediated by means of simulation, as a simulation of photography is framed by an achievement structure. [...] In category (b), photography is also remediated by means of simulation (photo mode). [...] However, photography may be implemented into games despite the lack of integrated cameras in the respective games. This may be achieved by way of (c) taking screenshots or (d) modding the game. (Möring & De Mutiis, 2019, p.87)
Knowledge Games	"I use the term "knowledge games" to label and express those games that seek to invent, create, and synthesize new understandings of the world, solve real-world problems big and small, and help us reconsider, reframe, and reflect on humanity and our universe. These games solve problems and create new understandings inside the game, but with real-world application." (Schrier, 2016, pp. 2–3) See also: (Shaffer, 2006b)

Reference	Example
Zichermann, G., & Linder, J. (2010). *Game-based marketing: Inspire customer loyalty through rewards, challenges, and contests*. Wiley.	
de Smale, S. (2016, January 1). Game Essays as Critical Media and Research Praxis. *Proceedings of 1st International Joint Conference of DiGRA and FDG*. DiGRA/FDG 2016 Conference, Dundee, Scotland, UK. https://dl.digra.org/index.php/dl/article/view/767	See also: Italian G|A|M|E Journal - ***Games on Games Project*** https://www.gamejournal.it/games-on-games-project-2/
Schrier, K. (2016). *Knowledge games: How playing games can solve problems, create insight, and make change*. Johns Hopkins University Press.	***Peacemaker***, ***Darfur Is Dying***, ***The World Peace; Game***, ***Ayiti: The Cost of Life***, ***Half the Sky***
Postigo, H. (2007). Of Mods and Modders. *Games and Culture*, 2, 300–313. https://doi.org/10.1177/1555412007307955	
Sotamaa, O. (2010). When the Game Is Not Enough: Motivations and Practices Among Computer Game Modding Culture. *Games and Culture*, 5(3), 239–255. https://doi.org/10.1177/1555412009359765	
Bogost, I. (2010). *A Slow Year: Game poems*. Open Texture.	
de Freitas, S. (2018). Are Games Effective Learning Tools? A Review of Educational Games. *Journal of Educational Technology & Society*, 21(2), 74–84.	
Von Ahn, L., & Dabbish, L. (2008). Designing games with a purpose. *Communications of the ACM*, 51(8), 58–67. https://doi.org/10.1145/1378704.1378719	"The ESP Game,22 a.k.a. the Google Image Labeler (images.google.com/ imagelabeler/), is a GWAP in which people provide meaningful, accurate labels for images on the Web as a side effect of playing the game" "Other GWAPs include Peekaboom,25 which locates objects within images (and has been played more than 500,000 human-hours); ***Phetch***, which annotates images with descriptive paragraphs; and ***Verbosity***, which collects commonsense facts in order to train reasoning algorithms. In each, people play not because they are personally interested in solving an instance of a computational problem but because they wish to be entertained." (Von Ahn & Dabbish, 2008, p. 59)
Lafourcade, M., Joubert, A., & Le Brun, N. (2015). *Games with a purpose (GWAPs)*. ISTE.	The Authors classify GWAP in: Biological Games; Games with a Medical Purpose; GWAPs for Natural Language Processing; Unclassifiable GWAPs.
Möring, S., & De Mutiis, M. (2019). Camera Ludica: Reflections on Photography in Video Games. In M. Fuchs & J. Thoss (Eds.), *Intermedia Games—Games Inter Media: Video Games and Intermediality*. Bloomsbury Academic. https://doi.org/10.5040/9781501330520	
Schrier, K. (2016). *Knowledge games: How playing games can solve problems, create insight, and make change*. Johns Hopkins University Press.	"in ***EyeWire***, neurons and the process of investigating them are transformed into a game environment, and we can use this to directly produce new knowledge with real-world applications." (Schrier, 2016, p. 8) ***Foldit*** https://fold.it; UK Cancer Reserach: ***Play to Cure***, http://www.cancerresearchuk.org; ***EteRNA; Reverse the Odds; Monster Proof; Apetopia***

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Table 6.2 - Game Forms

Form	Definition
Machinima	Machinima is the “art of making animated movies in a 3D virtual environment in real time” (Marino, 2006, p. 2)
	"Machinima movies transform gameplay through performance, spectatorship, subversion, modification, and player communities." (Lowood, 2006, p. 25) "Depicting machinima as high-performance play stems from its emergence from interrelationships of play, spectatorship, technical virtuosity, and storytelling in computer games. Each of these factors played a role in defining the practices of machinima as practices of game performance." (2006, p. 26)
	"Machinima is a relatively recent expressive form. Digital audiovisual created by appropriation and manipulation of a video-game, rejects the essential characteristic of the original text: interactivity. As such, it is more video than game. Not only: it is a meta-ludic modality: it is the way in which artists play with the digital medium. Machinima is, for all intents and purposes, a game video." (Bittanti, 2017, p. 7, translation from Italian)
	"The convergence at work in Machinima can be found on several levels. Aesthetically, the cinema, animation and video games imagery are merging into a new hybrid form. From a theoretical perspective, Machinima illustrates the recent theories of inter-mediality and new inter-relationships between many research areas." "Moreover, Machinima has finally allowed the encounter between art and video games." (Picard, 2006, p. 2)
Newsgames	"newsgames, a term that names a broad body of work produced at the intersection of videogames and journalism." (Bogost et al., 2010, p. 6) **Current Event Games:** *editorial games*, *tabloid games*, *reportage games*. "Editorial games are current event games with an argument, or those that attempt to persuade their players in some way." (2010, p.15) "Tabloid games are playable versions of soft news—particularly celebrity, sports, or political gossip." (2010, p.16) "Reportage games fall somewhere between editorial and tabloid games. They strive to emulate factual reporting, producing the videogame version of a written article or televised segment. Reportage games are carefully researched, with an eye toward factual description. [...] Unlike editorial games, they seek not to persuade players, but to educate them. And unlike documentary games [...], they are of smaller scale, and released while an issue is still current." (2010, p. 16) **Playable Infographics:** "works that adopt infographics' principles but add layers of gameplay around them. In particular, playable infographics embrace a synthetic amalgam of directed and exploratory infographic design principles." (2010, p. 47) **Documentary Newsgames:** "titles that engage broader historical and current events in a manner similar to documentary photography, cinema, and investigative reporting." (2010, p. 7) **Puzzle newsgames:** "Puzzles have not always carried news content, but experiments such as editorial crosswords and news quizzes have tried to do so." (2010, p. 8) **Literacy newsgames:** games that "offer direct or indirect education in how to become a good journalist, or for understanding why journalism is important to citizens and their communities." (2010, p. 8) **Community newsgames:** games that "create and nurture local populationsoften by situating games wholly or partly in the real world rather than in front of the screen." (2010, p. 8) **Newsgame platforms: "**systems for the creation of new forms of game-based journalism that might supplement or replace current coverage in the future.” (2010, p. 8)
Non-Games	Agains commercial games. More interested in world creation and put narratives in them. (Harvey & Samyn, 2006)
	"a form of entertainment that really doesn't have a winner, or even a real conclusion" (Iwata, 2005)
Open-Ended Video Games	"we can take one particular type of video game—open-ended simulation, or “sandbox” games—and use its capacity to recruit diverse interests, creative problem solving, and productive acts (e.g., creating artwork, game mods, or using games as tools for modeling, i.e., for building digital models of phenomena, such as world civilizations)" (Squire, 2008, p. 168) "Sandbox games are known for their status as contexts for creative player expression, with multiple solution paths (their quality is judged according to their ability to deliver such an experience) as opposed to their ability to create a more-or-less common experience. As a rule of thumb, if a game has many spots where a player can say to another, “remember where you did x,” then the game is a role-playing game, not a sandbox game. Many targeted games, such as abstract puzzle games with a high degree of emergence, also have this particular quality." (Squire, 2008, pp. 170–171)
Pervasive Games see also: Altered Reality Games (ARG)	Games that have “one or more salient features that expand the contractual magic circle of play spatially, temporally, or socially” (Montola et al., 2009, p. 12) See also: (Duggan, 2017)

Reference	Example
Marino, P. (2006). The art of machinima: 3D game-based filmmaking. Paraglyph Press.	
Lowood, H. (2006). High-performance play: The making of machinima. Journal of Media Practice, 7(1), 25–42. https://doi.org/10.1386/jmpr.7.1.25/1	***Diary of a Camper***, The Rangers, 1996. Considered the first machinima movie. Made using ***Quake (***id Software, 1996); ***Quake done Quick***, Donner et al., 1997. Made using Quake (id Software, 1996)
Bittanti, M. (Ed.). (2017). ***Machinima: Dal videogioco alla videoarte***. Mimesis.	***Videos After Videogames***, Miltos Manetas, 1996-2006
Picard, M. (2006). Machinima: Video Game As An Art Form? Loading. Journal of the Canadian Game Studies Association, 1(1).	Friedrich Kirschner, The Journey, 2004. Made using Unreal Engine 4; Friedrich Kirschner, ***person2184***, 2005. Made using Unreal Engine 4; Chris Brandt, ***Dance, Voldo, Dance***, 2005. Made using Soul Calibur (Namco & Yotoriyama, 1999); Vogt, ***Game On***, 2005
Bogost, I., Ferrari, S., & Schweizer, B. (2010). Newsgames: Journalism at play. MIT Press.	**Current Event Games** (Editoria, Tabloid, Reportage) **Editorial Games:** *Septembre 12th*, *Layoff!*, *Kabul Kaboom*, *McDonald's Videogame* **Tabloid Games:** *Hothead Zidane* **Reportage Games:** *Food Import Folly*, *Points of Entry* **Playble Infographics:** *Budget Hero*, *Sully's Flight* (chronological graphic), *The ReDistricting Game (Maps)*, *Sun Sentinel* (Diagrams) **Documentary Games:** *JFK Reloaded*, *Berlin Wall* **Puzzle Newsgames:** *Scoop!*, *Crickler* **Literacy Newsgames:** *Dead Rising*, *Beyond Good & Evil*, *Disaster at Harperville*, *Global Conflicts* series (Serious Games Interactive) **Community Newsgames:** *Picture the Impossible* (Lab for Social COmputing at Rochester Institute of Technology, Rochester Democrat and Chronicle) **Newsgame Platforms:** *Play the News* Cutthroat Capitalism: The Game, Wired, 2009. "explains how a pirate crew's modest, persistent efforts will produce significant results within the economic and social system of sea commerce that it disrupts." (Bogost, Ferrari & Schweizer, p.5) " Cutthroat Capitalism matches five of the seven genres of promising newsgames just mentioned: infographics, editorial, documentary, puzzles, and platforms." (2010, p. 9)
Harvey, A., & Samyn, M. (2006). Realtime Art Manifesto. Gaming realities: the challenge of digital culture mediaterra festival of Art and Technology, Athens, Greece. https://www.tale-of-tales.com/tales/RAM.html	See games by Tale of Tales (Harvey and Samyn): https://tale-of-tales.com/videogames.php
Iwata, S. (2005). GDC 2005: Iwata Keynote Transcript (M. Casamassina, Trans.). IGN. https://www.ign.com/articles/2005/03/11/gdc-2005-iwata-keynote-transcript	Animal Crossing
Squire, K. (2008). Open-Ended Video Games: A Model for Developing Learning for the Interactive Age. In K. Salen (Ed.), The Ecology of Games: Connecting Youth, Games, and Learning. MIT Press.	Civilization III; Grand Theft Auto: San Andreas
Montola, M., Stenros, J., & Waern, A. (2009). Pervasive Games: Theory and Design. https://doi.org/10.1201/9780080889795	**Established Genres:** Treasure hunts: *letterboxing; Geocaching; Insectopia; Manhattan Story Mashup.*- Assassination games: Killer: *The Game of Assassination; Cruel 2 B Kind*, *BotFighters* - Pervasive Larps: *The Masquerade; Prosopopeia Bardo 2: Momentum* - Alternate Reality Games: *The Beast; Majestic; The Nokia Game* series; *I Love Bees; The Art of H3ist; Push, Nevada; ReGenesis; Sanningen om Marika*. See Altered Reality Games ***Emerging Genres:*** Smart Street Sports: *PacManhattan*, *Human Pacman* (Cheok et al., 2003), and *Pac-Lan* (Rashid, Bamford, Coulton, Edwards, & Scheible, 2006); - Playful Public Performances: *Big Urban Game*; *Shelby Logan's Run; Momentum*; *I Love Bees*; *The Amazing Race*. - Urban Adventure Games: *REXplorer; Visby Under*; *Uncle Roy All Around You*; *Backseat Gaming* (Bichard, Brunnberg, Combetto, Gustafsson, & Juhlin, 2006) - Reality Games: *Scen 3*; *Vem gråter*.

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Table 6.2 - Game Forms

Form	Definition
Professional Role-Playing Games	"professional role-playing games—games that situate learners in the roles of engineers, biologists, or forensic scientists in the process of solving complex scientific problems. These games offer an intriguing mix of sociocultural and constructivist learning theory. As a sociocultural learning theorist might want to see, they set up roles for players to inhabit, and all problem solving, game play, and argumentation take place within the service of those roles." (Squire, 2008, p. 169)
Queer Games	Queergaming: "the possibilities of noncompetitive, nonproductive, nonjudgmental play, as well as the uncertainty and inefficiency of glitches, exploits, and other goofiness and the desire for queer worlds as opportunities for exploration, for different rules and goals, and even for the radical potential of failure." (Chang, 2017, p. 17)
	"A category of digital games that effectively animates not only the formal but also the sociopolitical dimension of nonsovereign play (and indeed demonstrates how the two are intricately interconnected) is what have been called queer games. These games use technical systems to explore nonnormative ways of being, often within domains of gender and sexuality." (Jagoda, 2020, p. 155)
	See also: (Ruberg, 2019)
Remakes	"Remakes are recreations of earlier works, irrespective of the hardware platform of original creation or recreation. Remakes have a long history in other media, particularly in film and television, as well as in commercial videogames." (Bogost, 2010b) See also: (Forrest & Koos, 2002)
Repurposed Games	"We propose the term "repurposed game" to define this form of "catachresis," a term first used in linguistics to refer to misuses of words (e.g., "alibi" instead of "excuse") or to figures of speech that use existing expressions and give them a new meaning." (Alvarez et al., 2023, p. 400)
Sandbox Games	See: Open-ended Video Games See also: (Breslin, 2009; Rahimi et al., 2024)
Self-Organized Worlds	"the self-organized worlds of players producing game content independently of commercial studios, especially in MMOs" (Dyer-Witheford & De Peuter, 2009, p. 193) See also: Counterplay
Serious Games	"Games may be played seriously or casually. We are concerned with serious games in the sense that these games have an explicit and carefully thought-out educational purpose and are not intended to be played primarily for amusement. This does not mean that serious games are not, or should not be, entertaining." (Abt, 1970, p. 9)
	"any form of interactive computer-based game software for one or multiple players to be used on any platform and that has been developed with the intention to be more than entertainment" (Ritterfeld et al., 2009, p. 6)
	"games that do not have entertainment, enjoyment or fun as their primary purpose" (Michael & Chen, 2005, p. xv)
	"any meaningful use of computerized game/game industry resources whose chief mission is not entertainment" (Sawyer, 2007)
	"A mental contest, played with a computer in accordance with specific rules, that uses entertainment, to further government or corporate training, education, health, public policy, and strategic communication objectives." (Zyda, 2005, p. 26)
	""Serious Game = Utilitarian function(s) + Video Game" where utilitarian functions could represent a range of activities, such as broadcasting messages, training, and collect data" (Alvarez et al., 2023, p. 399)
	See also: (De Lope & Medina-Medina, 2017; Djaouti et al., 2011; Laamarti et al., 2014; Schrage, 1999; Wilkinson, 2016)
Serious Toys	"playthings with a purpose" (Ihamäki & Heljakka, 2024, p. 36) See also: (Alvarez et al., 2023)

Reference	Example
Squire, K. (2008). Open-Ended Video Games: A Model for Developing Learning for the Interactive Age. In K. Salen (Ed.), The Ecology of Games: Connecting Youth, Games, and Learning. MIT Press.	"Within commercial entertainment games, ***Full Spectrum Warrior*** is an excellent example of such a game, as players lead a squad of soldiers who behave according to army doctrine.10 The nonplayer characters and narrators all speak to the player as if he or she is the character in the world, allowing the player to become initiated into the discourse of the military. For many educators, role-playing games—especially the more open-ended, simulation variety (such as games produced by Irrational, e.g., ***SWAT4***, and ***Looking Glass Studios***, e.g., the ***Thief*** series)—serve as excellent models for how we might build learning games." (Squire, 2008, p. 169)
Chang, E. Y. (2017). Queergaming. In B. Ruberg & A. Shaw (Eds.), Queer Game Studies (pp. 15–23). University of Minnesota Press.	
Jagoda, P. (2020). Experimental Games: Critique, Play, and Design in the Age of Gamification. University of Chicago Press. https://doi.org/10.7208/chicago/9780226630038.001.0001	Anna Anthropy, ***Dys4ia;*** Liz Ryerson, ***Problem Attic;*** Tale of Tales, ***Luxuria Superbia***
Bogost, I. (2010). Atari Hacks, Remakes, and Demakes. Special Topics in Game Design and Analysis, Spring 2010. Bogost.Com. http://bogost.com/teaching/atari_hacks_remakes_and_demake/	
Alvarez, J., Djaouti, D., Louchart, S., Lebrun, Y., Zary, N., Lepreux, S., & Kolski, C. (2023). A Formal Approach to Distinguish Games, Toys, Serious Games and Toys, Serious Repurposing and Modding, and Simulators. IEEE Transactions on Games, 15(3), 399–410. IEEE Transactions on Games. https://doi.org/10.1109/TG.2022.3186919	"In addition, leading companies from the video game industry, such as Namco-Bandai propose to repurpose existing games and assign them purposeful aims in the health domain. For example, in Japan, arcade games, such as Gator Panic were adapted to senior citizens to keep them healthy." (Alvarez et al., 2023, pp. 399–400)
	Minecraft
Dyer-Witheford, N., & De Peuter, G. (2009). Games of empire: Global capitalism and video games. University of Minnesota Press.	
Abt, C. C. (1970). Serious Games. Viking Press.	
Ritterfeld, U., Cody, M., & Vorderer, P. (Eds.). (2009). Serious Games: Mechanisms and Effects. Routledge. https://doi.org/10.4324/9780203891650	
Michael, D. R., & Chen, S. L. (2005). Serious Games: Games That Educate, Train, and Inform. Muska & Lipman/Premier-Trade.	
Sawyer, B. (2007). The 'Serious Games' Landscape. Instructional & Research Technology Symposium for Arts, Humanities and Social Science, Camden, USA. https://slideplayer.com/slide/5179634/	See also: (Sawyer & Rejeski, 2002; Sawyer & Smith, 2008)
Zyda, M. (2005). From visual simulation to virtual reality to games. Computer, 38(9), 25–32. https://doi.org/10.1109/MC.2005.297	
Alvarez, J., Djaouti, D., Louchart, S., Lebrun, Y., Zary, N., Lepreux, S., & Kolski, C. (2023). A Formal Approach to Distinguish Games, Toys, Serious Games and Toys, Serious Repurposing and Modding, and Simulators. IEEE Transactions on Games, 15(3), 399–410. IEEE Transactions on Games. https://doi.org/10.1109/TG.2022.3186919	
Ihamäki, P., & Heljakka, K. (2024). Robot Pets as "Serious Toys"- Activating Social and Emotional Experiences of Elderly People. Information Systems Frontiers, 26(1), 25–39. https://doi.org/10.1007/s10796-021-10175-z	Robotic pet toys as companions for elderly

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Table 6.2 - Game Forms

Form	Definition
Simulation Games	"In *participatory simulation games*, physical simulation places the player within the setting of the game itself. To make progress in the game, the player is then required to perform actions in the game under fictional circumstances. In digital games, examples include virtual reality and augmented reality game systems." "In *iterative simulation games*, the player is given the ability to create an end result such as a business model or a computer simulation module. This is done by plugging in known variables one at a time and observing the results of iterative changes." "In *procedural simulation games*, an action-consequence model is used to reenact a real-life process. Procedural simulation games are designed to train users to complete a process by following a well- documented set of procedures. Most training simulators fall into this category of simulation games." "*Situational simulation games* are built around a simulation model that mostly deals with the behaviors and/or emotions of people that relate closely to a group of circumstances. Recently, the definition of situational simulation games was extended to include human, computer, and non-playable characters. This was done to account for the application of advanced artificial intelligence systems in complex environments in games."
Slow Games	"In this game [***VESPER 5***, Ed.], you may take one step each day, and then you must wait for the next day. If you wish to complete the game, you will have to make it a part of your life for at least 100 days. Make a ritual out of it." (Brough, 2012) See also: (Shapiro, 2012)
Slow Serious Games	"[...] slow interactions and play with serious games, and refer to this as slow serious games. [...] the focus of our work is on deliberate and controlled slow movement, interactions and play intended to focus attention/concentration, and provide openings and opportunities for reflection, contemplation, deep thinking and learning." (Marsh, 2016, p. 52)
Smart Toys	See: Serious Toys
Social Participation Games	"They're designed to give players real-world volunteer tasks that feel as heroic, as satisfying, and—most importantly—as readily achievable as MMORPG quests." (McGonigal, 2011, p. 249) "In short, social participation games are turning us into superheroes in our real lives." (McGonigal, 2011, p. 265)
Suggestive Media	"we should give people the ability to own technology, to bring it into their own complex life stories. I know two primary tactics for doing this. The first is to create 'suggestive media' – suggestive in that they are designed to encourage or impel ludic activity, and media in that they are tools through which people experience, create, or communicate freely. The second is to employ ambiguity at all phases of design." (Gaver, 2002)
Tactical Games	"designed by activists to disseminate radical social critique" (Dyer-Witheford & De Peuter, 2009, p. 193)
Tactical Media	"tactical media is a deliberately slippery term, a tool for creating "temporary consensus zones" based on unexpected alliances. A temporary alliance of hackers, artists, critics, journalists and activists." (Lovink, 2002, p. 271) "In its most expansive articulation, tactical media signifies the intervention and disruption of a dominant semiotic regime, the temporary creation of a situation in which signs, messages, and narratives are set into play and critical thinking becomes possible. Tactical media operates in the field of the symbolic, the site of power in the postindustrial society" (Raley, 2009, p. 6)
Toy Games	"a form of videogame in which, unlike most games, the player is given no explicit goals to achieve. Such games are typically simulations of a complex technological or sociological system that can be experimented within the manner of a toy; the US designer Will Wright has described his own contributions to the form as "software toys"" (Tringham, 2013, p. 407)
Walking Simulators See also: Wandering Games	"Walking Simulators are exploratory, nonviolent video games without points, goals, or tasks, in which the undying, third-person player character (PC) wanders around a narratively rich space." (Kagen, 2022, p. 1)
Wandering Games See also: Walking Simulators	"[...] wandering in games exposes the multiplicitous possibilities of the simple human act of moving through space and complicates what such movement might mean within different game worlds." (Kagen, 2022, p. 3)

Reference	Example
Narayanasamy, V., Wong, K. W., Fung, C. C., & Rai, S. (2006). Distinguishing games and simulation games from simulators. Computers in Entertainment, 4(2), 9. https://doi.org/10.1145/1129006.1129021	*Participatory simulation games*: Dance Dance Revolution [DDRFreak 2005] *Iterative simulation games*: Game titles published by Lavamind [2005] *Situational simulation games*: such as The Sims 2 [ElectronicArts 2]
Brough, M. (2012, August 12). Mighty Vision: VESPER.5. Mighty Vision. http://mightyvision.blogspot.com/2012/08/vesper5.html	"Molleindustria U***nmanned*** [...]; thechineseroom's ***Dear Esther***, Ed Key's ***Proteus***, and anything by Belgian arthouse studio Tale of Tales, strip away any semblance of "fast gaming." (Shapiro, 2012) ***VESPER.5***, Michael Brough, 2012, http://mightyvision.blogspot.com/2012/08/vesper5.html;
Marsh, T. (2016). Slow serious games, interactions and play: Designing for positive and serious experience and reflection. Entertainment Computing, 14, 45–53. https://doi.org/10.1016/j.entcom.2015.10.001	The Reef Game, 2015, The game adopts the design approach of Slow Games to "manipulate interaction and gameplay speed with the aim to create opportunities and openings for reflection and the shaping of experience." (Marsh, 2016, p. 49)
McGonigal, J. (2011). Reality is broken: Why games make us better and how they can change the world (Ed. with a new, 2. appendix). Penguin Press.	
Gaver, W. (2002). Designing for Homo Ludens. I3 Magazine, 12.	
Dyer-Witheford, N., & De Peuter, G. (2009). Games of empire: Global capitalism and video games. University of Minnesota Press.	See Counterplay
Lovink, G. (2002). Dark fiber: Tracking critical Internet culture. MIT Press.	
Raley, R. (2009). Tactical media. University of Minnesota Press.	
Tringham, N. (2013). Toy Games. In Science Fiction Video Games (1st ed., pp. 407–412). CRC Press. https://doi.org/10.1201/b17460	Flight Simulator (1979 subLOGIC) designed by Bruce Artwick; Sim City (1989 Maxis); The Sims (2000 Maxis); Microsoft Space Simulator, 1994. Bruce Artwick Organization (BAO). Designed by Charles Guy.
Kagen, M. (2022). Wandering games. The MIT Press.	The Path, Journey; Proteus; Dear Esther (Mod); The Stanley Prable (Mod); Firewatch; Virginia; Everybody's Gone to the Rapture; Tacoma
Kagen, M. (2022). Wandering games. The MIT Press.	Return of the Obra Dinn; Eastshade; Ritual of the Moon; 80 Days; Heaven's Vault; Death Stranding; and The Last of Us Part II.

1/3 > Table 6.3 – Analytical Frameworks

Form	Definition
Behavioral Game Theory	"Behavioral game theory is about what players actually do. It expands analytical theory by adding emotion, mistakes, limited foresight, doubts about how smart others are, and learning to analytical game theory. [...] Behavioral game theory is one branch of behavioral economics, an approach to economics which uses psychological regularity to suggest ways to weaken rationality assumptions and extend theory" (Camerer, 2003, p. 3)
Critical Gameplay	"Critical gameplay provides the opportunity to explore game ethics through the way games are designed to be played." (Grace, 2011, p. 128) "Critical gameplay is the study and production of computer and video games that seek to explore alternate ways to play. These play models are derived from critical reflection on the standards of gameplay and the culture that exists around them. As a three-step process, critical gamelpay is created by observing a set of standard assumptions, deconstructing the assumptions in that standard, and reorienting that set of assumptions through the production of an alternate model of play." (2011, p. 128)
Deludology See also: Conterplay	"[...] cheating raises a number of pertinent issues about games, such as the questions of authorship, textual fluidity and rule-bounded-ness. [...] At the same time, however, cheats can be used in games research to understand how games are constructed and by what means they can be deconstructed. In other words, cheating should not only be an object but also a method of games research." (Kücklich, 2007, p. 357) "As a method, cheating allows us to reflect upon the presuppositions that we bring to games, no matter from which perspective we are studying them. It also enables us to identify blind spots in our research perspectives and thus discover new avenues of inquiry with regard to the phenomena we study." (2007, p. 357)
Experimental Games	"games, including video games, serve as a form for staging, encountering, processing, and testing experience and reality in the twenty-first century. More than this, [...] games do not merely represent or simulate reality, but also serve as an experimental form that has the potential to alter the conditions of the historical present." (Jagoda, 2020, p. xi) "[...] a simulation game may seek to model the real world with degrees of calculated external validity or an educational video game may attempt to change attitudes or behaviors within empirical constraints that can generate data about test subjects. However, in a world increasingly saturated by digital and networked media, even popular video games intended for entertainment purposes entrain players to particular modes of perception, action, and habit. Such games produce experimental situations, even if they often occur in largely uncontrolled conditions. Reciprocally, too, players regularly test a game's possibility space, but they also find themselves in the midst of experiments to which they have not entirely, or at least consciously, consented." (2020, p. xiv) "I avoid using the category of the experimental as a modifier [...]. Ultimately, there is something experimental about all games—not just the ones that scholars may find most intellectually challenging, formally novel, or politically generative." (2020, p. 73) "I mean "experimental" to signal qualities that inhere in all games, not just ones inspired by modernist and postmodernist aesthetics or by political art. To put it directly up front, games operate as experiments insofar as they combine a stable foundation of starting conditions, rules, and objectives on the one hand with the contingency and possibility of play on the other." (2020, p. 28) "Digital games, I contend, are perhaps the best test case for and the ideal form taken by the emergent contemporary art-science of experiment. Beyond the problem-solution framework of gamification, games can serve as an alternative form of experimental art-science that move us from the realm of problem solving toward problem finding or, more properly, problem making" (2020, p. xiv) For another use of "experimental" see: http://shinyspinning.com; See also: (Fullerton, 2009)
Game Theory (Mathematics)	"the study of mathematical models of conflict and cooperation between intelligent, rational decision-makers" (Myerson, 2007, p. 1) In this context, the term game refers to a "situation in which two or more decision-makers (called 'players') each has two or more alternative decisions (called 'strategies'), and for each player the result he will experience depends on the decisions of all the players" (Howard, 1971, pp. 8–9) See also: (Von Neumann & Morgenstern, 1944/2007)
Idiogame See also: Orthogame, Metagame	"A series of interesting decisions that produce a personal outcome." (DeCoster, 2013)
Instrumental Play	"There are several qualities to the approach that emerged: a focus on efficiency and instrumental orientation, dynamic goal setting, commitment to understanding the underlying game systems/structures, and technical & skill proficiency." (Taylor, 2003, p. 302) "In the examination of power gamers you begin to confront a model of play that at times looks and sounds quite unlike how we usually speak of gaming in general. The simple idea of "fun" gets turned on its head by examples of engagement that rest on efficiency, (often painful) learning, rote and boring tasks, and the like. Indeed many power gamers don't at all use the term fun to describe why they play but instead talk about a more complicated notions of enjoyment and reward. At times it almost appears as if they were speaking of... work." "I would argue that one of the problems with simple notions of fun is that it cedes the discussion of the pleasures of play to an overly dichotomized model in which leisure rests on one side and labor on another." (Taylor, 2003, pp. 309–310)

Reference	Applicative Example
Camerer, C. (2003). Behavioral game theory: Experiments in strategic interaction. Russell Sage Foundation ; Princeton University Press.	
Grace, L. (2011). Critical Gameplay. Design Techniques and Case Studies. In K. Schrier & D. Gibson (Eds.), Designing Games for Ethics: Models, Techniques and Frameworks. IGI Global. https://doi.org/10.4018/978-1-60960-120-1	Levity (1994) - http://criticalgameplay.com/levity.html "Like many Critical Gameplay games, it is a prototype of teaching an alternate value system through the mechanics of gameplay. It asks the basic question, what if the habit of collecting was discouraged? What if players were encouraged to enjoy the freedom of lack?" (Grace, 2011, p. 139) See also: http://criticalgameplay.com/page2.html
Kücklich, J. (2007). Homo Deludens: Cheating as a Methodological Tool in Digital Games Research. Convergence: The International Journal of Research into New Media Technologies, 13(4), 355–367. https://doi.org/10.1177/1354856507081951	
Jagoda, P. (2020). Experimental Games: Critique, Play, and Design in the Age of Gamification. University of Chicago Press. https://doi.org/10.7208/chicago/9780226630038.001.0001	"The unique experimentality of video games has much to do with the ways they condition experience and modulate affect as part of what I call the video game sensorium." ((Jagoda, 2020, p. 36) Blizzard, StarCraft, 1998 Jonathan Blow, Braid, 2008 The Stanley Parable (2013) Moirai, 2013 Undertale, 2015 Anna Anthropy, Dys4ia (2012) Liz Ryerson, Problem Attic (2013) Auriea Harvey & Michaël Samyn, Luxuria Superbia (2013), Jason Nelson, Game, Game, Game, and Again Game (2007) Alexander D. Ocias, Loved (2010) Durham, SPENT (2011) Jörg Lukas Matthaei, Thresholdland: An Expatriation in Ten Days (2010) Tomorrow Corporation, Little Inferno (2012). Jagoda, the parasite, 2017
Fullerton, T. (2009). Reflections on The Night Journey: An Experimental Video Game. Kritische Berichte: The Ludic Society—The Relevance of Videogames. http://www.tracyfullerton.com/assets/ReflectionsonTheNightJourney_tfullerton.pdf	Bill Viola, The Night Journey
Von Neumann, J., & Morgenstern, O. (2007). Theory of games and economic behavior (60. anniversary ed., 4. printing, and 1. paperback printing). Princeton University Press.	
Myerson, R. B. (2007). Game theory: Analysis of conflict. Harvard University Press.	
Howard, N. (1971). Paradoxes of Rationality: Theory of Metagames and Political Behavior. MIT Press.	
DeCoster, R. (2013). Beyond Dungeons & Dragons. PAX Australia, Melbourne, Australia. https://frontrowcrew.com/geeknights-lectures/111/definitions-of-game-orthogame-and-idiogame/	
Taylor, T. L. (2003). Power games just want to have fun?: Instrumental play in a MMOG. Proceedings of DiGRA 2003 Conference: Level Up, 302–311. https://dl.digra.org/index.php/dl/article/view/51	Disscussing powergamers in EverQuest MMORPG

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Table 6.3 – Analytical Frameworks

Form	Definition
Metagames	"It is how a game interfaces with life. A particular game, played with the exact same rules will mean different things to different people, and those differences are the metagame. The rules of poker may not change between a casino game, a neighborhood nickel-dime-quarter game, and a game played for matchsticks, but the player experience in these games will certainly change. The experience of roleplaying with a group of story oriented players and playing with some goal oriented power gamers is entirely different, even though the underlying rules being played with may be the same. There is of course no game without a metagame - by this definition. A game without a metagame is like an idealized object in physics. It may be a useful construct but it doesn't really exist." (Garfield, 2000, p. 16)
	"Metagames transform videogames from a mass medium and cultural commodity into instruments, equipment, tools, and toys for playing, competing, spectating, cheating, trading, making, breaking, and ultimately intervening in the sensory and political economies of those technologies responsible for the privatization of play." (Boluk & LeMieux, 2017, p. 4) "Metagames are where and when games happen, not a magic circle within which unnecessary obstacles and voluntary pursuits play out, but a messy circle that both constrains games and makes them possible in the first place. Inside this second circle, the ideological desire to distance leisure from labor, play from production, or games from life breaks down: it's metagames all the way down." (2017, p. 15)
	See also: (Carter et al., 2012; Debus, 2017)
Orthogame See also: Paragame, Metagame	"a game for two or more players, with rules that result in a ranking or weighting of the players, and done for entertainment" (Elias et al., 2012, p. 8)
	"An orthogame is a 2 or more player game where there are victory conditions. Typically I think about single player games and role playing games separately." (Garfield, 2000, p. 14)
	"what players collectively consider to be the 'right and correct game'" (Carter et al., 2012)
Paragame See also: Orthogame, Metagame	"the term paragame refers to that which is performed peripheral to, but alongside the orthogame." (Carter et al., 2012)
Paraplay	"playful activities that take place within the context of an interactive game or other play activity, but outside the activity itself." (Downs et al., 2013)
Serious Gaming	"[...] a design philosophy that focuses less on serious games and more on serious gaming. We see games not so much as vehicles for delivering curricular content as spaces for exploration, experimentation, and problem solving. We do not simply want to tap games as a substitute for the textbook; we want to harness the meta-gaming, the active discussion and speculation that take place around the game, to inform other learning activities." (Jenkins et al., 2009, pp. 448–449)
	Whereas the term "serious games" denotes games designed to convey learning material in being played through, "serious gaming" encompasses any (educational) utilization of the broader ecology of games that is, all of the technologies, practices, literacies and social processes surrounding games, like reviewing games; producing machinima; or designing virtual items, avatars, levels, or whole games. (Deterding et al., 2011, p. 10)
Situated Gaming See also: Situated Gaming	"Play is situational and reliant not simply on abstract rules but also on social networks, attitudes, or events in one's non/game life, technological abilities or limits, structural affordances or limits, local cultures, and personal understandings of leisure." (Taylor, 2006, p. 156)
	"The term situated gaming is used to evoke the specificity of context that defines particular gaming situations. Situated gaming refers to the numerous specific and particular local cultures of use that make up the global digital game ecology. It invokes a 'situated ecology', a peculiarly local and situated niche or instantiation within the digital game ecology. The situated ecology is a specific ecotone where the digital game ecology and the local rhythms of everyday life intersect." (Apperley, 2010, p. 35) "Situated gaming is an approach to examining digital games that is based upon two core principles: the materiality of the embodied experience of gaming, 'the gaming body', which is influenced by conditions stemming from the local cultures and contexts of play; and that the game experience is played out as a negotiation between the 'global' immateriality of the virtual worlds of the digital game ecology and the myriad material situated ecologies that are manifestations of the 'local'." (2010, p. 35)
	See also: (King & Krzywinska, 2006; Yates & Littleton, 1999) See also, Situated Knowledge: (Haraway, 1988)

Reference	Applicative Example
Garfield, R. (2000). Metagames. In J. Dietz (Ed.), Horsemen of the Apocalypse: Essays on Roleplaying (pp. 14–18). Jolly Roger Games.	See: https://manifold.umn.edu/projects/metagaming/resource-collection/metagames
Boluk, S., & LeMieux, P. (2017). Metagaming: Playing, competing, spectating, cheating, trading, making, and breaking videogames. University of Minnesota Press. https://manifold.umn.edu/projects/metagaming	
Elias, G. S., Garfield, R., & Gutschera, K. R. (2020). Characteristics of games (First MIT Press paperback edition). The MIT Press. (Original work published 2012)	
Garfield, R. (2000). Metagames. In J. Dietz (Ed.), Horsemen of the Apocalypse: Essays on Roleplaying (pp. 14–18). Jolly Roger Games.	
Carter, M., Gibbs, M., & Harrop, M. (2012). Metagames, paragames and orthogames: A new vocabulary. https://doi.org/10.1145/2282338.2282346	
Carter, M., Gibbs, M., & Harrop, M. (2012). Metagames, paragames and orthogames: A new vocabulary. https://doi.org/10.1145/2282338.2282346	
Downs, J., Vetere, F., & Howard, S. (2013). Paraplay: Exploring Playfulness Around Physical Console Gaming. In P. Kotzé, G. Marsden, G. Lindgaard, J. Wesson, & M. Winckler (Eds.), Human-Computer Interaction – INTERACT 2013 (Vol. 8119, pp. 682–699). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-40477-1_47	
Jenkins, H., Camper, B., Chisholm, A., & Grigsby, E. (2009). From Serious Games to Serious Gaming. In U. Ritterfeld, M. Cody, & P. Vorderer (Eds.), Serious Games: Mechanisms and Effects. Routledge. https://doi.org/10.4324/9780203891650	
Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: Defining 'gamification'. Proceedings of the 15th International Academic MindTrek Conference on Envisioning Future Media Environments - MindTrek '11, 9–15.	
Taylor, T. L. (2006). Play between worlds: Exploring online game culture. MIT Press.	
Apperley, T. H. (2010). Gaming Rhythms: Play and Counterplay from the Situated to the Global. Institute of Network Cultures.	

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Table 6.3 – Analytical Frameworks

Form	Definition
Speculative Play	"The Speculative Play project brings together the critical practices and forecasting of speculative design with the hands-on experience of play, and especially the play of interactive digital game-like things." (Khaled et al., 2020) [The project] "seeks to explore the intersection between the discursive design traditions of Speculative and Critical Design on the one hand, and the pragmatic philosophies and best practices of interaction design and playful media (PM) on the other." (Khaled et al., 2020)
	"a design frame for the development of practice of designing games that allow players to rehearse alternative presents and speculative futures." (Coulton et al., 2016, p. 1) See also: (Kunzelman, 2022)

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Table 6.4 – Conceptrual Tools

Tool	Definition
Conceptual Algorithms see also: Conceptual Video Games	"I try to formulate a few conceptual movements, a few conceptual algorithms, for thinking about video games. What is an algorithm if not a machine for the motion of parts? And it is the artfulness of the motion that matters most. Following Deleuze and Guattari, I wish my conceptual algorithms to be as ad hoc, as provisional, as cobbled together as theirs were. Let them be what Northrop Frye once called "an interconnected group of suggestions." (A. Galloway, 2006, p. xi)
Games of Emergence see also: Games of Progression	*"Emergence* is the primordial game structure, where a game is specified as a small number of rules that combine and yield large numbers of game variations, which the players then design strategies for dealing with. This is found in card and board games and in most action and all strategy games. Emergence games tend to be replayable and tend to foster tournaments and strategy guides." (Juul, 2022, p. 323) Emergence in games: **Rules interaction:** "The simplest form, which is not really emergence, I would Ilike to name rule interaction." **Combination:** "[...] games usually feature a lot of different potential game sessions to be had from their rules. This is simple combination" **Emergent strategies:** "[...] actually emergent properties that are not immediately deductible from the game rules." "As a rule of thumb, the simplest way to tell games of emergence from games of progression is to find guides for them on the net. Progression games have walkthroughs: lists of actions to perform to complete the game. Emergence games have strategy guides: rules of thumb, general tricks." (2022, p. 329) See also: (Squire, 2008)
Games of Progression see also: Games of Emergence	"Progression is the historically newer structure that entered the computer game through the adventure genre. In progression games, the player has to perform a predefined set of actions in order to complete the game. One feature of the progression game is that it yields strong control to the game designer: Since the designer controls the sequence of events, this is also where we find the games with cinematic or storytelling ambitions. This leads to the infamous experience of playing a game "on a rail", i.e. where the work of the player is simply to perform the correct pre-defined moves in order to advance the game. Progression games have walkthroughs, specifying all the actions needed to complete the game." (Juul, 2022, p. 323) "As a rule of thumb, the simplest way to tell games of emergence from games of progression is to find guides for them on the net. Progression games have walkthroughs: lists of actions to perform to complete the game. Emergence games have strategy guides: rules of thumb, general tricks." (2022, p. 329)
Video Game Sensorium (Affect in Games)	"Affect, especially as it comes through in the philosophical trajectory that leads from Baruch Spinoza to Gilles Deleuze, is a capacity to affect and be affected by people, things, and atmospheres in the world. Moreover, it names a nonconscious sensitivity to "unformed and unstructured potential" prior to the moment that it is actualized or captured." (Jacoda, 2020, pp. 86-87) "affect (in its more expansive humanistic sense) introduces an alternative way of thinking that exceeds the forms of logic and rationality that underlie traditional scientific and philosophical thought." (2020, p.87) "[...] digital games depend on the computational logic that underlies software and the rules that structure gameplay, even as they simultaneously tap into human affects in unique ways. [...] this complicated interplay between rationality and affect is part of what imbues games with such a powerful world-making capacity." (2020, p.90) "Digital games can affect and modulate attitudes, behavior, desire, and habits at an affective, which is to say nonconscious and nonrepresentational level" (2020, pp.91-92) "the ways in which video games condition experience and modulate affect through what I will call the video game sensorium" (2020, p.74) The video game sensorium is represented by "the specific experiences of spatiality, temporality, velocity, interactivity, participation, system perception, procedural activity, and networked sociality that video games make available." (2020, p.93)

Reference	Applicative Example
Khaled, R., Bourgault, S., Sych, S., & Barr, P. (2020). NEO//QAB: Creating a World Through Speculative Play. ISEA2020: 26th International Symposium on Electronic Art. https://isea-archives.siggraph.org/presentation/neo-qab-creating-a-world-through-speculative-play/ http://www.speculativeplay.com Quebec FRQSC funded project	ChaBoT (Rilla Khaled) NEO//QAB (Rilla Khaled + team) Aunties-Algorithms (Rilla Khaled + team) It is as if you were doing work (Pippin Barr) It is as if you were making love (Pippin Barr) http://www.speculativeplay.com
Coulton, P., Burnett, D., & Gradinar, A. (2016, June 27). Games as Speculative Design: Allowing Players to Consider Alternate Presents and Plausible Futures. https://doi.org/10.21606/drs.2016.15	

Reference	Applicative Example
Galloway, A. (2006). Gaming. Essays on Algorithmic Culture. University of Minnesota Press.	
Juul, J. (2022). The Open and the Closed—Games of Emergence and Games of Progression. In F. Mäyrä (Ed.), Computer Games and Digital Cultures Conference Proceedings (pp. 323–329). Tampere University Press. https://www.jesperjuul.net/text/openandtheclosed.html	**Rules interaction:** "Quake III: Rocket-jumping. (Fire rocket into the ground, fly on the blast.); Deus Ex: Proximity Mine Climbing" **Combination:** "The variety of possible states and game sessions that a game's rules allow." **Emergent strategies:** "All game strategies. (Imperfect emergence - rules of thumb rather than absolute commands.)" "The teamplay required in ***Counter-strike*** or the advantage of working in groups in ***EverQuest***.", "Dominant, complete strategies. (Completely defined strategies that will always lead to victory.)" "On a most general level, ***EverQuest*** is a game of emergence, in this case a large world governed by a typical ***Dungeons & Dragons*** system [...]. At the same time EverQuest contains a large number of quests, where a computer-controlled character (non-player character, NPC) through a simple conversation system presents the player with a task to complete [...] his is of course a progression structure since the game in detail describes the actions that the player has to perform. As such, EverQuest is a game of emergence, with embedded progression structures." (Juul, 2022, p. 328)
Juul, J. (2022). The Open and the Closed—Games of Emergence and Games of Progression. In F. Mäyrä (Ed.), Computer Games and Digital Cultures Conference Proceedings (pp. 323–329). Tampere University Press. https://www.jesperjuul.net/text/openandtheclosed.html	"Branching narratives are probably the purest example of this: Everything that happens in a branching narrative is explicitly pre-determined." "What the emergence aspect of EverQuest does not do is characterise the more social/cultural aspects of the world. This is rather done using progression structures, with NPCs giving away small amounts of personal story and background such as personal conflicts as they send the player on a quest. So the social aspects of the world are characterised using progression." (Juul, 2022, p. 328)
Jagoda, P. (2020). Experimental Games: Critique, Play, and Design in the Age of Gamification. University of Chicago Press. https://doi.org/10.7208/chicago/9780226630038.001.0001	

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Table 6.5 - Practices

Practice	Definition
Archeogaming	Archaeogaming, broadly defined, is the archaeology both in and of digital games. [...] In archaeogaming, archaeology is not used as an analogy or metaphor for a certain kind of analysis. [...] digital games are archaeological sites, landscapes, and artifacts, and the game-spaces held within those media can also be understood archaeologically as digital built environments containing their own material culture. The gaming archaeologist (or archaeogamer) understands that all games can be explored on two levels: in-game (synthetic world) and extra-game (natural world), existing at the same time, using hardware as a nexus connecting the two. Archaeogaming does not limit its study to those video games that are set in the past or that are treated as "historical games," nor does it focus solely on the exploration and analysis of ruins or of other built environments that appear in the world of the game. Any video game—from Pac-Man to Super Meat Boy—can be studied archaeologically. (Reinhard, 2018) See also: (Reinhard, 2024) For more references and case studies, see: https://archaeogaming.com
Bad Play	"two potentially inclusive categories of generic bad play: play that is threatening, risky, or otherwise ***harmful*** to the self or others; and play that is ***against the rules***. Of these two, the former can be considered a ***functional*** definition of bad play; the latter can be considered, in contrast, a ***formal*** definition of bad play" (Myers, 2010, p. 17)
Countergaming	"Here is a summary, then, of the formal differences between conventional video gaming and countergaming: 1. ***Transparency versus foregrounding***. (Removing the apparatus from the image versus pure interplay of graphics apparatus or code displayed without representational imagery.) 2. ***Gameplay versus aestheticism***. (Narrative gameplay based on a coherent rule set versus modernist formal experiments.) 3. ***Representational modeling versus visual artifacts***. (Mimetic modeling of objects versus glitches and other unexpected products of the graphics engine.) 4. ***Natural physics versus invented physics.*** (Newtonian laws of motion, ray tracing, collisions, etc., versus incoherent physical laws and relationships.) 5. ***Interactivity versus noncorrespondence.*** (Instant, predictable linkage between controller input and gameplay versus barriers between controller input and gameplay.) Looking at this list, one may conclude that there exists no true avantgarde of gamic action today. [...] We need an avant-garde of video gaming not just in visual form but also in actional form. We need radical gameplay, not just radical graphics. So here is another principle, which I hope will further develop the as yet unrealized potential of art gaming: 6. ***Gamic action versus radical action.*** (Conventional gaming poetics versus alternative modes of gameplay.)" "[...] countergaming is an unrealized project. An independent gaming movement has yet to flourish, something that comes as no surprise, since it took decades for one to appear in the cinema. But when it does, there will appear a whole language of play, radical and new, that will transform the countergaming movement [...]" (A. Galloway, 2006, p. 126)

Reference	Applicative Example
Reinhard, A. (2018). Archaeogaming: An introduction to archaeology in and of video games. Berghahn.	"There are five main themes, each with room for growth and participation: 1) Archaeogaming is the study of physical video games as well as the metadata surrounding the games themselves. [...] 2) Archaeogaming is the study of archaeology within video games. [...] 3) Archaeogaming is the application of archaeological methods to synthetic space. [...] 4) Archaeogaming is the approach to understanding how game design manifests everything players see and interact with in-world. [...] 5) Archaeogaming is the archaeology of game mechanics and the entanglement of code with players. [...]"
Reinhard, A. (2018). Archaeogaming: An introduction to archaeology in and of video games. Berghahn.	
Galloway, A. (2006). Gaming. Essays on Algorithmic Culture. University of Minnesota Press.	**Transparency versus Foregrounding:** *% My Desktop*, 2002, Jodi, https://www.moma.org/collection/works/193145 - "They are an excellent example of the countergaming technique of "foregrounding." Jodi works with computers in the same way that Dan Sandin works with video or Raymond Queneau worked with words—irreverently manipulating a medium at its most fundamental level." (A. Galloway, 2006, p. 114) *untitled game, 1998-2002, Jodi* - - "[untitled game] foregrounds the gaming apparatus both through the use of visual material and through code. The work often lapses into pure data, streaming real-time code up the screen with little or no representational imagery at all[...]. This is a way of foregrounding the apparatus of the game's source code. But at other times, the code is ignored, and the image apparatus is foregrounded purely through the kaleidoscopic interplay of images." (2006, p. 115) **Gameplay versus Aestheticism:** "A common outcome of having no gameplay is having no explicit narrative. Mods like *Adam Killer*, *Super Mario Clouds* (Cory Arcangel), and most of Jodi's work follow this tendency—Pit Schultz refers to this as "aestheticizing the technical error."In all these works, any conventional sense of gameplay is obscured." "A slightly different approach to the use of unintended narratives is seen in Velvet Strike[...], or in Condon's in-game performance titled Worship. While not technically mods, these works still attack conventional gamic form by creating unintended scenarios and narratives inside the game. They create conditions of estrangement and unpleasure" "Consider also the example of machinima (like *Red vs. Blue* [Rooster Teeth Productions], Jim Munroe's *My Trip to Liberty City*, or Eddo Stern's *Sheik Attack*) where artists remove gameplay altogether, substituting it with the rote choreography of a noninteractive video." (2006, p. 118) **Representational Modeling versus Visual Artifacts:** "Glitches in the graphics engine break the illusion of representational modeling. Eddo Stern calls these glitches "artifacts" [...] For example, the op art visual effects of Jodi's *SOD* or *untitled game* (particularly the sections "*Ctrl-9*," "*Ctrl-F6*," "*Ctrl-Space*," "*O-O*," "*Slipgate*," and "*V-Y*") are visual artifacts resulting from both the lack of anti-aliasing in the game's graphics engine and a baseline screen resolution of seventy-two dots per inch, but the streaming onscreen code in the work ("*A-X*," "*M-W*," and "*V-Y*") is a deliberate effort to foreground the real-time data of the game software." (2006, p. 119) See also: (Stern, 2002) **Natural Physics versus Invented Physics:** "*Untitled game* (particularly the sections "*E1M1AP*," " i," and "*Q-L*"), on the other hand, introduces a set of entirely counterintuitive physical laws, wherein space warps and spins for no reason at all. The physical laws of the work are not predictable or intelligible. They are entirely invented." "The glitch effect known as "trailing" (or "hall of mirrors"), where the background image is not refreshed as objects pass across it, resulting in an iterative smear effect, is often used in artist-made game mods, as in *r/c*, *Adam Killer*, or *QQQ*." (2006, pp. 119–120) **Interactivity versus Noncorrespondence:** "[...] to comment again on Jodi's *untitled game*, in artist mods the keyboard and mouse often become uncoupled from the physical space of the game entirely, leaving the player at a loss for any type of faithful interactivity." "Many artist game mods are completely noninteractive, not unlike watching a game play by itself in demo mode. *Super Mario Clouds* is a good example of this. Or consider Eddo Stern's *Fort Paladin: America's Army*, which celebrates the removal of interactivity entirely by robotically automating the act of gameplay. The work is less game than sculpture." (2006, pp. 121–122) **Gamic action versus radical action:** By radical action, I mean a critique of gameplay itself. [...] Artists should create new grammars of action, not simply new grammars of visuality. They should create alternative algorithms. They should reinvent the architectural flow of play and the game's position in the world, not just its maps and characters. Ruth Catlow's *Activate: 3 Player Chess* does this; the *Etoy Toywar* did this; the "everybody must win" philosophy of Fuller's "World Game" also shows the way—an evocative idea when one considers that these works exhibit almost none of the given countergaming principles. Other examples are few and far between."

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Table 6.5 - Practices

Practice	Definition
Counterplay	"acts of contestation within and against the ideologies of individual games of Empire" (Dyer-Witheford & De Peuter, 2009, p. 193)
	"Counterplay is an important concept for digital game scholarship as it does not privilege the compulsive element of play, instead providing an account of play that emphasizes how the relationships between players and digital games oscillates between compulsion and adaptation, training and practice." "Counterplay challenges the validity of models of play that suggest digital games compel the players to play according to encoded algorithms, which they must follow exactly in order to succeed. Instead, it opens the possibility of an antagonistic relationship between the digital game and player. An antagonism that is considerably more high stakes than the player overcoming the simulated enemies, goals and challenges that the game provides, rather it is directed towards the ludic rules that govern the digital games configurations, processes, rhythms, spaces, and structures." (Apperley, 2010, p. 102)
	"The term “counterplay” is repurposed here to encapsulate play that is understood as oppositional, anti-social, and even criminal by its players and observers. Counterplay can therefore be regarded as being counter to the general expectation of compliant conventional play and instead contains a dynamic that works against rules, against other players, seeks alternate ways of playing and potentially different pleasures." (Meades, 2015, p. 12) "As we shall see, there are a number of other terms that capture some of this dynamic – cheating, trolling, grief-play, transgressive play, abject play, dark play etc. – but instead, counterplay is used here in an attempt to simultaneously differentiate between these terms and to present a less pejoratively loaded term to better emphasize what I believe to be the universality of counterplay" (2015, p. 12)
Dark Play See: Counter Play.	"Putting someone other than yourself at risk during play includes bullying and other aggressive forms of childhood play—sometimes labeled "dark play"." (Myers, 2010, p. 17)
	See also: (Linderoth & Mortensen, 2015; Schechner, 1988)
Situationist Play	“a kind of invisible insurrection (Trocchi, 1963) that acts internally into the video ludic system, without modifying neither the gameplay nor the code. It is a transformative operation that, similarly to IS [Situationist International, t/n], plays with the formal characteristics of the video ludic medium deriving its contentions: it appropriates the principles of situationist detournement to trigger a process of re-functionalization of the game space with the goal to begin a reorganization of its discrete units and its meanings [...]” (Fantacci, 2023, p. 157) [translation from Italian]
Transgressive Play	"Transgressive play is a symbolic gesture of rebellion against the tyranny of the game, a (perhaps illusory) way for the played subject to regain their sense of identity and uniqueness through the mechanisms of the game itself." (Aarseth, 2007, p. 131)

Reference	Applicative Example
Dyer-Witheford, N., & De Peuter, G. (2009). Games of empire: Global capitalism and video games. University of Minnesota Press.	"We survey six pathways of multitudinous activity that can be seen, sensed, or speculated on at the margins—and sometimes deep in the heart—of contemporary video game culture: ***counterplay*** [...]; ***tactical games*** [...]; ***polity simulators***[...]; the ***self-organized worlds*** [...]; ***software commons*** [...]" (Dyer-Witheford & De Peuter, 2009, p. 191)
Apperley, T. H. (2010). Gaming Rhythms: Play and Counterplay from the Situated to the Global. Institute of Network Cultures.	
Apperley, T. H. (2010). Gaming Rhythms: Play and Counterplay from the Situated to the Global. Institute of Network Cultures.	
Myers, D. (2010). Bad Play. In Play Redux: The Form of Computer Games. University of Michigan Press. https://doi.org/10.2307/j.ctv65swkk	
Fantacci, G. (2023). Sovversioni Videoludiche. Dalle avanguardie alle pratiche performative in-game. G|A|M|E Games as Art, Media, Entertainment, 1(10), 147–163.	See also: https://www.ludozofi.com/home/games/situationist-games/ https://1000littlehammers.wordpress.com/wp-content/uploads/2012/02/dissolving.pdf
Aarseth, E. (2007). I Fought the Law: Transgressive Play and The Implied Player. Proceedings of DiGRA 2007 Conference: Situated Play. Proceedings of DiGRA 2007 Conference: Situated Play. https://dl.digra.org/index.php/dl/article/view/282	

1/1 > Table 6.6 - Game Design Strategies, Approaches & Methodologies

	Definition
Critical Game Design	"What is needed, we argue, are epistemic practices, material interventions, and institutional and noninstitutional systems that work toward the deep synthesis of game design, cultural critique, and reflective design research practices." (Malazita & O'Donnell, 2023, p. 6)
Gamification	""Gamification" is the use of game design elements in non-game contexts." (Deterding et al., 2011, p. 10) "a process of enhancing a service with affordances for gameful experiences in order to support user's overall value creation." (Huotari & Hamari, 2012, p. 19) "Gamification replaces these real, functional, twoway relationships with dysfunctional perversions of relationships. Organizations ask for loyalty, but they reciprocate that loyalty with shams, counterfeit incentives that neither provide value nor require investment. When seen in this light, "gamification" is a misnomer. A better name for this practice is exploitationware. And as a concept, exploitationware has numerous rhetorical benefits:" (Bogost, 2011b) "Gamification is bullshit. I'm not being flip or glib or provocative. I'm speaking philosophically." (Bogost, 2011a) "Bullshit is not mere nonsense, but a name for the process of persuading an audience irrespective of the truth value of the propositions presented." (Bogost, 2014, p. 69) Gamification is not really a style of game design or a manner of putting games to use. Rather, it's a style of consulting that happens to take up games as its solution. (2014, p. 68) See also: (Frankfurt, 2005) "Gamification, I would like to suggest, names a condition of seepage through which game mechanics and objectives come to constitute the work, leisure, thought patterns, affects, and social relations of the overdeveloped world—that is, the very ways that a privileged population (to which I, in several senses, belong) interfaces with the real." (Jagoda, 2013, p. 116) See also: (Jagoda, 2020)
Iterative Design	"Iterative design is a design methodology based on a cyclic process of prototyping, testing, analyzing, and refining a work in progress. In iterative design, interaction with the designed system is used as a form of research for informing and evolving a project, as successive versions, or iterations of a design are implemented." (Zimmerman, 2003) "Iterative design is a process-based design methodology, but it is also a form of design research. In each of these three case studies, new questions emerged out of the very process of design, questions that were not part of the initial investigation but were nevertheless addressed through iterative play and design." (2003)
MDA Framework	*"MDA (Mechanics, Dynamics, and Aesthetics) is a formal approach to understanding games - one which attempts to bridge the gap between game design and development, game criticism, and technical game research." (Hunicke et al., 2004)* See also: (Walk et al., 2017)
Method for Design Materialization	"a methodological approach for capturing game design that we call the method for design materialization (MDM), which has been conceived of in light of the particular context of academic game design." (Khaled & Barr, 2023, p. 55)
Procedural Rhetoric (Persuasive Games)	"videogames that mount procedural rhetorics effectively." (Bogost, 2007, p. 46) "procedural rhetoric is the practice of persuading through processes in general and computational processes in particular." (2007, p. 2)
Situational Game Design See also: Situated Gaming	"Situational game design is a design methodology that takes into account how play unfolds when the player either isn't interacting or isn't trying to win. It sees interactivity and winning not as foundational to play, but merely as two useful strategies for the construction of playful situations." (Upton, 2018, p. 5)

Reference	Applicative Example
Malazita, J., & O'Donnell, C. (2023). Introduction: Toward Critical Game Design. Design Issues, 39(1), 4–13. https://doi.org/10.1162/desi_e_00702	
Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: Defining 'gamification'. Proceedings of the 15th International Academic MindTrek Conference on Envisioning Future Media Environments - MindTrek '11, 9–15.	
Huotari, K., & Hamari, J. (2012, October 3). Defining Gamification—A Service Marketing Perspective. ACM J. https://doi.org/10.1145/2393132.2393137	
Bogost, I. (2011a). Persuasive Games: Exploitationware. https://www.gamedeveloper.com/design/persuasive-games-exploitationware	
Bogost, I. (2011b). Gamification is Bullshit. Bogost. Com. http://bogost.com/writing/blog/gamification_is_bullshit/ Bogost, I. (2014). Why gamification is bullshit. In S. P. Walz & S. Deterding (Eds.), The Gameful World (pp. 65–80). The MIT Press. http://www.jstor.org/stable/j.ctt1287hcd.7 See also: Frankfurt, H. G. (2005). On bullshit. Princeton University Press.	
Jagoda, P. (2013). Gamification and Other Forms of Play. Boundary 2, 40(2), 113–144. https://doi.org/10.1215/01903659-2151821 See also: Jagoda, P. (2020). Experimental Games: Critique, Play, and Design in the Age of Gamification. University of Chicago Press. https://doi.org/10.7208/chicago/9780226630038.001.0001	
Zimmerman, E. (2003). Play as Research. In B. Laurel (Ed.), Design Research: Methods and Perspectives. MIT Press.	SiSSYFiGHT 2000, LOOP, and LEGO Junkbot
Hunicke, R., LeBlanc, M., & Zubek, R. (2004). MDA: A Formal Approach to Game Design and Game Research. Proceedings of the AAAI Workshop on Challenges in Game AI, 4(1). https://users.cs.northwestern.edu/~hunicke/MDA.pdf	
Khaled, R., & Barr, P. (2023). Generative Logics and Conceptual Clicks: A Case Study of the Method for Design Materialization. Design Issues, 39, 55–69. https://doi.org/10.1162/desi_a_00706	Application case study on: Pippin Barr, ***It is as if you were making love***, 2018, http://pippinbarr.com/itisasifyouweremakinglove/info/
Bogost, I. (2007). Persuasive games: The expressive power of videogames. MIT Press.	Gaede, Owen. ***Tenure***. Minneapolis: Control Data Corporation, 1975. "***Tenure*** outlines the process by which high schools really run, and it makes a convincing argument that personal politics indelibly mark the learning experience. I suggest the name procedural rhetoric for the new type of persuasive and expressive practice at work in artifacts like ***Tenure***. Procedurality refers to a way of creating, explaining, or understanding processes. And processes define the way things work: the methods, techniques, and logics that drive the operation of systems, from mechanical systems like engines to organizational systems like high schools to conceptual systems like religious faith. Rhetoric refers to effective and persuasive expression. Procedural rhetoric, then, is a practice of using processes persuasively. More specifically, procedural rhetoric is the practice of persuading through processes in general and computational processes in particular."
Upton, B. (2018). Situational game design. CRC Press, Taylor & Francis Group.	

Chapter Bibliography

For the sake of brevity, this bibliography only includes works referenced in the main text. Bibliographical references for table items are provided within the tables themselves.

Aarseth, E. J., Smedstad, S. M., & Sunnanå, L. (2003). A multi-dimensional typology of games: Level Up. In M. Copier & J. Raessens (Eds.), *Level Up: Digital Games Research Conference Proceedings* (pp. 48–53). Universteit Utrecht.

Abt, C. C. (1970). *Serious Games*. Viking Press.

Arjoranta, J. (2014). Game Definitions: A Wittgensteinian Approach. *Game Studies*, *14*(1). https://gamestudies.org/1401/articles/arjoranta

Avedon, E. M., & Sutton-Smith, B. (1971). *The study of games*. J. Wiley.

Caillois, R. (2001). *Man, play, and games* (M. Barash, Trans.). University of Illinois Press. (Original work published 1958)

Crawford, C. (1984). *The Art of computer game design: Reflections of a master game designer*. Osborne/McGraw-Hill.

Elias, G. S., Garfield, R., & Gutschera, K. R. (2012). *Characteristics of games*. MIT Press.

Elverdam, C., & Aarseth, E. (2007). Game Classification and Game Design: Construction Through Critical Analysis. *Games and Culture*, *2*(1), 3–22. https://doi.org/10.1177/1555412006286892

Fink, E. (2008). *Oasi del gioco. Idee per una ontologia del gioco.* (A. Calligaris, Ed.). Cortina. (Original work published 1957)

Huizinga, J. (2002). *Homo ludens*. Einaudi. (Original work published 1939)

Juul, J. (2005). *Half-Real. Video Games between Real Rules and Fictional Worlds*. MIT Press.

Kirsh, D., & Maglio, P. (1994). On Distinguishing Epistemic from Pragmatic Action. *Cognitive Science*, *18*(4), 513–549. https://doi.org/10.1207/s15516709cog1804_1

Markauskaite, L., & Goodyear, P. (2017). *Epistemic Fluency and Professional Education* (Vol. 14). Springer Netherlands. https://doi.org/10.1007/978-94-007-4369-4

Rollings, A., & Morris, D. (2004). *Game architecture and design* (New ed). New Riders.

Salen, K., & Zimmerman, E. (2004). *Rules of Play*. MIT Press.

Schniz, F. (2020). *Genre und Videospiel: Einführung in eine unmögliche Taxonomie*. Springer VS.

Stenros, J. (2017). The Game Definition Game: A Review. *Games and Culture*, *12*(6), 499–520. https://doi.org/10.1177/1555412016655679

Suits, B. (2005). *The grasshopper: Games, life and utopia*. Broadview Press. (Original work published 1978)

Taylor, T. L. (2009). The Assemblage of Play. *Games and Culture*, *4*(4), 331–339. https://doi.org/10.1177/1555412009343576

von Neumann, J., & Morgenstern, O. (1944). *Theory of games and economic behavior*. Princeton University Press.

Von Neumann, J., & Morgenstern, O. (2007). *Theory of games and economic behavior* (60. anniversary ed.). Princeton University Press. (Original work published 1944)

Wark, M. (2021). *Capital is dead. Is this something worse?* Verso.

Wittgenstein, L. (1953). *Philosophical Investigations*. Wiley-Blackwell.

Zhang, J., & Patel, V. L. (2006). Distributed cognition, representation, and affordance. *Pragmatics & Cognition*, *14*(2), 333–341. https://doi.org/10.1075/pc.14.2.12zha

7. Design Gameplay

7.1. Introduction

In Chapter 2 I have discussed the theoretical bridges that situate video games as the paradigmatic artifacts that constitute the commodity form in contemporary digital capitalist and technocultural society. I have defined it as the *Game Form*, and I have argued that it is needed a deeper connection between game and design research in order to better understand and design in the contemporary product-service system. In Chapter 6 I have presented a semi-systematic review of the *game-forms* (cf. Table 6.2), that I have described as the concrete expressions of the video game artifact that enable various forms of engagement—and thus the construction of meaning—between users/players and the medium itself (cf. Table 7.1). I have also classified game-related theoretical frameworks, conceptual tools, and game design strategies, and methodologies (cf. Tables 6.3, 6.4, 6.5, 6.6). From these premises, in this chapter I further expand on the argument that *game-forms* have the potential to be adopted as epistemic tools in design research. More specifically, they represent current and flexible knowledge artifacts in research *through* design.

In order to develop such argument, in this chapter I adopt the understanding of video games and *game-forms* as *objets ambigues*. As it is argued in the following section, this interpretation of the game artifact allows to define a *creative possibility space* which is open to both design subjectivities and shared modes of co-creation. The boundaries of the *creative possibility space* are malleable, permeable, and dynamically defined by the creative negotiation that happens between designers and other participants in the design process. In this model, designers can use the *game-forms* and the theoretical and practical tools that derive from game research to develop flexible analytical and applicative design methodologies. I define such dynamic model *design gameplay* and I consider its application in design research.

The *design gameplay* model is described using a synoptic framework which systematizes the insights coming from the research. It presents possible applications in design research and innovation. This model is later tested in the applicative case studies presented in Chapter 8.

7.2. Video Games as *objets ambigues*

In this thesis, the form of video game has been investigated through a literature and case study review which provided an articulated landscape of definitions, interpretation and understanding of this medium. Moreover, the previous chapters looked at the video game artifact from the perspective of its industrial production, its role in negotiating the power relationship in late capitalist Western economy, and its communicative and expressive use in contemporary technocultural panorama. This analysis shows that video games are an open-ended medium, which can be interpreted from multiple perspectives and situated within a wide range of theoretical analysis and applicative practices. Therefore, it appears compelling to the framework proposed by this research adopting Felix Schniz's understanding of video games as *objet ambigu* (Schniz, 2020, 2023).

The concept is derived from Paul Valéry's dialogue *Eupalinos ou l'Architecte* (Valéry, 1924). *Eupalinos* is a dialogue between Socrates and Phaedrus that take place in Ades. Socrates is telling a story about an object he found while walking on the seashore when he was young:

> "L'adolescence est singulièrement située au milieu des chemins... Un jour de mes beaux jours, mon cher Phèdre, j'ai connu une étrange hésitation entre mes âmes. Le hasard, dans mes mains, vint placer l'objet du monde le plus ambigu. Et les réflexions infinies qu'il me fît faire, pouvaient aussi bien me conduire à ce philosophe que je fus, qu'à l'artiste que je n'ai pas été..." (Valéry, 1924, p. 34)

In the first instance, the ambiguity of the found object relate to Socrates potentiality, in that specific phase of his life, to pursue different paths in either philosophy or architecture. Such alternative, represented by the ambiguity of the object, "must have consisted in its indeterminacy with regard to its theoretical or aesthetic objecthood [Gegenständlichkeit] or objectification [Vergegenständlichung]", provoking countless considerations that "played between the possibilities "to construct" [construire] and "to know" [connaître]"(Blumenberg, 1964/2022, p. 416). Contemplating the object, young Socrates reflects on his future: will he become a philosopher or an architect?

> "Là même. J'ai trouvé une de ces choses rejetées par la mer; une chose blanche, et de la plus pure blancheur; polie, et dure, et douce, et légère. Elle brillait au soleil, sur le sable léché qui est sombre, et semé d'étincelles. Je la pris; je soufflai sur elle; je la frottai sur mon manteau, et sa forme singulière arrêta toutes mes autres pensées. Qui t'a faite? pensais-je. Tu ne ressembles à rien, et pourtant tu n'es pas informe. Es-tu le jeu de la nature; ô privée de nom, et arrivée à moi, de par les dieux, au milieu des immondices que la mer a répudiées cette nuit?" (1924, p. 57)

Socrates tries to understand the nature of the object observing it from multiple angles. It appears as an indefinite and enigmatic object, somewhat ordinary but hardly definable in this wholeness. Parts of it can be recognized but cannot stand together under one single definition. Socrates wonders: is it the work of nature – created by the continuous friction of the waves on the object's surface – or is it the work of an artisan? Socrates, after having observed the object for a while, suddenly throws it away. In that specific moment, young Socrates makes his decision to become a philosopher. As highlighted by Schniz, the way the story is told, shifts its focus from the object to the subject, Socrates, and the potential that the object unveiled in its beholder (Schniz, 2020, 2023).

According to Schniz, video games are *objets ambigus* since they evoke different potentiality in players. When interacting with video games, players choices and agency within the system of rules of the game allows for the expression of individual subjectivities and potential. Within the possibility space (Squire, 2008) of the game, the *objet ambigue* invites us to be creative and innovative. Schniz suggest that the value of conceiving video games as *objets ambigues* lays on the "focus on subjectivity, human creativity, and potential in the process of playing"[1]. Extending such understanding into the field of design, allows to approach video games not only as mere technological tools for design research, or as designed artifacts for the market-exchange system.

My argument is that, when approaching video games as *objets ambigues* in the field of design, they offer a similar duality to that described by Valéry between constructing (designing) and knowing (doing design research). This tension defines a creative potential that situates video games and the experience of playing, designing and, broadly speaking, engaging with them, alongside the approaches and the methodologies that generate design knowledge and lead toward the design of novel artifacts. In section §7.5 I describe such an approach as *Design Gameplay*.

Adopting a visual metaphor, several components intervein in shaping video games as *objets ambigues*. From a design perspective, it is useful to conceive such form as a dynamic materialization of intrinsic and extrinsic tensions, similar to those that define the commodity form (cf. §2.4).

The gamespace is a system defined by rules (Salen & Zimmerman, 2004) with which players interact in a fictional world (Juul, 2005). Such system offers a possibility space where players can experience *intellectual* and *identity* play (Squire, 2008). Players, each one with their own subjectivity, interact with the gamespace through tangible and intangible technological system from the perspective of a material world characterized by social and political structures different from the fictional one (Taylor, 2009). In the gamespace, players are continuously faced with decisions and speculation[2] that stratifies during gameplay (Kunzelman, 2022). However, players can appropriate and re-functionalize (Bittanti & Quaranta, 2006) the gamespace, they can subverted it (Flanagan, 2009/2013) and extend it into a liminal space in continuous negotiation between the fictional and the actual world, between the ludic, political, critical and the aesthetic experience (Fig. 7.1).

The interplay between such intrinsics and extrinsic tensions, and the resulting interpretations, knowledge, applications, artistic and political expression which materialize as *game-forms* (cf. Chap.6), derive from the understanding of video games as *objets ambugues*. The potential of video games for designers is therefore in the diverse and dynamic combinations they can be interpreted in design research, and in the novel modes of inquiry they enable. As young Socrates on the shore, we - as designers - encounter this *objet ambigu*. Whether we choose to throw it away or keep it, we open to the exploration of the creative possibilities of *Design Gameplay* (cf. §7.5).

1 Personal correspondence, 2024.

2 With a particular focus on science fiction games, Kunzelman describes the "mechanics of speculation" as the "ways that games specifically ask us to engage in speculative practices while playing them" (Kunzelman, 2022, p. 22). As presented by Kunzelman, those mechanics are specific to the medium and can produce several effects on the players, from Brechtian estrangement to the stage of the differences between the actual and the fictional world, between one ideology or the other.

Figure 7.1 - Creative Possibility Space

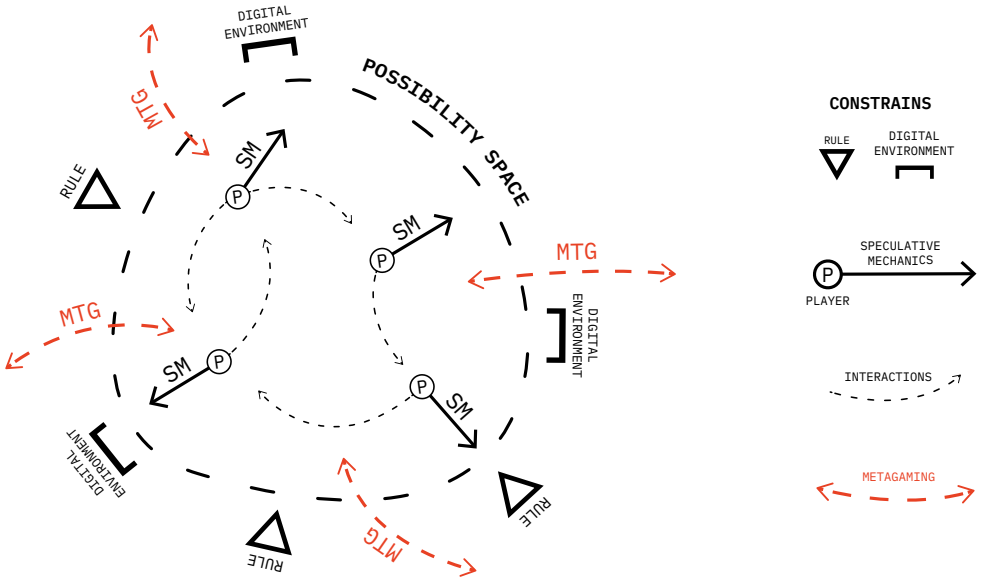


Table 7.1 - Qualitative analysis of game-forms

	Type of Engagement											
	Social	Political	Educational	Training	Physical	Economic	Philosophical	Artistic	Gamplay	Critical	Ethical	Analytical
Activist Games	●	●										
Advergames						●						
Alternate Reality Games	●		●			●			●			
Art Games							●	●				
Applied Games	●		●		●							
Art Mods								●	●	●		
Avant-garde Games		●						●				
Conceptual Video Games												●
Critical Games	●	●								●	●	
Citizen Science Games			●									●
Crowd Science Games			●									●
Deep Games							●	●				
Demakes									●			
Documentary Games	●	●										
Ectogames						●						
Educational Games			●									
Epistemic Games												●
Exergames					●				●			
Existential Games							●					
Fictional Games		●								●		
Funware						●						
Game Essay			●									●
Games for Change	●	●	●									
Game Mods									●			
Game Poems							●	●				
Game Science			●									●
Game With A Purpose			●									●
Photography Game	●							●	●			
Knowledge Games			●									●
Machinima	●							●		●		
Newsgames	●	●										
Non-Games							●	●		●		
Open-Ended Video Games									●			
Pervasive Games			●		●				●			
Professional RPGs				●								
Queer Games		●							●	●		
Remakes									●			
Repurposed Games			●									●
Sandbox Games									●			
Serious Games			●	●								
Serious Toys			●	●								
Slow Games				●					●			
Slow Serious Games							●		●			
Simulation Games			●	●					●			
Smart Toys			●	●								
Social Participation Games			●									●
Suggestive Media										●		●
Tactical Media	●	●								●		
Tactical Games	●	●								●		
Toy Games			●						●			●
Walking Simulators									●			
Wandering Games	●	●							●	●	●	

Business Model							Game Mode		Creative Strategies					
B2B	B2C	R2B	A2S	N2S	R2S	S2S	Single Player	Multiplayer	Re-mediation	Re-functional.	Appropriation	Subversion	Adaptation	
			●	●	●		●	●		●	●	●	●	Activist Games
	●						●	●		●				Advergames
●	●				●			●						Alternate Reality Games
			●				●		●	●			●	Art Games
●		●					●	●		●				Applied Games
			●				●			●	●	●	●	Art Mods
	●		●	●	●		●		●		●	●		Avant-garde Games
			●		●		●	●	●	●	●			Conceptual Video Games
			●		●		●	●		●	●	●		Critical Games
				●	●			●		●				Citizen Science Games
				●	●			●		●				Crowd Science Games
			●		●	●	●						●	Deep Games
						●	●					●		Demakes
			●		●	●	●		●	●			●	Documentary Games
	●							●		●				Ectogames
●	●			●	●		●	●		●			●	Educational Games
					●		●	●		●				Epistemic Games
	●			●	●		●	●		●				Exergames
			●			●	●			●				Existential Games
			●						●					Fictional Games
●	●						●			●	●			Funware
			●		●				●	●	●			Game Essay
				●	●		●	●		●				Games for Change
	●					●	●	●		●	●			Game Mods
			●		●		●		●	●			●	Game Poems
				●	●			●		●				Game Science
●	●				●			●		●				Game With A Purpose
	●		●			●	●		●	●				Photography Game
					●		●	●		●				Knowledge Games
			●			●			●	●	●		●	Machinima
	●				●	●	●		●	●			●	Newsgames
			●		●	●	●			●		●		Non-Games
	●						●	●						Open-Ended Video Games
●	●						●	●	●					Pervasive Games
●		●					●	●		●			●	Professional RPGs
	●		●			●	●	●				●	●	Queer Games
	●					●	●	●					●	Remakes
●		●			●		●	●		●				Repurposed Games
	●						●	●						Sandbox Games
●		●					●	●		●				Serious Games
	●						●	●		●				Serious Toys
	●						●	●					●	Slow Games
			●			●	●	●						Slow Serious Games
				●	●		●	●		●				Simulation Games
	●						●	●		●				Smart Toys
				●	●			●		●				Social Participation Games
					●		●	●		●				Suggestive Media
			●			●	●	●		●		●		Tactical Media
			●		●	●	●	●		●		●		Tactical Games
	●		●			●	●			●				Toy Games
	●		●			●	●						●	Walking Simulators
			●			●	●				●		●	Wandering Games

Table 7.2 - **Analytical Frameworks**

	Area of Analysis	References
Behavioral Game Theory	Economy	(Camerer, 2003)
Critical Gameplay	Ethics / Critical	(Grace, 2011)
Deludology	Gameplay / Critical	(Rusch, 2017)
Experimental Games	Critical	(Jagoda, 2020)
Idiogame	Gameplay / Society	(Carter et al., 2012) See also: Metagame, Paragame, Orthogame
Instrumental Play	Gameplay / Society	(Taylor, 2003)
Metagames	Gameplay / Society / Politics / Economy	(Boluk & LeMieux, 2017; Carter et al., 2012; Debus, 2017; Garfield, 2000)
Orthogame	Gameplay	(Carter et al., 2012; Elias et al., 2012/2020; Garfield, 2000) See also: Metagame, Ideogame, Paragame
Paragame	Gameplay / Society	(Carter et al., 2012) See also Metagame, Ideogame, Orthogame
Paraplay	Gameplay / Society	(Downs et al., 2013)
Serious Gaming	Education / Critical	(Deterding et al., 2011; Jenkins et al., 2009)
Situated Gaming	Subjectivity	(Apperley, 2010; Haraway, 1988; Taylor, 2006)
Speculative Play	Critical	(Coulton et al., 2016; Khaled et al., 2020; Kunzelman, 2022)

Table 7.3 - **Conceptual Tools**

	Area of Analysis	References
Conceptual Algorithms	Gameplay/Procedurality	(Galloway, 2006)
Games of Emergence	Gameplay	(Juul, 2022)
Games of Progression	Gameplay	(Juul, 2022)
Video Game Sensorium	Gameplay/Subjectivity	(Jagoda, 2020)

Table 7.4 - **Practices**

	Area of Application	References
Archeogaming	Platform Studies, Archeology, Digital Archeology, Game Design & Mechanics	(Reinhard, 2018, 2024)
Bad Play	Gamplay	(Myers, 2010)
Countergaming	Gamplay, Art	(Galloway, 2006)
Counterplay	Gamplay, Politics	(Apperley, 2010; Dyer-Witheford & De Peuter, 2009; Meades, 2015)
Dark Play	Social	(Linderoth & Mortensen, 2015; Myers, 2010; Schechner, 1988)
Situationist Play	Art	(Fantacci, 2023)
Transgressive Play	Gameplay	(Aarseth, 2007)

Table 7.5 - **Game Design Strategies, Approaches & Methodologies**

	Area of Application	References
Critical Game Design	Gameplay & Mechanics, Game Design, Critical Design	(Malazita & O'Donnell, 2023)
Gamification	Economy, Education, Training, Politics	(Bogost, 2011, 2014; Deterding et al., 2011; Huotari & Hamari, 2012; Jagoda, 2013, 2020)
Iterative Design	Game Design, Analysis	Zimmerman, E. (2003). Play as Research. In B. Laurel (Ed.), Design Research: Methods and Perspectives. MIT Press.
MDA Framework	Game Design & Analysis	(Hunicke et al., 2004; Walk et al., 2017)
Method for Design Materialization	Game Design & Analysis	(Khaled & Barr, 2023)
Procedural Rhetoric	Politics, Social	(Bogost, 2007)
Situational Game Design	Game Design & Subjectivity	(Upton, 2018)

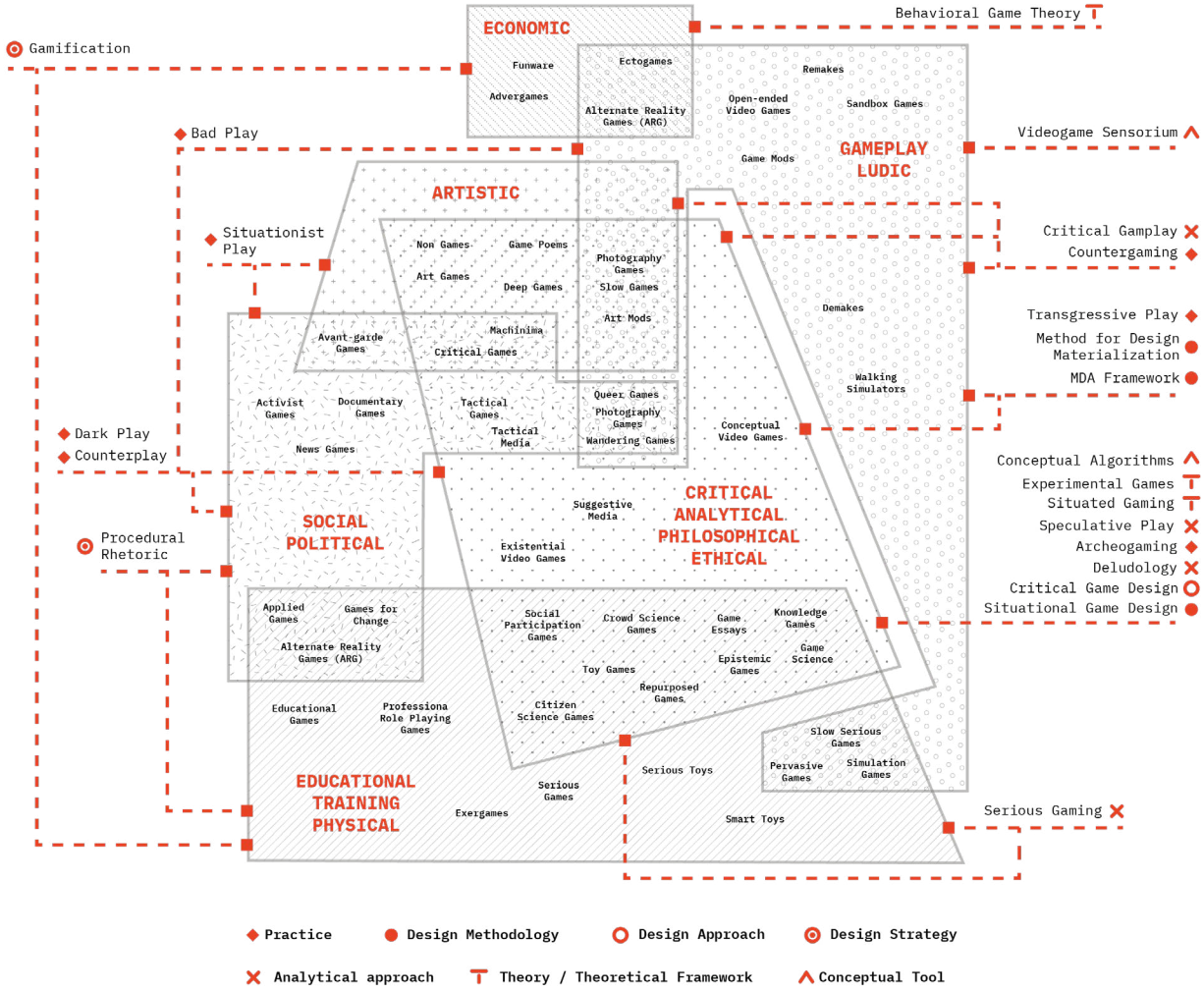


Figure 7.2 - Synoptic Framework

7.3. Game-forms as *objets ambigues*

The adoption of the *objet ambigu* as an ontological tool for understanding video games in design research allows to apply such perspective on the *game-forms* that have been described in Chapter 6. I have analyzed *game-forms* according to a set of key evaluation parameters that are used to synthetically describe and situate each item within design research and practice (Table 7.1). These parameters are grouped into categories:

- *Type of engagement*: describes the applicative context and the expected outcome deriving from the use of such form. The kind of engagement can be: Social; Political; Educational; Training; Physical; Economic; Philosophical; Artistic; Ludic; Analytical; Ethical.

- *Spatial dimension*: describes whether the item is predominantly used in a physical, digital or hybrid space. Although the analysis focuses on video games, some forms have strong connection with the physical space.

- *Game mode*: describes if an item is designed to be used by a single user or multiple users at the same time.

- *Business model*: describes if an item is designed and used for a Business-to-Business (B2B), Business-to-Consumer (B2C), or a Research-to-Business (R2B) market. Other models, such as Artistic-to-Society (A2S), Non-Profit-to-Society (N2S), and Research-to-Society (R2S) are mapped, Society-to-Society (S2S). Society is used as an umbrella term both for identifying society as a whole, and for specific communities of interest and practices.

This qualitative evaluation considers the general and salient characteristics of each *game-form*. It is, however, non-exhaustive of other interpretation and non-representative of all applications, either already implemented or potential. In the analysis presented in Table 7.1, *game-forms* are classified according to the creative practices identified in Section §5.5: *Re-mediation*, *Re-functionalization*, *Appropriation*, *Subversion*, *Adaptation*. These strategies, though originally contextualized within an artistic framing, offer modes of engagement with *game-forms* that can also be effectively implemented in design research.

As emerged from the semi-systematic literature review presented in Chapter 6, it is possible to identify a second set of items composed by analytical frameworks (Table 7.2), conceptual tools (Table 7.3), Practices (Table 7.4), and game design strategies, approaches and methodologies (Table 7.5). Each of this research item are classified according to their primary domain of analysis or application.

Comparing *game-forms* with this second set of items, it is possible to establish interconnections according to common analysis and application domains. Such connections are described in a synoptic framework illustrated in Figure 7.2. The emerging landscape describe a rich ecosystem which is hardly frameable in a static picture, due to the dynamic *ambiguity* of the *objects,* and the subjectivities that shape the emerging creative relationships. It is within such an environment that designer question *game-forms* as *objects ambigues* and develop their own knowledge artifacts, approaches and methodologies through a dynamic research process I define *design gameplay* (cf. §7.5).

7.4. Design Gameplay: Bridging Game Cultures and Design Research

As argued in the previous chapters (cf. §2.3), a deeper connection between the game and design fields is required by the characteristics of the contemporary product-service system and by the continuous transformation it is undergoing under social, cultural, economic, technological, and ecological influences. The need for a greater integration between game-related disciplines and design is highlighted by James Malazita and Casey O'Donnell in their 2023 curated issue of *Design Issues*. The curators argues that the distance between games and design is still present (Malazita & O'Donnell, 2023), despite it had already been addressed by researchers and designers like Brenda Laurel (Laurel, 2003) and Peter Lunenfeld (Lunenfeld, 2003) over twenty years ago. As Malazita and O'Donnell note, current game industry training and professionalization mainly take place within the context of computer science programs, where there is limited integration between technical skills development and a broader concern for the political and cultural role of game artifacts. Such distance between design and game cultures also echoes in the difficult integration between Game Studies and Game Design. According to Deterding, despite the effort of the Game Study community to establish themselves as a legitimate and fundamentally different research field (Aarseth, 2001) that defined its identity, strength and challenges through interdisciplinarity (Krzywinska et al., 2005; Mäyrä, 2008), Game Studies failed to become the "umbrella interdiscipline *of* (digital) game research" (Deterding, 2017, p. 12). On the contrary, Game Studies scholars "have become a sub-community *within* game research" (2017, p. 12).

On a direct and empiric level, during the interviews and the personal conversation I had for the purpose of this research, I have often witnessed such distance between researchers' and developers' perspectives. Therefore, what Malazita and O'Donnell deem desirable are "epistemic practices, material interventions, and institutional and noninstitutional systems that work toward the deep synthesis of game design, cultural critique, and reflective design research practices" (Malazita & O'Donnell, 2023, p. 6) (Fig. 7.3).

The synthesis between disciplines, as highlighted by the Authors, require the construction of bridges on multiple levels: research, practice, institutional (academic and administrative) and non-institutional (cultural and creative networks, productive and industrial sectors). The contribution of this thesis moves toward such direction. It does so on an analytical and practical level through the systematization of the clusters of practices, and the creative strategies identified in Chapter 5; through the classification of *game-forms* and game-related theoretical and practical instruments mapped in Chapter 6; and by the definition of synoptic framework of their interconnections presented in the previous paragraph. The application of such analysis into the design field is presented in the next chapter through the description of the developed experimentations. On the theoretical level, the thesis aims to bridge game cultures with design research through the concept of video games as *objects ambigues* (cf.§7.2) as knowledge artifacts of R*t*D (cf. §2.3, §7.3). The *objet ambigu* allows to synthetize in the creative potential of video games the formal, critical, and analytical perspectives that the different disciplines have projected on game artifacts. Such theoretical framework understands design research as a dynamic *Design Gameplay* in which designers manipulate *game-forms*,

apply and experiment *on* and *through* game technologies, and, more broadly, develop a playful/gameful approach for the development of design knowledge.

To better argument what I mean by Design Gameplay, it is useful to recall what the concept of gameplay describes.

> "...the gameplay experience can be defined as an ensemble made up of the player's sensations, thoughts, feelings, actions and meaning-making in a gameplay setting. Thus it is not a property or a direct cause of certain elements of a game but something that emerges in a unique interaction process between the game and the player." (Ermi & Mäyrä, 2005, p. 2)

According to the gameplay experience model proposed by Ermi and Mäyrä, gameplay "is represented as interaction between a particular kind of a game and a particular kind of a game player" (2005, p. 7). In this model, there are three dimensions which concurs to the definition of the gameplay experience: Sensory immersion, Challenge-based immersion, Imaginative immersion (therefore the model is abbreviated SCI-model). For the Authors, immersion, understood as becoming part of the experience itself both physically and/or virtually, is a key component of gameplay[3].

These levels of immersion are elements that define the *Design Gameplay* experience as well. Perceptual aspects are crucial in experimental design practices that involve Virtual and Augmented Reality systems (Neroni et al., 2021). Challenge-based immersion is connected with the concept of the flow state, a balanced level of challenge and reward, characterized by complete concentration, clarity of goals, immediate feedbacks, sense control (Cziksentmihalyi, 1991/2008). As acknowledged by Cziksentmihalyi, the flow concept, originally described in the field of phycology, has been largely used to develop ideas in several fields, including that of design. Lastly, imaginative immersion, relates to the narrative and fictional qualities of the experience as well as with how non-diegetic elements are integrated. Speculative Design and Design Fiction practices largely rely on the interplay between diegetic and non-diegetic elements, fictional and actual scenarios (Auger, 2013; Celi & Formia, 2015). Therefore, the concept of immersion, as described by Ermi and Mäyrä, finds direct correlation in the activity/gameplay of design research.

Nevertheless, I find useful to expand the concept of immersion adopting Jagoda's conceptual tool of *video game sensorium* (Jagoda, 2020a). Jagoda, as previously mentioned, argues that, in the contemporary socio-cultural environments characterized by digital and networked technologies deeply intertwined with an experimental[4] economic system (Thomke, 2003), video games represent an iterative form art-science experiment (cf. Par.5.3). Such quality is deeply connected with the way video games are experienced in relation with the *video game sensorium*. The *video game sensorium* is defined by "the specific experiences of spatiality, temporality, velocity, interactivity, participation, system perception, procedural activity, and networked sociality that video games make available" (Jagoda, 2020a, p. 93). Immersion plays an important role in modulating the perceived experience of playing. However, the *video game sensorium* explicitly acknowledges the social and systemic relations that affect the experience of gameplay. In other terms, the *video game sensorium* expands the subjectivity invoked by the *object ambigu* and puts it in relation with other subjectivities.

3 As recalled by Ermi and Mäyrä, Pine and Gillmore (1999) have proposed a classification of different kind of experiences on the basis of the kind of user's participation (active-passive) and connection (immersion-absorption): entertainment (passive absorption), educational (active absorption), aesthetic (passive immersion), escapist (active immersion). According to this classification, gameplay experiences are escapist experiences which require active immersion in the game world.

4 Contemporary global markets are a dynamic exchange field which materialize the experimental economy in which non-specialists are active actors of a "mainstream method for maximizing innovation" (Jagoda, 2020b, p. 74) that has been made possible by technological transformation. Digital interfaces and networked digital systems, in fact, have redefined the way users experience, navigate and interact with physical and digital spaces, and how product's life cycle is managed (cf. Par 5.2). In the experimental economy, the production and consumption paradigms are no longer the ones that characterize the traditional industrial and post-industrial economy. In fact, in the experimental economy, commodities emerge from an iterative experimental process of production and re-production (Thomke, 2003; Thrift, 2008), rather than being a direct output of a linear production process based on problem finding and problem solution. In the experimental economies, commodities are in a constant state of evolution and transformation that involve consumers' participation. In designer's terms, the definition of the commodity form is a process of continuous innovation determined by socio-cultural, economic, environmental and technological variables (Celaschi, 2000, 2008). If the commodity form is an expression of such context, on the other way around, designer should consider how the commodity form can influence users' agency inside the experimental economy.

I therefore define *Design Gameplay* as the dynamic creative negotiation among subjectivities, material and immaterial networks and practices, scientific and non-scientific modes of inquiry, for the generation of design knowledge through the experimental affordances of video games. *Design Research Gameplay* is how design researchers build meaning, find problems, envision solutions. In the *Design Research Gameplay*, designers transfer in the creative process their own subjectivities and experiences that derive from the interaction with the multilayered complexity of the ludic artifact.

Out of the numerous contribution which have defined the relationship between design and research (cf. §2.2), one which I find compelling for the perspective I have developed in this research is that proposed by Eric Zimmerman that understands play as research. For Zimmerman (2003), design itself is a form of research.

> "Design research, when it occurs through the practice of design itself, is a way to ask larger questions beyond the limited scope of a particular design problem. When design research is integrated into the design process, new and unexpected questions emerge directly from the act of design." (Zimmerman, 2003, p. 176)

As argued by Zimmerman, the emergence of new knowledge and, more noticeably, new questions derive from an iterative process in which the interaction with the designed systems activates a circular process of design, test, and analysis. Iterative designs applies both to game and product-service development. Iteration, however, as previously discussed, is also the defining characteristics of the experimental economies. This aspect adds to connections that insist between video games, their understanding as research *through* design artifacts, and their emergence as the contemporary paradigmatic form of commodities.

In conclusion, *Design Gamplay*, upending Zimmerman's perspective on *play* as *research*, aims to understand *research* as *play*. Through the creative potential of *game-forms* as *objets ambigues*, their possible assemblages, their integration within iterative research *through* design methodologies, designers explore experiential art-science experimentation into a new *creative possibility space* of design research. The following chapter presents the applicative experimentations that were developed to develop the *Design Gameplay* and evaluate its potential and limits.

Chapter Bibliography

Aarseth, E. (2001). Computer Game Studies, Year One. *Game Studies: An International Journal of Computer Game Research*, *1*. http://www.gamestudies.org/0101/editorial.html

Auger, J. (2013). Speculative Design: Crafting the Speculation. *Digital Creativity*, *24*. https://doi.org/10.1080/14626268.2013.767276

Bittanti, M., & Quaranta, D. (Eds.). (2006). *Gamescenes: Art in the age of videogames*. Johan & Levi.

Blumenberg, H. (2022). Socrates and the objet ambigu: Paul Valéry's Discussion of the Ontology of the Aesthetic Object and Its Tradition (H. Bajohr, F. Fuchs, & J. P. Kroll, Trans.). In *History, Metaphors, Fables. A Hans Blumenberg Reader*. Cornell University Press and Cornell University Library. https://doi.org/10.1515/9781501748004 (Original work published 1964)

Celaschi, F. (2000). *Il design della forma merce*. Il Sole 24 Ore.

Celaschi, F. (2008). Il Design come mediatore tra bisogni. Il Design come mediatore tra saperi. In C. Germak (Ed.), *L'Uomo al centro del progetto. Design per un nuovo umanesimo.* (pp. 19–31). Umberto Allemandi & C.

Celi, M., & Formia, E. (2015). Advanced design practices for sharing futures: A focus on design fiction. *The Value of Design Research - 11th International European Academy of Design Conference*, 16. https://doi.org/10.7190/ead/2015/141

Cziksentmihalyi, M. (2008). *Flow: The Psychology of optimal experience*. Harper Perennial. (Original work published 1991)

Deterding, S. (2017). The Pyrrhic Victory of Game Studies: Assessing the Past, Present, and Future of Interdisciplinary Game Research. *Games and Culture*, *12*(6), 521–543. https://doi.org/10.1177/1555412016665067

Ermi, L., & Mäyrä, F. (2005, January 1). Fundamental Components of the Gameplay Experience: Analysing Immersion. *Proceedings of DiGRA 2005 Conference: Changing Views: Worlds in Play*. Proceedings of DiGRA 2005 Conference: Changing Views: Worlds in Play. https://dl.digra.org/index.php/dl/article/view/119

Flanagan, M. (2013). *Critical Play. Radical game design*. MIT Press. (Original work published 2009)

Jagoda, P. (2020a). *Experimental Games: Critique, Play, and Design in the Age of Gamification*. University of Chicago Press. https://doi.org/10.7208/chicago/9780226630038.001.0001

Jagoda, P. (2020b). *Experimental Games. Critique, Play, and Design in the Age of Gamification*. The University of Chicago Press.

Juul, J. (2005). *Half-Real. Video Games between Real Rules and Fictional Worlds*. MIT Press.

Krzywinska, T., Mäyrä, F., & Crogan, P. (2005). *"hardcore: Introduction"*. DiGRA.Org. https://digra.org/hc1-krzywinska-et-al-hardcore-introduction/

Kunzelman, C. (2022). *The World Is Born From Zero: Understanding Speculation and Video Games*. De Gruyter. https://doi.org/10.1515/9783110719451

Laurel, B. (Ed.). (2003). *Design Research: Methods and Perspectives*. MIT Press.

Lunenfeld, P. (2003). The Design Cluster. In B. Laurel (Ed.), *Design research: Methods and perspectives* (pp. 10–15). MIT Press.

Malazita, J., & O'Donnell, C. (2023). Introduction: Toward Critical Game Design. *Design Issues*, *39*(1), 4–13. https://doi.org/10.1162/desi_e_00702

Mäyrä, F. (2008). *An Introduction to Game Studies: Games in Culture*. SAGE Publications Ltd. https://doi.org/10.4135/9781446214572

Neroni, M. A., Oti, A., & Crilly, N. (2021). Virtual Reality design-build-test games with physics simulation: Opportunities for researching design cognition. *International Journal of Design Creativity and Innovation*, *9*(3), 139–173. https://doi.org/10.1080/21650349.2021.1929500

Pine, B. J., & Gilmore, J. H. (1999). *The Experience Economy: Work is Theatre and Every Business a Stage*. Harvard Business Press.

Salen, K., & Zimmerman, E. (2004). *Rules of Play*. MIT Press.

Schniz, F. (2020). Das Videospiel. Ein objet ambigu. In *Genre und Videospiel* (pp. 15–24). Springer VS, Wiesbaden. https://doi.org/10.1007/978-3-658-27244-9_2

Schniz, F. (2023). Solving the True, Good, and Beautiful Puzzle. The Video Game as Objet Ambigu. *Colloquium: New Philologies*, *8*(1–2), 164–178. https://doi.org/10.23963/cnp.2023.8.1.9

Squire, K. (2008). Open-Ended Video Games: A Model for Developing Learning for the Interactive Age. In K. Salen (Ed.), *The Ecology of Games: Connecting Youth, Games, and Learning*. MIT Press.

Taylor, T. L. (2009). The Assemblage of Play. *Games and Culture*, *4*(4), 331–339. https://doi.org/10.1177/1555412009343576

Thomke, S. H. (2003). *Experimentation Matters: Unlocking the Potential of New Technologies for Innovation*. Harvard Business School.

Thrift, N. (2008). *Non-representational theory: Space, politics, affect*. Routledge.

Valéry, P. (1924). Eupalinos ou L'Architecte. In L. Süe & A. Mare, *Architectures: Recueil publié sous la direction de Louis Süe & André Mare ; comprenant un dialogue de Paul Valéry et la présentation d'ouvrages d'architecture, décoration intérieure, peinture, sculpture et gravure contribuant depuis mil neuf cent quatorze a former le style français*. Èditions De La Nouvelle Revue Française.

Zimmerman, E. (2003). Play as Research. In B. Laurel (Ed.), *Design Research: Methods and Perspectives*. MIT Press.

8. Practice-Based Case Studies

8.1. Introduction

In this section, I discuss the emerging opportunities, criticalities, and outcomes arising from the practical experimentations I developed during the three years of the research (Fig. 8.1). These applications allowed me both to conceptualize and evaluate the *Design Gameplay* (cf. §7.4).

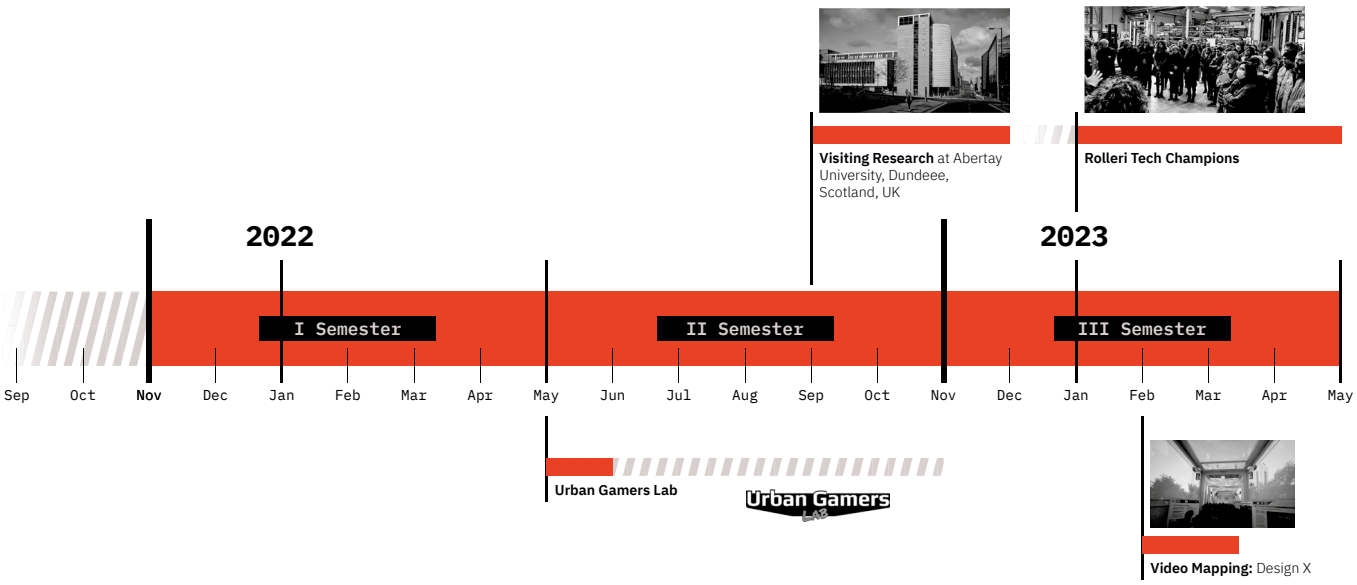
As discussed in the previous chapter, I describe *Design Gameplay* as a dynamic creative negotiation among subjectivities, material and immaterial networks and practices, scientific and non-scientific modes of inquiry, for the generation of design knowledge through the experimental affordances of video games.

The discussion, rather than analyzing the single case studies and their individual outcomes (some of which are described in the Appendix) focuses on the approach that designers, students, and other involved participants developed during the activity. During the various activities, indeed, participants engaged with the *game-forms* and game/play-related creative strategies that I have described and categorized in Chapter 6.

I have adopted such methodological approach because, in the practice-base part of this research, I am concerned with understanding how the *game-forms* and the creative strategies revolving around games that I have theoretically analyzed so far can be integrated into design research and practice scenarios. Moreover, the decision to adopt such methodological approach also depends on to the need to investigate the *Design Gameplay* not only in confined experimental settings but also in real-world context. In fact, most of the case studies that have been considered for this discussion have been developed within the activities of the *Advanced Research Unit* of the University of Bologna, the academic research organization I belong to. Some of these were designed with a gameful or playful approach since the beginning, while in others, this approach was introduced during implementation. Alongside these case studies, I developed other activities to evaluate specific research aspects, develop technical knowledge, and implement a reflective R*t*D practice.

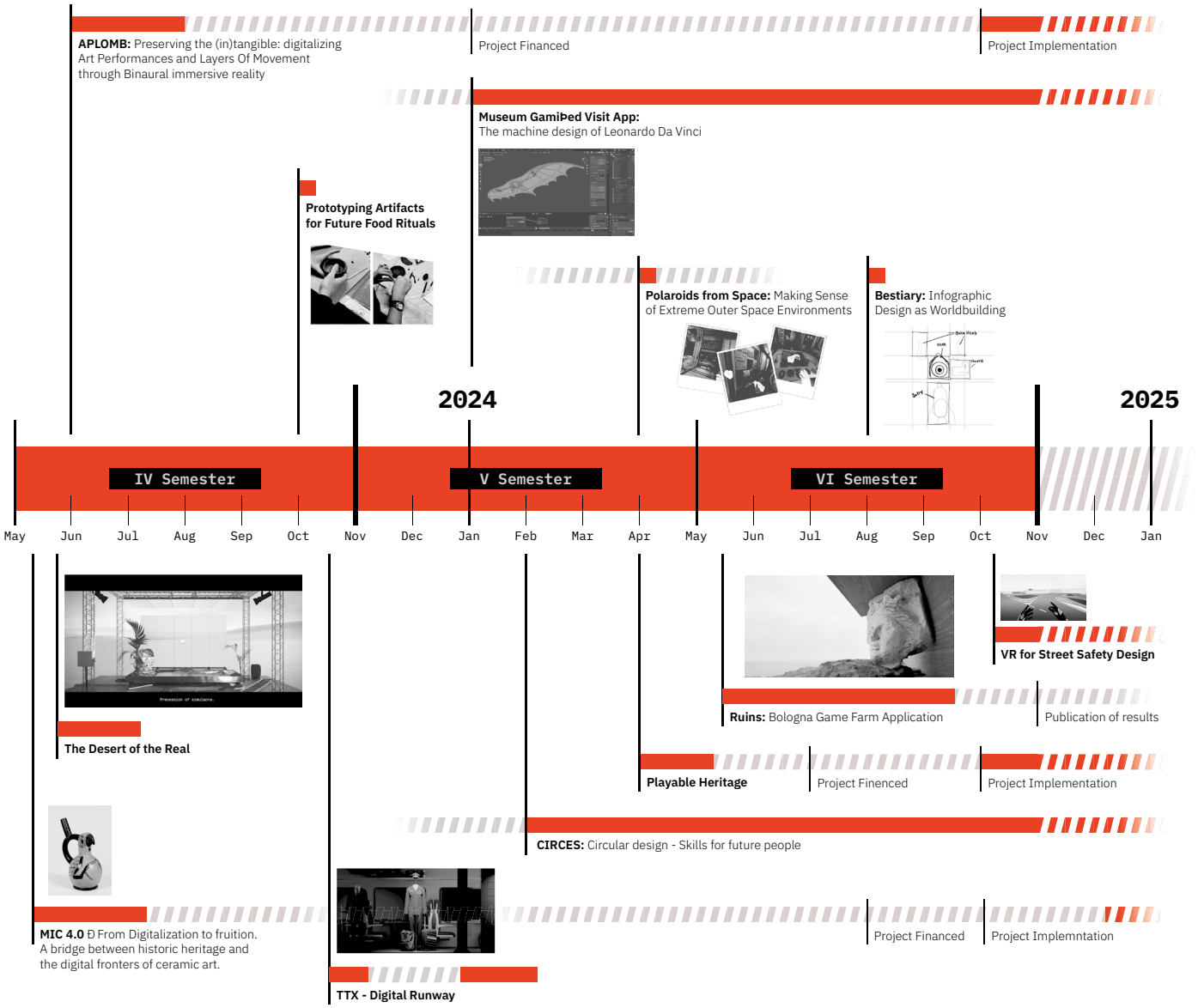
8.2. Discussion

The case studies that I have considered in this analysis are those that more clearly offer both theoretical and practical insights on the creative and collaborative dynamics enabled by the adoption of different *game-forms* and design approaches. The aim is to present and propose *Design Gameplay* not as a rigid methodology but as a flexible approach to design research, adaptable to various design scenarios, use cases, diverse participants, and different stages of the project.



During the implementation of the activities, I have recorded notes about emerging challenges and opportunities, participants' behaviors and design dynamics. At the end of the implementation phase, I have defined an analysis matrix to compare the activities according to a set of key parameters. Such parameters are:

- *Space*: activities taking place in digital or physical environments
- *Application Context*: the implementation scenarios in which case studies have been carried on, either in research, professional, or educational settings
- *Game-forms*: which game forms have been used, or can be recognized
- *Design Area*: which field of design are interested by the case study
- *Approach*: synthesize how participants engaged with the materials, processes, game-forms, and other subjects involved in the experimentation.



The analysis matrix is presented in Table 8.1. From this compared analysis, some consideration can be made.

Several activities involved both physically and digitally mediated interactions. This allowed participants with fewer experience with digital games to develop a gradual understanding of the medium. EX.02 Polaroids from Space, provides a clear example of such aspect. In this case study, both young and experienced designers used a VR game to develop knowledge about outer space environments, which they later applied to developing product and architectural design concepts. Despite most participants did not have previous experience with VR games, everyone successfully completed the workshop activity. According to the questionaries results (cf. APX.03), they considered this activity an effective way to acquire useful insights for the design task they had to work on. It also emerged that some of the participants gradually started drifting form the given instructions to

embrace more playful and exploratory behaviors. In the future development of this research, I wish to demonstrate that such subjective, unstructured, and playful forms of exploration that emerge during game-based research activity can not only foster radical creative thinking but also have quantifiable impacts on the development of effective design solution ideas.

As it emerges from EX.02 case study, experiencing unfamiliar interactions with design tools can result in positive outcomes, and not necessarily represent a frustrating creative hindrance. Compared to other pieces of software, such 3D modelling or digital illustration and drawing tools, video games are generally designed for providing immediate understanding of their interfaces, controls, and affordances. Design tools, most often, require specialized training or, at the very least, some effort to transfer existing technical skills to the new tool to achieve satisfactory results. With some exceptions, such as management and strategic simulation games, video games generally provide intuitive interfaces where basic affordances can be understood and experienced even by non-expert players. This reflection was solicited by a previous experimentation that took place in a physical setting. EX.01 was developed to investigate how young designers approached a novel material practice to solve a design problem. In the workshop, participants were asked to design and materialize a diegetic prototype using clay, a material which crafting techniques were unfamiliar for most of them. Details about the activity are described in the appendix (cf. APX.02). However, what is relevant to highlight in this discussion is that it was possible to recognize in participants playful behaviors, similar to those observed in EX.02. Understanding how a new medium can be handled, negotiating between the physical and mechanical affordances, discovering how it reacts to inputs, can lead towards a creative possibility space which is common to both digital and physical mediums.

EX.03 provides a further example about how playful engagement with different materiality can support the development of design knowledge. In this case study, indeed, data represent the raw material of the experimentation. In this experimentation, I used the data I had collected and systematized in Chapters 6 that led me to the definition of the *game-forms*. The idea of adopting a playful attitude toward such data, emerged while exploring ways to present in a visual form the analysis results. Infographic design often leverages of visual metaphors to better represent data relationships, trends, and magnitude. Similarly, while collecting *game-forms*, each of them suggested me, not only possible applications, modes of interaction, and creative possibilities, but also – if that can be said for *game-forms* – diverse personality traits. Therefore, I coded a simple python script to associate each *game-form* to a pre-defined set of visual elements according to the specific value of each analyzed parameter (see APX.04). The combination of the visual elements defined a fictional animal-like character for each *game-form*. The experience resulted in a cosmogony of characters, whom I envision populating a fictional world of lively *game-forms* to engage with in the *Design Gameplay*. This experimental and speculative approach could be further be developed for other diagrammatic form of data visualization (for example, Figure 7.2 could become game world map), exploring possible interactions between users and the data environment.

Although the technical aspects that define the specificity of the video game medium are not the focus of this research, they inevitably emerge when situating video games in applicative scenarios of design research. Indeed, this aspect was often

		EX.01 - Prototyping Artifacts for Future Food Rituals	EX.02 - Making Sense of Extreme Outer Space Environments	EX.03 - Bestiary: Infographic Design as Worldbuilding	EX.04 - Ruins - Bologna Games Farm Project design & application	EX.05 - Machinima: The Desert of the Real	EX.06 - TTX - Digital Runway	EX.07 - The Machines Designs of Leonardo Da Vinci	EX.08 - Rolleri Tech Champions	EX.09 - Playable Heritage	EX.10 - Interactive Playful Interfaces at MIC Museum	EX.11 - Circes EU Project	EX.12 - Urban Gamers Lab	EX.13 - APLOMB Project
Space	Digital		●	●	●	●	●	●		●	●	●	●	●
	Physical	●	●					●	●	●	●	●	●	
Application Context	Academic									●		●	●	
	Applied Research		●		●		●	●	●		●			
	Education									●		●	●	
	Experimental Research	●		●	●	●								
	Project Financing				●									●
Game-form	Educational Games							●			●	●	●	●
	Toy Games	●		●							●			
	Serious Toys										●			
	Documentary Games													
	Repurposed Games		●											
	Wandering Games		●		●									
	Photography games		●		●									
	Applied Games								●					
	Game Essay					●								
	Machinima					●	●							
	Epistemic Games			●										
Subjects	Students	●	●				●			●		●	●	
	Designers		●				●							
	Organization						●		●	●	●	●		
	Design Researcher		●	●	●	●								
	Users				●			●			●			●
Design Area	Design Research	●	●	●	●	●				●	●			
	Product/Service Design				●		●	●			●			●
	Advanced Design	●	●			●			●					
	Design Education	●								●		●	●	
Approach	Experimental	●	●	●	●	●				●				
	Qualitative	●	●	●	●				●				●	
	Quantitative			●								●		
	Speculative		●	●										
	Experiential	●	●		●				●	●		●	●	
	Technical				●		●	●			●			●
	Performative		●			●								

pointed out while discussing my ongoing research with other colleagues and scholars. The relevance of technical constrains can be predominant is some use cases, hindering the feasibility of the application. However, the *Design Gameplay* provides a range of possibilities, as seen in EX.02, which do not require extensive technical expertise. For EX.02, for example, a custom space environment could have been developed instead of using a commercial game set in outer space. This, however, would have required more time, resources, and preparatory research. Moreover, using pre-existing content in such contexts allows for comparing different representations of the design scenario under inquiry, opening up possibilities for developing a critical design practice. In the article attached in the appendix (cf. APX.06) I have developed the theoretical grounding for the use of video games as interactive design fiction environments. In the article I argue that video games can function as design fiction tools in which the narrative environments and the virtual props can serve as diegetic prototypes of anticipatory, extreme, and speculative scenarios.

As argued, although the repurposing of existing video games constitutes a viable and fruitful design research strategy, in *Design Gameplay* the practical aspects of *making* video games is one of the key R*t*D practice designers can adopt. Therefore, I evaluated some of the practical implications of introducing game development technologies during design research. I approached this part of the research with no prior technical knowledge about game development. I only had some modelling and rendering skills, and very basic coding knowledge. Therefore, failed and unproductive attempts have been numerous and not documented in this thesis. Also, I have approached different game engines to have a general understanding of the most popular game development platforms. EX.04, EX.05, and EX.06 provide three of the most insightful case studies I have developed during this part of the research. EX.05 and EX.06 outputs are two linear media. The first one is a visual essay about Jean Baudrillard's *Precession of Simulacra*, while the second is the digital runway of the garment designs developed for an applied research project commissioned by a regional transportation company. The key aspect I wish to emphasize in this section is that, despite a steep learning curve, linear media production through game engine allows to explore novel creative opportunities. Although EX.05 and EX06 do not offer experimental qualities in terms of artistic expression, they provided me with the opportunity to explore a shared technological platform between traditional industrial design and game development workflows. Moreover, this part of the research proved to be particularly valuable because, in combination with other experimentations, if provided insights about the technological challenges of integrating a design curriculum with game development modules.

EX.04, on the other hand, provides a more complex example. The case study led to the design the prototype for a commercial game vertical slice developed as a proposal for the *Bologna Games Farm* National acceleration program. Whitin the scope of this research, this case study aimed at combining commercial requirements with that opportunity to develop an design research platform. The game is indeed designed to provide interdisciplinary connection with the research domains of architecture, human-machine interaction, cultural heritage. Project details are reported in APX.05. EX.07, EX.09, EX10 an EX.13 provide further examples of how games can connect to cultural heritage though design.

EX.08, EX.11, and EX.12 are focused on educational activities respectively targeting company employees (EX.08), and secondary schools' students (EX.11, EX.12). Educational aspects are also present in other case studies, and it can be acknowledged, as already emerged form literature, that *game-forms* are largely adopted in educational applications. Details in the following section describe the opportunities and the criticalities that emerged in each case study.

In conclusion, I would argue that this whole research work emerges from a *Design Gameplay* that progressively allowed me to develop my arguments through an iterative investigation process characterized by a constant alternation of analytical, critical, speculative, qualitative and quantitative attitudes toward research.

EX.01 Prototyping Artifacts for Future Food Rituals

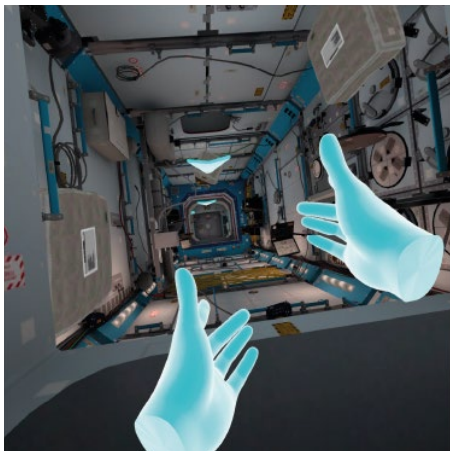
This experimentation was designed to evaluate how playful dynamics could activate creative processes during manual prototyping. Triggered by speculative facts about the future of food, participants were asked to use clay to prototype a food-related physical artifact. Without prior knowledge about clay working, participants engaged with clay unfamiliar mechanical qualities, negotiating between exploratory making, designing, and playing. Despite this experimentation did not involve video games, it served as an evaluation of the creative possibilities that can generate from the interaction with an unfamiliar medium. The observed dynamics suggest that similar effect could be enabled by digital mediums as well. This aspect appears to be relevant since not all designers are used to play with playing video games, and therefore are not used to their input system and feedback response.

Emerging opportunities:

- The playful approach proposed to the students successfully combined with the speculative design setting of the research.
- Although students had no prior experience with clay working, they managed to interact with the prototyping medium in a successful way. This strategy could be also applied to prototyping with other unusual mediums.

Emerging criticalities:

- Some students felt limited by their lack of skill in handling clay. This hindered their creative flow. In these cases, a longer training session may allow to overcome such block.



EX.02 Polaroids from Space: Making Sense of Extreme Outer Space Environments

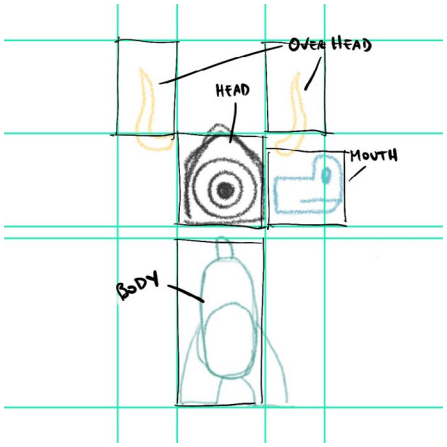
In this activity, a group of students, together with young and experienced designers used in-game photography as a design strategy to develop knowledge about orbing outer space modules. This experimentation re-functionalized a commercial VR game into a photography game aimed at capturing references and developing a spatial understanding of extreme living conditions. The use of VR, despite adding a degree of unfamiliarity for some of the participants, contributed to enable playful modes of experiencing the digital space. After the activity, participants used the taken pictures to share and discuss their findings and doubts with each other. All participants argued that this activity improved their knowledge about orbiting modules in way that is useful for designing in such contexts.

Emerging opportunities:

- The use of commercially available games as design research tools allows economic and easy-to-implement experimentation during the design process.
- In-game photography can effectively be implemented as a research strategy.
- Despite the used VR game was rather an educational experience, further experimentations can be developed using different commercial games.

Emerging criticalities:

- Despite the great genre variety and depicted fictional environments, the use of commercially available games may have limitation regarding the availability of specific features, scenarios, and interactions. Custom game-mods could be used to overcome such limitations.



EX.03 Bestiary: Infographic Design as Worldbuilding

This activity was developed after the collection and analysis of the *game-forms* presented in Chapter 6. In this activity I explored a playful approach to data visualization and infographic design inspired by worldbuilding and character design. The goal was to visualize the *game-forms* as lively creatures, characterized by a unique personality derived from the different kinds of engagements they enable. In the analysis, in fact, each *game-from* have been associated to one or more kinds of user engagement (economic, political, artistic, ...). This aspect reflected in the different illustrations of the creature body parts. Using a simple python script which combined the body parts illustrations, 54 creatures were generated using data from the *game-form* analysis.

Emerging opportunities:

- Infographic design offer experimental opportunities for developing diverse forms of engagement with data. Data constitute a central part of video games artifacts, and therefore they can serve as the raw materials for playful modes of data use.
- Adopting playful approaches to data utilization can serve as an effective design strategy in projects addressing issues related to users' awareness of personal data usage.

Emerging criticalities:

- The scale and type of the experimentation did not show specific criticalities. However, as more data are involved, other strategies could be implemented for facilitating data management and organization, such as the use of AI tools.

EX.04 Ruins – Bologna Game Farm Project proposal

Ruins is the playable prototype of a commercial game on the exploration of abandoned anthropic environments. It uses mechanics of in-game photography, environmental storytelling, and treasure hunt to solicit players curiosity. I developed this project with two main goals: directly evaluating the technical and design challenges involved in the production of a small-scale commercial game; submit a proposal for the *Bologna Games Farm* acceleration program. The project development allowed to self-assess the skills acquired during the research about game development and production. In fact, together with the playable prototype, I have designed a game design document, a technical analysis, and a production plan to evaluate the cost, time, and expertise required for further implementation of the project.

Emerging opportunities:

- Beside technical skills, the case study demonstrates that traditionally trained designers can develop relatively small-scale video games using their set of knowledge. However, this needs to be tied to a broader understanding of the medium, and of its contemporary forms in commercial and cultural domains.

Emerging criticalities:

- Although development tools are becoming more accessible, investment in specific training and instruments are still time and resource intensive. Therefore, if traditional design curricula aim to train and educate students on game design and production, it is essential to extensively integrate these topics throughout the course.
- Technical complexities, such as the lack of programming skills, can highly hinder the possibility to materialize creative and design ideas. Therefore, multidisciplinary collaboration with experienced developers is crucial for enabling the creative use of the medium.

EX.05 The Desert of the Real

https://vimeo.com/951519159

In this case study, I designed and developed a machinima inspired by Jean Baudrillard's *Simulacra and Simulation* (1981). The machinima dramatizes the precession of simulacra described by the French philosopher using Unreal Engine 5. The case study engages with machinimas and game essays as *game-forms* for narrative storytelling, and as a reflective practice designers can adopt in design research. Indeed, the concept of simulacra is used throughout the thesis but, due to its philosophical and abstract nature, I had to adopt a design strategy to derive useful insights for my research. This experimentation also allowed me to acquire technical knowledge about game production tools. The machinima was selected and screened during Milan Machinima Festival 2024: https://milanmachinimafestival.org/blog/2024/3/9/mmf-mmxxiv-alberto-calleo-desert-of-the-real

Emerging opportunities:

- Through the development of the project, it was possible to better understand how technical aspect influence the creative possibilities enabled by the medium. Although the output consisted into a linear narrative, the creative potential of the game engine was explored during production. It both challenged and encouraged exploratory approaches.
- The project helped to reflect of the possible use of machinimas and video essays for visual storytelling in the field of design research.

Emerging criticalities:

- Being one of first project I have developed using Unreal Engine 5, the technical challenges had a significant impact on production time. This issue can be addressed by either adopting commercial games as platforms for recording machinimas, or by scaling up the project team and using a commercially available asset.

EX.06 TTX Digital Runway

https://vimeo.com/1018993151?share=copy#t=0

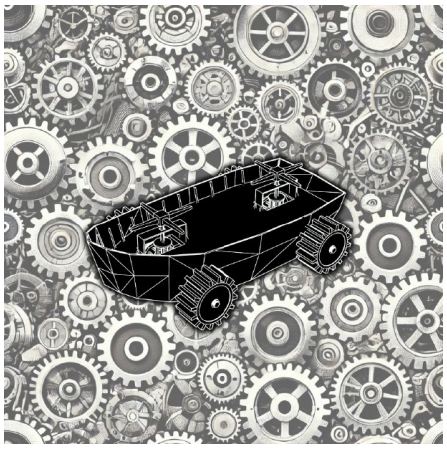
This activity is set in the broader context of an extensive workshop on the topic of uniform design commissioned by a regional train transportation company. Students participated in the educational and training activities which consisted in *design pills* about sustainable garment design and production, wearable technologies, ergonomics, fashion industry, and garment design tools. I was responsible for the *design pills* about digital modelling, prototyping and visualization. Students were given a basic training on Clo3D garment design software and were supported and coordinated during the digitalization of their uniform designs. Subsequently, I optimized and imported the model into Unreal Engine 5 for producing a digital runway for the final presentation to the company.

Emerging opportunities:

- The use of game technology tools allowed fast integration of the 3d models into the digital runway environment, avoiding long rendering and production time.
- The visual representation of the designed outfit allowed an effective communication of the designed garment features.
- Fashion design demonstrates to be a promising application field for the creative application of game technologies and video games in general.

Emerging criticalities:

- The use of specialized modeling tools requires specific training. However, the activity demonstrated that students with prior general modelling knowledge can rapidly transferer their capability to new software.



EX.07 The machine design of Leonardo Da Vinci

This case studies analyses the design and development process of a gamified application for the Leonardo Da Vinci Museum in Vinci (FI). The museum exhibition features wood models of Leonardo Machine's designs. Although most of the models have functioning parts, due to preservation requirements, they cannot be manipulated by visitors. Therefore, to improve the visit experience, the museum commissioned a gamified VR app with gamified elements. The app has been developed in collaboration with a local game company, and with the support of industrial design master's students. At the moment of writing, the app is being finalized and user test are about to begin. For the scope of this thesis, the case study has been relevant for evaluating workflow dynamics between game companies, young designers, and museal organizations.

Emerging opportunities:

- The knowledge that traditionally trained Industrial designers develop during their curricula of studies effectively fit into game design and development context, if project complexity is limited.
- Designer mediation with institutional organizations allows to develop synergic opportunities with the game industry. Although museal and cultural organizations are more open toward such collaborations, designers can facilitate such process, coordinating the project implementation alongside other initiatives that may involve the exhibition design.

Emerging criticalities:

- Designers need to improve their knowledge of video game production to cooperate with game companies on larger-scale projects.
- Knowledge of game development tools competences are also needed for designers to facilitate more integrated collaboration models. Especially when collaboration activities are carried out remotely, the lack of basic competences about the use of game engines leads to longer evaluation, decision, and implementation time.

EX.08 Rolleri Tech Champions

This case study is about an extended workshop activity developed for the Rolleri Holding, a national manufacturing company specialized in the industrial sector of metal sheet bending, tooling, and robotics. The activity involved both the company management and employees and aimed at improving collaboration and product-service innovation capacity. I was responsible for the workshop design and implementation. During the workshop, participants were introduced to research field and applicative scenarios from other industrial sectors. Thereafter, working groups developed product-service concepts using the newly acquired inspiration. Video games and gamification were one of the proposed topics. The groups designed product-service concepts that used gamification mechanics to improve department-department collaboration, B2B communication, technical operators training, and knowledge transfer within the organization.

Emerging opportunities:

- The role of designers as mediators between knowledge and innovation practices is particularly evident when comparing industrial sectors that have significantly different characteristics. In this specific case, designer served as facilitator, introducing the company to industrial innovation opportunities arising from the adoption of game technologies and game-based design processes.
- Company's employees were particularly engaged by the workshop activities and, in particular, by the opportunities they discerned from adopting games and game technologies within their industrial sector.

Emerging criticalities:

- Innovation processes that incorporate methodologies and approaches new to companies require time, dedication and commitment from management. Without such involvement, such unfamiliar methodologies risk not being properly developed and implemented. In this case study, management was largely engaged and invested in the project value.

EX.09 Playable Heritage

This case studies introduced a project proposal for the development of scientific and cultural exchange processes on game design disciplines and cultural heritage. Developed in collaboration with the Brazilian Feevale University, which offers a game design curriculum and is connected with the game cluster of its region, the project was financed by a national grant and will be implemented from October 2024. Therefore, at the moment of writing, it is not possible to discuss emerging opportunities and criticalities. However, the case study materialize one of the argument of this thesis, namely the need to more actively pursuing educational synergies between game design and the rest of design disciplines. The project's funding contributes to demonstrate the relevance of such aspect.

EX.10 Interactive Playable Interfaces at MIC Museum

The International Museum of Ceramics in Faenza (RA) is one of the leading cultural institutions active in the documentation and preservation of ceramic art. With the support of the *Advanced Design Unit* of the Univesity of Bologna and the University of the Republic of San Marino, the Museum was awarded a regional grant for the development of more accessible exhibition space. This experimentation addresses the development of interactive installments that use game-technology for real-time interaction with the exhibited artifacts. The project implementation will start in October 2024, however preliminary feasibility studies have already been conducted. I developed one of the exhibition piece prototypes for the interactive display of a pre-Colombian whistling jar. The 3D printed copy of the artifact was liked to the Unity3D game engine through an Arduino Board. The movement of the digital object mirrored that of physical one. Sound and visual effects were added to communicate how the whistling jar was used.

Emerging opportunities:

- The use of video game engines software in combination with photogrammetric digitalization techniques allows to expand the possibilities in the field of exhibition design, providing novel modes of interaction that can improve accessibility as well.
- Assets developed for one project can be also implemented in other synergic activities. For example, the photogrammetric scans that were produced for documental purposes, were refunctionalized as part of the interaction interface.

Emerging criticalities:

- Novel exhibition design interventions that leverage on video games and game technologies need to account for physical, preservation, and curatorial constrains.

EX.11 CIRCES - Circular design: Skills for future people

The Erasmus+ financed project *CIRCES - Circular design: Skills for future people* proposes a strategic and proactive response to the EU policies and indication regarding the sustainable transition. Using digital tools and game-based learning, the *CIRCES* project aims to promote knowledge about Circular Design among young generations. Moreover, the project provides a modular learning format that leverages on cultural and formative interchange between educational bodies, companies, academic research, and technological development institutions. This forma translates in a Training Toolkit based on digital and game-based tools. It is designed to facilitate the implementation, across different national school systems, of modular, digital and analogic, and flexible educational paths. Specifically, simple educational games were developed to allow students to self-assess the newly acquired knowledge about circular economy.

Emerging opportunities:

- Both literature and case study analysis reveal that educational games have positive effects on learning. The project situated such gaming experience within a broader activity that involves diverse learning formats. The project suggests the potential to further integrate digital and physical learning activity that leverage on playful engagement.
- Playful approaches could be adopted also during the project development phases, for example during data collection and collaborative activities developed with the partners.

Emerging criticalities:

- The experimentation confirms that a constant communication between UX designers, educational content producers, game designers, and game developer is needed, in particular in multidisciplinary projects that involve partners with different backgrounds and operating procedures.
- It emerges the need of a shared language between designers and other actors, in particular those in charge of developments, to more effectively discuss and communicate design choices.

EX.12 Urban Gamers Lab

Urban Gamers Lab was an educational project that useed game-based learning to develop secondary school students' soft-skills. The developed dissemination events and educational workshops to advance digital knowledge in young generations. Students were involved in participative and co-design activities that aimed at: developing awareness about the opportunities and challenges of digital transition in relation to the local territory and urban development; allow students to explore their own talents; support students in developing their critical thinking, problem solving, creative, and communicative capabilities; using a game-based approach to co-design the digital transformations of the future urban environment.

During the project, 7 workshop activities were developed with design, game design, and digital technologies experts. My main involvement was in the curation and implementation a workshop with a class of secondary school students on the topic of game design as a profession. The activity involved both a presentation about the local game industry and the possible professional opportunities, and a video game design workshop with a game developer.

Emerging opportunities:

- Game-based learning proves to be attractive and engaging with young students. During the workshop, it actively encouraged a more active participation from students who demonstrated greater introversion.

Emerging criticalities:

- Young students are used to play with digital games, mainly through their smartphones. However, there are not fully aware of exploitative mechanics that are embedded in some gaming applications.
- Although the educational gaming activities are engaging, it can be challenging to keep young students' attention focused on the learning objectives of the game.

EX.13 Aplomb

The Aplomb project aims to combine the art of dance and music with virtual reality technologies. It has been financed by the regional grant for the support to the cultural and creative industries *ER/ICC*. The object aims to prototype a Virtual Reality application for the experience of artistic dance performances and uses game technologies and game elements to propose a novel and accessible form of experience. The dance performance is captured using motion capture technology and are digitally relocated inside virtual environments that represent its relations with the artistic, cultural, architectonic environments from which they emerged. Users will be able to engage with the recorded performance through VR and to interact and explore the digital environments. The project has been financed and implementation is starting in October 2024. Therefore, it is not possible to discuss insights and outputs. However, the project has been presented as a case study because it represents a collaboration between operators of the CCIs, facilitate by designers who have advocated for the integration of game-technologies and interactive modes of engagement. Such aspect has been positively evaluated by the regional committee who financed the project.

Other activities

Other activities were developed doring the three years research period. Despite not being direlty related to the thesis research, they influenced my *Design Gamplay*.

Research project in collaboration with the Department of Civil Engineering: Perceived safety evaluation of two-lanes cycle path through the usage of virtual reality

Riccardo Ceriani, Sofia Palese, Alberto Calleo, Michele Zannoni, Margherita Pazzini , Claudio Lantieri

Multimodal accessibility to transport facilities constitutes a fundamental pillar of sustainable mobility, as it not only encourages the adoption of new forms of mobility but also increases the modal share of multimodal transportation systems. However, the mere provision of infrastructure is not sufficient to ensure its effective utilization by users. Among the factors influencing the successful adoption of such infrastructure, the perceived safety experienced by users emerges as a critical determinant. Perceived safety extends beyond the physical features of the infrastructure, encompassing users' subjective feelings of security and confidence when navigating the space. In recent decades, the integration of innovative immersive virtual reality (VR) tools has revolutionized the evaluation and design processes for transportation infrastructure. These tools enable designers, policymakers, and researchers to create and present highly realistic, interactive scenarios that replicate various infrastructure environments. This novel methodology provides an unparalleled opportunity to assess critical elements such as perceived safety, usability, and overall user experience, thereby informing and refining project designs. In the context of this study, the design of a new bicycle lane intended to connect the terminal of Bologna Airport was subjected to detailed evaluation through the use of virtual reality technology. A sample of users participated in the test, experiencing virtual scenarios of the proposed infrastructure. To systematically capture their perceptions, an ad-hoc questionnaire was administered, focusing specifically on aspects related to perceived safety in certain sections of the lane.

Photography book

In this book I collected the suggestions that emerged doring a two-weeks travel through China and Hong-Kong.

The book was later used by Zixuan Zhou from Beijing Film Academy, who I met during Cumulus Budapest 2024, in her classes for student discussion.

Video Mapping

Developed for the celebration activity programs for the 10th adniversary of the Industral Design Degree at the University of Bologna.

9. Conclusions

9.1. Conclusions

The development of a three-year long doctoral research project is an evolving and transformative process. It is evolving since the initial research trajectories often drift towards uncharted territories, liminal spaces, diverging paths of knowledge and practices. It is transformative since the original attitude towards the object of research and the research methodology is continuously challenged as new viewpoints are unveiled. In my research, evolving and transformative dynamics were triggered by the constant shift of perspectives between design and game research, their practices and cultures. Through this alternation of lenses, knowledge from one field were projected on the other, providing novel understandings, some answers, and most often new questions. I experienced this research process as a self-reflective practice that enabled reasoning about the meaning of doing design research itself.

Here, I synthetize the research outcomes highlighted in the previous chapters to provide the answers to the initial research questions.

RQ1: How do video games situate in the contemporary market-exchange system of digital and data capitalism?

Video games reflect and amplify the characteristics of contemporary products and services which are instable (Redström & Wiltse, 2019), agentive and probabilistic (Giaccardi, 2019). The dynamics of contemporary market-exchange system are paradigmatically represented by the productive (cf. Ch.3), exchange and consumption (cf. Ch.4, Ch.5) dynamics that are negotiated and perpetuated through video games. Therefore, I have used the term *Game Form* to describe the paradigmatic materialization of the contemporary form of commodities (cf. Ch.2). As a commodity, the *Game Form* inherits, perpetuates, and amplifies the modes of production and consumption of contemporary digital capitalist and technocultural society (cf. §2.4). It defines a negotiation space that modulates the power dynamics that articulate the relationships between producers and consumers through what I have defined as the *game-exchange* (cf. §2.5).

RQ2: How does designer *design* when video games define the characteristics of contemporary commodity form?

Since I have defined the *Game Form* as the paradigmatic materialization of contemporary commodity form, I argue that there is a need for a shared space between design and game research and cultures (cf. §2.6) to decode contemporary artifacts and design in today's product-service system. This space is built by acknowledging the epistemic potential that is intrinsic to the *Game Form*. Form a market commodity perspective, such aspect translates in value extraction mechanisms (cf. Ch.4) characteristics of the experimental economy (Thomke, 2003; Thrift, 2008). In the experimental economy, indeed, commodities emerge from an iterative experimental process of production and re-production that is fostered by the constant production of information derived by users-generated data (Jagoda, 2020) (cf. Ch.7). From the perspective of design research, the epistemic

potential of the *Game Form* is represented by what I have classified as *game-forms* (cf. Ch.6). I have defined *game-forms* as specific instantiation of the *Game Form* which articulate the double dimension of games as commodity and as epistemic and creative instruments. They indeed materialize how video games are used to generate knowledge within different contexts and when experienced by different users.

RQ3: How can video games generate knowledge in design research and practice?

The classification of *game-forms* (cf. Ch.6) is a practical tool that links game and design research. The analysis of applicative case studies presented in Chapter 8, provide an overview of the emergent opportunities and criticalities that arise from this experimental practice. At this point of the research, indeed, I have come to the understanding of design research as a *gameplay* dynamic within the creative possibility space of video games. *Design Gameplay* engages with Gaver's argument for a design attitudes that complements scientific approaches with more "subjective, idiosyncratic ones" (Gaver, 2002, p. 4). It does so by looking at video games as "an alternative form of experimental art-science that move us from the realm of problem solving toward problem finding or, more properly, problem making" (Jagoda, 2020, p. xiv). Therefore, *game-forms* provide such art-science experimental instruments that enable knowledge building in design research. Moreover, *Design Gameplay* emphasizes the role of subjectivity in creative processes by adopting the understanding of the video game artifact as an *objet ambigu* (Schniz, 2020), reframing and reshaping designers epistemic context. *Design Gameplay* aims to solicit questions by the iterative process of design itself (Stappers & Giaccardi, 2017; Zimmerman, 2003). It embraces the creative potential of video games and the experience of playing, designing and, broadly speaking, engaging with them. *Design Gameplay* situates alongside the approaches and the methodologies that generate design knowledge and lead toward the design of novel artifacts and design innovation. Framing design research as a *gameplay* dynamic I aim to connect the design production system and that of video games through their respective languages, practices, and theoretical-interpretative models. In doing so, this research shares the vision of Malazita and O'Donnell who call for a "deep synthesis of game design, cultural critique, and reflective design research practices" (Malazita & O'Donnell, 2023, p. 6).

RQ4: What possible role can designers have in the regional game industry?

National and regional institutions have acknowledged the strategic relevance of the video game sector. The analysis of the Emilia-Romagna video game industry compared with other international settings (cf. Ch.3), provided a deeper understanding of such strategic role in the development of the local network of cultural and creative industries. Moreover, the potential of the video game industries has been further contextualized in relation to the broader regional production systems, characterized by small and medium manufacturing enterprises. Indeed, as a technological advanced industrial sector, that of video games emerges as a synergic innovation partner for the local industrial ecosystem. Moreover, as it has been observed from other international contexts, the collaboration across productive sectors represents a stabilizing resource for the economic sustainability of the regional game cluster. However, in the analyzed regional industrial ecosystem, it appears plausible that the activation and implementation of such links are facilitated by the intrinsic

mediation sensitivity of industrial design. With this aim, industrial design education system requires to integrate the practical competences that have been produced through field experience by industry veterans, and to engage with the large body of knowledge developed by game and play scholars.

9.2. Future developments

The development of this research has led to the activation of several initiatives (cf. Ch.8) which implementation will represent the opportunity to further investigate the theoretical and practical outcomes of this work. One of this is the *Playful Heritage* project, which will establish a research and didactic collaboration activity between the *Advanced Design Unit* of the University of Bologna and Brazilian University of Feevale on the topic of video games and cultural heritage.

The network of actors, both in academic research and industry, will provide collaboration opportunities also in the context of European research and innovation programs. The *Horizon Europe* and *Erasmus+* programs, provide several lines of action that address the development of local game industries and professional skills.

With the objective to develop more synergic integration on the educational level between industrial design, game design, and game studies, the practical and theoretical outcomes of this thesis could be used to integrate industrial design academic curricula. As mediators in the envisioned innovation model between the local productive and game industries, designers need both a framing of the cultural significance of games, their role in the global product-service system, and technical competences on game design and development. In pursuit of this goal, this set of knowledge need to organically integrate with the rest of the industrial design curriculum.

Chapter Bibliography

Gaver, W. (2002). Designing for Homo Ludens. *I3 Magazine*, *12*, 9–11.

Giaccardi, E. (2019). *Histories and Futures of Research through Design: From Prototypes to Connected Things*. *13*(3).

Jagoda, P. (2020). *Experimental Games: Critique, Play, and Design in the Age of Gamification*. University of Chicago Press. https://doi.org/10.7208/chicago/9780226630038.001.0001

Malazita, J., & O'Donnell, C. (2023). Introduction: Toward Critical Game Design. *Design Issues*, *39*(1), 4–13. https://doi.org/10.1162/desi_e_00702

Redström, J., & Wiltse, H. (2019). *Changing things: The future of objects in a digital world*. Bloomsbury Visual Arts.

Schniz, F. (2020). Das Videospiel. Ein objet ambigu. In *Genre und Videospiel* (pp. 15–24). Springer VS, Wiesbaden. https://doi.org/10.1007/978-3-658-27244-9_2

Stappers, P. J., & Giaccardi, E. (2017). Research through Design. In M. Soegaard & R. Friis-Dam (Eds.), *The Encyclopedia of Human-Computer Interaction* (2nd ed., pp. 1–94). The Interaction Design Foundation. https://www.interaction-design.org/literature/book/the-encyclopedia-of-human-computer-interaction-2nd-ed/research-through-design

Thomke, S. H. (2003). *Experimentation Matters: Unlocking the Potential of New Technologies for Innovation*. Harvard Business School.

Thrift, N. (2008). *Non-representational theory: Space, politics, affect*. Routledge.

Zimmerman, E. (2003). Iterative_Design.pdf. In B. Laurel (Ed.), *Design Research*. MIT Press. https://static1.squarespace.com/static/579b8aa26b8f5b8f49605c96/t/59921253cd39c3da5bd27a6f/1502745178453/Iterative_Design.pdf

Appendix

APX.1. A brief Overview of the Global Game Industry

This overview provides readers with fewer familiarity with the video game sector a brief introduction to the geography of the video game industry to highlight its global evolution trends and the salient regional specificity. The aim is to outline elements that are functional to design cultures to support innovation processes for the local video game industry.

The overview begins by tracing the history of the North American and Asian game industries. North America and Japan represent two of the most historically important productive centers for the video game industry thanks to their market scale and to the presence of numerous publishers, established productive networks, and gaming hardware manufacturers, their influence the global trends in terms of production practices, distribution strategies, and policy trends. Over the last decade, however, it has been documented a significant growth of the Chinese market which, since 2015, has surpassed that of the United States (Newzoo, 2016).

The following sections describe the main events in the evolution of the North American and Asian markets, and later focus on the European and British game Industry.

Figure APX.1.1 - © Joi Ito from Inbamura, Japan - Spacewar running on PDP-1, CC BY 2.0. Retrieved at https://commons.wikimedia.org/w/index.php?curid=2099696

APX.1.1. North America

Research on video game history agrees in tracing the origins of the digital game industry in the United State of America (Kent, 2021; Wolf, 2015). American game industry foundation is traced back to late 1880s in coin-operated entertainment machines such as card machine and Kinetoscopes. The capability of visual media to overcame the language barriers that still affected a society mainly constituted by immigrants allowed mechanic and then electromechanics games, like pinball, to gain popularity between 1930s and 1950s (Wolf, 2015). Similarly to the United States, the prehistories of other national video game industries have been identified in the in coin-operate electromechanical amusement machines (Fassone, 2020). However, the convergence of specific cultural and technological factors determined the emergence and the rapid evolution of video game production of the United States. Pioneering, do-it-yourself, and entrepreneurial attitude got in contact with the rapid technological innovation fostered by military needs pushed by the Second World War. The Cold War period further accelerated the development of computer technology and engineering. Such concurrent condition fostered the development of university technology laboratories in which computer game firstly appeared (Wolf, 2015). In a context in which technological research was predominantly driven by military needs, the early video game industry offered an alternative creative environment for programmers and engineers who were not drawn by the military industrial complex (Izushi & Aoyama, 2006). It is in this academic technical environment that in the early 1960s, *Spacewar!* was developed at the Massachusetts Institute of Technology laboratories by Stephen Russell (Russell, 1962) for the PDP-1 computer (Fig. APX.1.1). The game simulated a space battle between

1 A playable emulated version of Spacewar! has been made available by Norbert Landsteiner here: https://www.masswerk.at/spacewar/

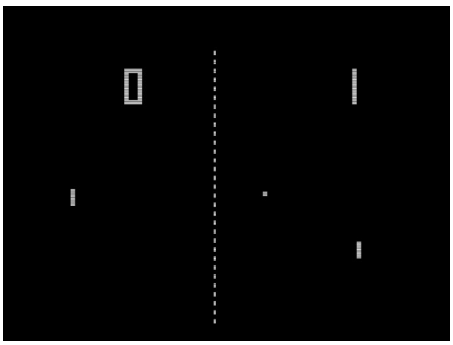


Fig. APX.1.2 - Public Domain. Retrieved at https://commons.wikimedia.org/w/index.php?curid=799667

two spacecrafts, each one controlled by a player[1]. Inspired by *Spacewar!*, Nolan Bushnell and Ted Dabney developed a more compact commercial version called *Computer Space* (Bushnell & Debney, 1971). The two entrepreneurs started Atari, the first video game development company in 1972 in California. Shortly after, *Atari* published the first commercially successful game *PONG* (Atari, 1972) which is considered the starting point of the global video game industry (Fig. APX.1.2). In the same years, the growing diffusion of televisions led to the development of the first video game home system, the *Magnavox Odyssey* designed by Ralph Baer in 1972. The industry rapidly grew expanding both its domestic and export markets. In this period commercial partnerships between American and Japanese companies started with Nintendo importing the *Magnavox Odyssey* in Japan and *Atari* developing the home version of the Japanese arcade success *Space Invaders* (Taito, 1978). This is considered a pivotal moment for US video game industry as it foresaw the takeover by Japanese game companies. In fact, the industry crash of 1983 during which American companies experienced major economic loss, paved the way to *Nintendo*'s 8-bit home game system *Famicom* that was imported in North America in 1985 with the name of *Nintendo Entertainment System* (*NES*). The US game industry, however, kept its edge in home computer games thanks to the leading role of American companies such as *IBM*, *Microsoft*, and *Apple* (Wolf, 2015). The home computer market further developed with the diffusion of network capabilities and access to the Web since 1993. Leveraging on its experience in computer systems, in 2001 *Microsoft* launched the home system *Xbox* which successfully brought an American company back on the home console market. Proximity with other technological and creative industries has favored the spread of game companies. For example, it has been observed how the video game industry initially emerged from the Silicon Valley's technological companies, and later rapidly spread in Los Angeles thanks to the cross-fertilization with the Hollywood movie industry (Pilon & Tremblay, 2013).

Even if the Japanese video games industry represented the reference point for the digital entertainment sector through the 1980s and the 1990s, holding a paramount role in game culture even nowadays, the United States have represented the biggest video game market until recently. In 2015, the Chinese market surpassed the US becoming the biggest video game market in the World (Newzoo, 2016). The US, however, remain one of the most important video game producers and consumer globally.

It has been estimated that the US video game sector has a national economic impact of 90.3 billion dollars and it generates 143.000 jobs directly connected to the various areas of game production, and over 285.000 indirect job positions (Tripp et al., 2020). Some of today's biggest and most successful video game multinational companies have been funded in the United States. At the time of redacting this chapter (beginning of 2024), *the Impact of the Video Game Industry Map* (Fig. APX.1.3), developed by the *Entertainment Software Association*[2], lists 1.249 among publishers, developers and hardware companies; of those, 444 are hosted in the state of California, 121 in Washington, 100 in Texas, 94 in New York, and 46 in Florida. 414 college programs are distributed in similar percentage across the country: 57 in California, 31 in Texas, 20 in Florida, 23 in New York suggesting how the presence of the industry is directly connected to the number of academic course offering. It also emerges that states with a smaller percentage of game companies but with an established university tradition, like Pennsylvania (19 companies, 20 college programs), Ohio (18 companies, 15 college

2 https://www.theesa.com/video-game-impact-map/

3 Governmental real-estate renovation project started in Montreal in late 1990s

programs), and Michigan (18 companies, 14 college programs), there is a considerable amount of educational offer dedicated to game related topics.

Together with the United States, Canada plays a major role in North American's video game industry. Due to its proximity to the border and the absence of language barriers, early US game productions could easily be exported to Canada at the same time of the US release. It has been observed that the bilingual context of Quebec was not sufficient for the development of an import market from France, since the European *PAL* video standard did not allow native compatibility with the *NTSC* standard, and cost and time needed for technical adaptation made it economically not convenient (Arsenault & Guay, 2015). It has been estimated that in 2021 the Canadian video game industry directly employs 32.300 Full-Time Equivalents (FTEs), contributing with a direct impact of 3.2 billion $ to Canada's GDP (Nordicity, 2021). The number of game company has grown to 937 active companies, with micro companies (less than 4 employees) accounting for 54%, standard (5 to 99 employees) for 39%, and large (more than 100 employees) for 6%. 80% of Canadian video game companies are located in: Ontario (298), Quebec (157) and British Columbia (164). The indirect and induced impact has been estimated in 11.600 and 11.400 FTEs respectively. 84% of the revenues are coming from exports, mainly for standard and large companies. In addition to the emerging local companies, Canada also hosts local division of foreign companies such as *Electronic Arts Vancouver*, *Ubisoft Montréal*, and *Rockstar Toronto*. Despite accounting for only 6% of the total companies, large studios with over 100 workers employ 76% of the people working in the Canadian video game industry. The development of the Canadian game industry has been attributed to a number of factors: cheaper operational cost compared to the US, the establishment of technology industry clustering, fiscal incentives supported by the government, high skilled and creative workforce coming from high quality postsecondary education (Arsenault & Guay, 2015). In fact, the presence of a well-established tradition of digital animation studios, in conjunction to the proximity to Hollywood's entertainment industry, offered many creative

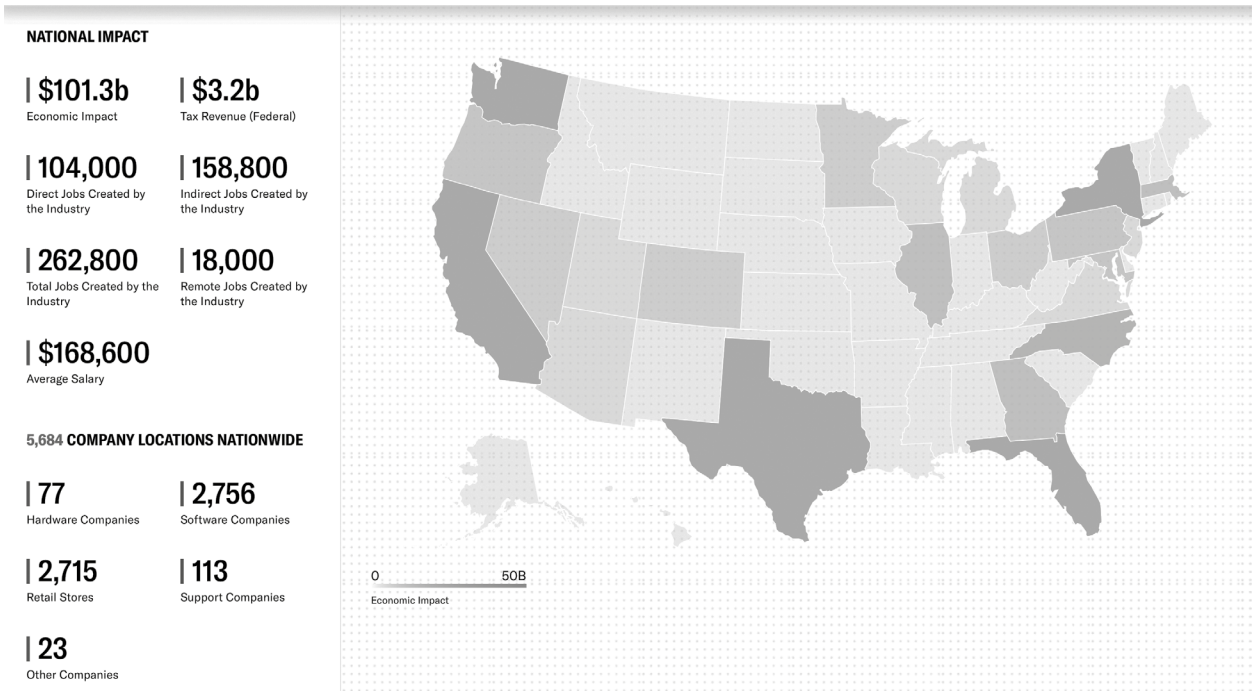


Fig. APX.1.3 - © entertainment software association. Impact of the Video Game Industry Map. Retrieved at https://www.theesa.com/state-impact-map/ in December 2024

professionals at a much lower cost compared to the US (Pilon & Tremblay, 2013). Moreover, the role of government policies that offered incentives for companies which decided to open offices in Montreal Multimedia City[3], and dedicated financial support have played a major role in attracting foreign companies to Canada (Pilon & Tremblay, 2013). As observed by Pilon and Tremblay (2013), also cultural factors, such as English-French bilingualism, made Montréal a cultural bridge between French and the US, facilitating working relationships between North America and Europe. It is the case of the French company Ubisoft. Since the opening of the company's branch in Montréal in 1997, a growing number of companies have moved or started their business in the city, leading to the establishment of a large and important cluster.

APX.1.2. Asia

Together with the United States of America, Japan has played a significant role in the development of the game industry since the late 1970s. Japanese game industry has been compared to other Japanese productive sectors, highlighting how cultural, political, and financial factors have influenced the success of some industries (such as automotive and manufacturing) and weakened others, specifically that of software development with the notable exception of video games (Anchordoguy, 2000). However, the success of Japanese game companies, both in game software and hardware production, has been addressed to the rich creative environment of cartoon animation and its successfully combination with technological knowledge coming from the consumer electronics industry (Aoyama & Izushi, 2003). Similarly to other studies focused on local game industry evolutions (Wolf, 2015), Japanese video game industrial history can be classified according to the most relevant and representative gaming platforms that characterized each period (Koyama, 2023). The Arcade is the first era (Fig. APX.1.4), from early Seventies until 1983, when gambling regulation and youth protection laws started the decline of arcades in favor of home consoles. The 2D, thanks to home console distribution, saw a market expansion. The 3D era, considered the peak of the Japanese game industry, started with the introduction of the Sony PlayStation in 1994 and the adoption of 3D graphics technology. 2006 was the beginning of the handheld era which was characterized by a sensible market transformation due to the increasing production cost and to the changes in users' lifestyle. 2012 is considered the beginning of the Smartphone era with a significant rise in competition across the different gaming platforms.

Figure 2.7 - © Arcade Museum, Fair use, https://en.wikipedia.org/w/index.php?curid=41622028 Space Invaders (Taito, 1978) arcade flayer.

As mentioned, it is relevant to observe the impact of institutional measures on the development of national video game industries. In Japan, the video game industry was not targeted by the "catch-up" regime adopted since the end of the Second World Was. This strategic measure of industry development was introduced to higher Japanese productive standards to those of advanced Western countries. This model, that was originally conceived as the establishment of teacher-learner relations among nation, was in effect implemented as a nationalistic dirigiste that resulted in significant restrictions on technology transfer and foreign exchange (Ozawa, 2001). The adoption of this model, on one side, allowed heavy and technological industries survive, on the other, imposed strong restriction that significantly hindered innovation and development towards global markets. Without being affected by such restrictions, during the 1980s the Japanese video game industry had the opportunity to develop freely (Anchordoguy, 2000).

Despite being globally recognized as one of the most influential game industries, the increasing competition from the United States, Europe and other Asian countries has generated concerns about the Japanese gaming industry stability (deWinter, 2015). Chinese companies, such as *Tencent* and *NetEase*, have opened new game studios in Japan and have acquired Japanese game companies (Parkin, 2023). Even if with significant difference in terms of target platforms and business models compared to Japan and Western countries, China has become the world's biggest video game market for size and revenue, surpassing the United States in 2015 (Newzoo, 2016). The Chinese industry is mainly producing mobile and online games and it has rapidly grown thanks to the adoption of new business models that adapt and intercept users' consumption behaviors (Kshetri, 2009). Despite its global role, however, Chines game industry has so far received limited attention, and only recently contributions are analyzing its peculiarities and development dynamics (Chen et al., 2024; Kim & Kang, 2021). This is also due to the difficulty to access data due to government's restrictions and control on distribution platforms[4].

APX.1.3. Europe

The local differences that characterize European nations, both in the heterogeneity of their cultural background, creative production, and development levels in technological sectors, reflect in the characteristics of their video game industries as well. Compared to the US, the development of the video game industry lacks a unified narrative. The different dynamics of local industries and the diversity of production is observed and studied on a national, or even regional, level. Significant contributions are coming from the local chapters and interest groups of the *Digital Game Research Association* (*DiGRA*) that, since its foundation in 2003 in Finland, has been contributing to the systematization and diffusion of game studies in academic research. In 2023, out of 17 chapters, 9 are located in Europe and include: British *DiGRA*, *DiGRA* Croatia, Dutch *DiGRA*, Finnish *DiGRA*, *DiGRA* Belgium, German-Speaking Countries *DiGRA*, Italian *DiGRA*, *DiGRA* Central and Eastern Europe, *DiGRA* Spain.

The European video game market is the third global market in the world, following the Asia-Pacific region and North America (Newzoo, 2022). It is estimated that in 2022 the EU27 game market revenue generated 24.5 Bn€ (European Commission, Directorate-General for Communications Networks, Content and Technology, 2023) and 7.16 Bn£ in the UK (UKIE, 2022). In Europe, the video game industry employs an estimated of 110.000 people with the major productive center represented by the United Kingdom (20.975), France (18.000), Poland (12.000), Spain (8.800), and Sweden (7.944) (Video Games Europe, 2022).

A lack of professionals with adequate skills and the difficulty to access talents in Europe have been documented by a number of reports that have brought attention to gap between the industry growth rate and trained professionals availability (Swedish Games Industry, 2023; UKIE, 2022). Such issue has been recently addressed also by the European Union institutions (Council of the European Union, 2023; European Parliament, 2022). In fact, it has been documented that over 40% of the EU27 game companies have difficulties in finding and recruiting professionals (European Commission, Directorate-General for Communications Networks, Content and Technology, 2023). The scarcity of trained professionals makes the labor market highly competitive for companies seeking talents. This issue is particularly problematic for smaller companies (less than 10 people) that

4 During the Symposium on the Convergence of Gamification & Financialisation, held at Abertay University, Dundee/UK between May 31st and June 1st 2024, Anne Mette Thorhauge and Daniel Nielsen presented the preliminary results of an ongoing research project about Chinese game asset trading site Buff163. The researchers stressed the complexity of developing such research, and the need to conduct on-site research to gather data. For research abstract see: https://marjz.net/downloads/Symposium-abstracts-bios.pdf

represent 70% of game studios. The lack of economic resources for acquiring and retaining employees emerges as a problematic issue that hinder small and medium companies to expand. Resources coming from private financing are limited, leading smaller studios to become contractors of larger companies, to be acquired or to merge (European Commission, Directorate-General for Communications Networks, Content and Technology, 2023).

The impact of European and national policies and investment strategies is a key factor in the development of an emerging industrial sector. Public fundings and support action dedicated to the game sector have been adopted by European national government to aid and incentive the development of local game companies, even with diverse characteristics and magnitude. One example of early and impactful initiative on a national scale is the Finnish Skene program. Between 2012 and 2015, the Skene program aimed at professionalizing the Finnish game industry and in growing its economic impact with a found of 33.3 million euro directed to 105 game companies (Venäläinen et al., 2019). The expected program outcomes addressed the need, for the Finnish game sector, to adopt a comprehensive industrial approach in game production, to develop value networks with industry operators, to connect with other industrial sector, and to expand the service offering to other fields. On the European level, the report published by the Creative Europe MEDIA Desk of Italy and Denmark in 2021 provides a reference to initiatives and funding opportunities that have been activated across EU nations (European Game Funding Guide, 2021). The report highlights significant discrepancies between countries regarding the amounts of investment and the support strategies adopted.

As of today (2024), the main active European initiatives fall under the Horizon EU, Creative EU, Digital Europe, Erasmus+, and Interreg programs. They provide funding opportunities for game development studios and publishers, mixed and extended reality applications, higher education and research institutions, investors, trade associations, incubators, accelerators and clusters, industry event organization[5].

APX.1.4. United Kingdom

The United Kingdom's video game industry is the largest in Europe and among the first in the world. In early 2023 the *UK Game Map*[6] lists over 4.760 game companies. Most companies are based in England (4.282). Scotland accounts for 262 companies, Wales for 144 and Northern Ireland for 73. In greater detail, 21,9% of the workforce is located in London, 20,4% in South East England, 11,7% in North West England, 10,8% in Scotland, and 10% in West Midlands (Stephenson, 2022).

Although some early transposition of tabletop games were developed in computer laboratories between late 1940s and 1960s, the British video game market officially started around 1973 with the diffusion of home console with pre-installed clones of Atari's PONG (Donovan, 2015). Compared to the US, where the game industry started developing from university laboratories, in the UK the industry beginning can be traced back to the emergence of informal group of computer enthusiast who independently started experimenting with coding and with the first home computers (Izushi & Aoyama, 2006). The availability of affordable computers systems manufactured in the UK, such as the *ZX80*, *ZX81* and *ZX Spectrum* by *Sinclair Research Ltd* company produced between 1980 and 1992, allowed a significant number of British families to have a home computer. The diffu-

5 A synthesis of the open calls is provided by the European Game Developer Federation at https://www.egdf.eu/summary-of-eu-video-games-industry-funding-calls-for-2024/

6 The map has been developed by the trade association for the UK's games and entertainment industry (UKIE) https://map.gamesmap.uk/

sion of computers, rather than imported game console, played a major role in the development of the game industry in the UK. In fact, the diffusion of personal computers both protected the market from US and Japanese console competition, and allowed users not only to play, but also to program their own software (Donovan, 2015). "Bedroom coders" started creating their own games, developing networks of informal groups that shared resources and information. Also, the diffusion of computer magazines with software code that could be copied and compiled supported the diffusion of home game and software development.

It has been observed that in the early phase of the game industry there were no interaction and synergies with the British animation industry which, at the time, was considered to have already acquired a national elite status (Izushi & Aoyama, 2006). This aspect reflects in some of the interviews I have conducted during the research period I spent in Scotland in 2022. One interviewee observed that, as for comic books production, the Scottish game industry had the freedom to develop in the region, independently from central government influences, since it was not initially considered a strategic and relevant sector for national industry program[7]. Cross-sectorial synergies between game production and animation only started in the early 1990s when game were starting acquiring their economic legitimacy and the animation sector started suffering international competition (Izushi & Aoyama, 2006). Between late 1980s and early 1990s, British developers started organizing in structured teams with the goal to produce commercially successful products, investing in the development and adoption of advanced technological solution as 3D graphics. At the same time, with the diffusion of console platforms, a progressive globalization process brought British production overseas and the development of an import market from Japan and the United States.

The British game industry has significantly benefited from the establishment of game design, game development courses, and more generally, of the degrees that combined informatic skills with creative production. It has been estimated that UK's creative industries employee a significant rated of university graduates and, specifically, in the game sector around three-quarters of the workforce have at least an undergraduate degree and one quarter have a postgraduate degree (33% in visual effects and 36% in interactive media) (Mateos-Garcia & Bakhshi, 2013). In 1997 Abertay University in Dundee, Scotland, started the world's first video game degree program and, since then, a growing number of universities offer game related programs. Interviewed observers have highlighted the importance of industry-university cross-contamination and mutual support in training and employing students[8]. For a rapidly changing industry such as that of video games, developing and offering updated programs is crucial to meet industry's needs. Despite the abundance of game programs in the UK and the large number of graduates, however, reports have pointed out that it appears to be a mismatch between industry-relevant required skills and course programs (Report to the Creative Industries Council, 2012). In order to improve the synergy between industry and education, since 2015 the UK trade association of the video game industry *TIGA*[9], started and accreditation process in order to evaluate universities and college that deliver courses in required area of the game industry. In 2021-22 TIGA listed and accredited 75 higher education degrees in video games and animation (TIGA, 2021).

7 The interview was given by Brian Baglow, founder of the Scottish Game Network, writer, game designer. Cf. int

8 Interview with Shawn Taylor, InGAME Managing Director. Cf. int

9 https://tiga.org – spiega acronimo/sigla

Section Bibliography

Anchordoguy, M. (2000). Japan's software industry: A failure of institutions? *Research Policy*, *29*(3), 391–408. https://doi.org/10.1016/S0048-7333(99)00039-6

Aoyama, Y., & Izushi, H. (2003). Hardware gimmick or cultural innovation? Technological, cultural, and social foundations of the Japanese video game industry. *Research Policy*, *32*(3), 423–444. https://doi.org/10.1016/S0048-7333(02)00016-1

Arsenault, D., & Guay, L.-M. (2015). Canada. In *Video games around the world*. MIT Press.

Atari. (1972). *PONG* [Arcade].

Baujarrd, T., Derivry, H., Sandrone, S., & Rasmussen, E. K. (Eds.). (2021). *European Game Funding Guide*. Creative Europe MEDIA Desk Italy and Creative Europe MEDIA Desk Denmark.

Bushnell, N., & Debney, T. (1971). *Computer Space* [Arcade].

Chen, F., McAllister, K. S., & Ruggill, J. E. (Eds.). (2024). *The Chinese Video Game Industry | SpringerLink*. Palgrave Macmillan Cham. https://doi.org/10.1007/978-3-031-41504-3

Council of the European Union. (2023). *Enhancing the cultural and creative dimension of the European video games sector. 24 November 2023*. https://data.consilium.europa.eu/doc/document/ST-15901-2023-INIT/en/pdf

deWinter, J. (2015). Japan. In M. J. P. Wolf (Ed.), *Video games around the world*. MIT Press.

Donovan, T. (2015). United Kingdom. In M. J. P. Wolf (Ed.), *Video games around the world*. MIT Press.

European Commission, Directorate-General for Communications Networks, Content and Technology. (2023). *Understanding the value of a European video games society – Final report*. Publications Office of the European Union. https://data.europa.eu/doi/10.2759/332575

European Parliament. (2022). *European Parliament resolution of 10 November 2022 on esports and video games (2022/2027(INI))*.

Fassone, R. (2020). Una presistoria del videogioco italiano. In *Il videogioco in Italia: Storie, rappresentazioni, contesti*. Mimesis.

Izushi, H., & Aoyama, Y. (2006). Industry Evolution and Cross-Sectoral Skill Transfers: A Comparative Analysis of the Video Game Industry in Japan, the United States, and the United Kingdom. *Environment and Planning A: Economy and Space*, *38*(10), 1843–1861. https://doi.org/10.1068/a37205

Kent, S. L. (2021). *The ultimate history of video games, volume 1* (First edition, Vol. 1). Three Rivers Press.

Kim, J. Y., & Kang, S. H. (2021). Windows of Opportunity, Capability and Catch-Up: The Chinese Game Industry. *Journal of Contemporary Asia*, *51*(1), 132–156. https://doi.org/10.1080/00472336.2019.1656761

Koyama, Y. (2023). *History of the Japanese Video Game Industry* (Vol. 35). Springer Nature Singapore. https://doi.org/10.1007/978-981-99-1342-8

Kshetri, N. (2009). The evolution of the Chinese online gaming industry. *Journal of Technology Management in China*, *4*(2), 158–179. https://doi.org/10.1108/17468770910965019

Mateos-Garcia, J., & Bakhshi, H. (2013). *A Manifesto for the Creative Economy*. Nesta. https://media.nesta.org.uk/documents/a-manifesto-for-the-creative-economy-april13.pdf

Newzoo. (2016). *Global Games Market Report 2016*. https://web.archive.org/web/20220407234834/https://newzoo.com/insights/articles/global-games-market-reaches-99-6-billion-2016-mobile-generating-37/

Newzoo. (2022). *Global Game Market Report 2022*. https://app2top.ru/wp-content/uploads/2022/07/2022_Newzoo_Free_Global_Games_Market_Report.pdf

Nordicity. (2021). *The Canadian Video Game Industry*. Entertainment Software Association of Canada.

Ozawa, T. (2001). The "hidden" side of the "flying-geese" catch-up model: Japan's dirigiste institutional setup and a deepening financial morass. *Journal of Asian Economics*, *12*(4), 471–491. https://doi.org/10.1016/S1049-0078(01)00098-7

Parkin, S. (2023). Power up: Will Chinese financing be the saviour of the Japanese video game industry? | Games | The Guardian. *The Guardian*. https://www.theguardian.com/games/2023/nov/07/power-up-will-chinese-financing-be-the-saviour-of-the-japanese-video-game-industry

Pilon, S., & Tremblay, D.-G. (2013). The Geography of Clusters: The Case of the Video Games Clusters in Montreal and in Los Angeles. *Urban Studies Research*, *2013*, e957630. https://doi.org/10.1155/2013/957630

Report to the Creative Industries Council. (2012). The CIC Skillset Skills Group. https://static.a-n.co.uk/wp-content/uploads/2016/12/the_creative_industries_council_skillset_skills_group_report.pdf

Russell, S. (1962). *Spacewar!* [PDP-1].

Stephenson, S. (2022, May 24). TIGA Reveals Largest Centres of Games Development in the UK. *TIGA*. https://tiga.org/news/tiga-reveals-largest-centres-of-games-development-in-the-uk-2

Swedish Games Industry. (2023). *Game Developer Index*. Swedish Games Industry. https://static1.squarespace.com/static/5a61edb7a803bb7a65252b2d/t/654c9ece950b90706387302e/1699520218008/GameDeveloperIndex2023-EN-WEB.pdf

Taito. (1978). *Space Invaders* (Version Arcade) [Computer software].

TIGA. (2021). TIGA University Accreditation. *TIGA*. https://tiga.org/education/tiga-university-accreditation

Tripp, S., Grueber, M., Simkins, J., & Yetter, D. (2020). *The 2020 Economic Impact Report*. The Entertainment Software Association.

UKIE. (2022). *Annual Review 2022.pdf*. UKIE.

Venäläinen, R., Kato, P., Rocca, J. D., & Lähde, K. (2019). *3/2019 Programmes for Education and Gaming – Evaluation of Skene, Learning Solutions, Future Learning Finland and Education Export Finland Programmes*.

Video Games Europe. (2022). *All abouto Video Games: Video Games Europe Key Facts 2022*. Video Games Europe. https://www.videogameseurope.eu/wp-content/uploads/2023/08/Video-Games-Europe_Key-Facts-2022_FINAL.pdf

Wolf, M. J. P. (Ed.). (2015). United States of America. In *Video games around the world*. MIT Press.

APX.2. Playful Prototyping in Speculative Design Practices

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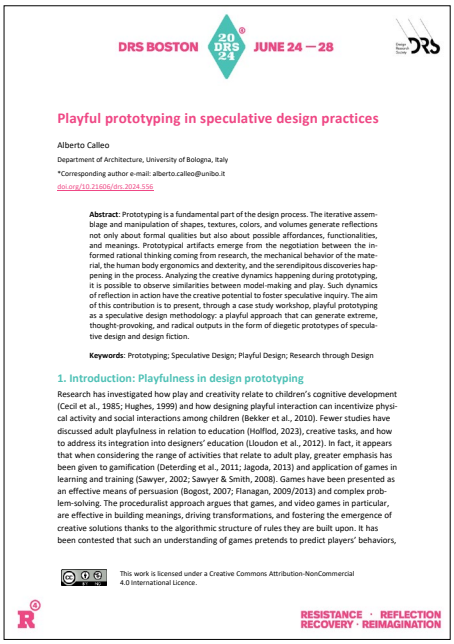

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Playful prototyping in speculative design practices

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Abstract: Prototyping is a fundamental part of the design process. The iterative assemblage and manipulation of shapes, textures, colors, and volumes generate reflections not only about formal qualities but also about possible affordances, functionalities, and meanings. Prototypical artifacts emerge from the negotiation between the informed rational thinking coming from research, the mechanical behavior of the material, the human body ergonomics and dexterity, and the serendipitous discoveries happening in the process. Analyzing the creative dynamics happening during prototyping, it is possible to observe similarities between model-making and play. Such dynamics of reflection in action have the creative potential to foster speculative inquiry. The aim of this contribution is to present, through a case study workshop, playful prototyping as a speculative design methodology: a playful approach that can generate extreme, thought-provoking, and radical outputs in the form of diegetic prototypes of speculative design and design fiction.

Keywords: Prototyping; Speculative Design; Playful Design; Research through Design

1. Introduction: Playfulness in design prototyping

Research has investigated how play and creativity relate to children's cognitive development (Cecil et al., 1985; Hughes, 1999) and how designing playful interaction can incentivize physical activity and social interactions among children (Bekker et al., 2010). Fewer studies have discussed adult playfulness in relation to education (Holflod, 2023), creative tasks, and how to address its integration into designers' education (Lloudon et al., 2012). In fact, it appears that when considering the range of activities that relate to adult play, greater emphasis has been given to gamification (Deterding et al., 2011; Jagoda, 2013) and application of games in learning and training (Sawyer, 2002; Sawyer & Smith, 2008). Games have been presented as an effective means of persuasion (Bogost, 2007; Flanagan, 2009/2013) and complex problem-solving. The proceduralist approach argues that games, and video games in particular, are effective in building meanings, driving transformations, and fostering the emergence of creative solutions thanks to the algorithmic structure of rules they are built upon. It has been contested that such an understanding of games pretends to predict players' behaviors,

RESISTANCE · REFLECTION RECOVERY · REIMAGINATION

Figure APX.2.1 - Conference proceedings cover. Published in 2024.

Abstract

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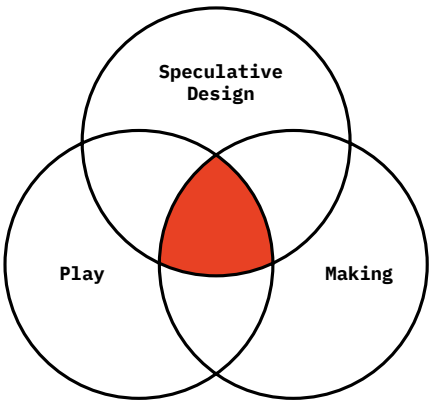
APX.2.1. Introduction: Playfulness in Design Prototyping



Research has investigated how play and creativity relate to children's cognitive development (Cecil et al., 1985; Hughes, 1999) and how designing playful interaction can incentivize physical activity and social interactions among children (Bekker et al., 2010). Fewer studies have discussed adult playfulness in relation to education (Holflod, 2023), creative tasks, and how to address its integration into designers' education (Lloudon et al., 2012). In fact, it appears that when considering the range of activities that relate to adult play, greater emphasis has been given to gamification (Deterding et al., 2011; Jagoda, 2013) and application of games in learning and training (Sawyer, 2002; Sawyer & Smith, 2008). Games have been presented as an effective means of persuasion (Bogost, 2007; Flanagan, 2009/2013) and complex problem-solving. The proceduralist approach argues that games, and video games in particular, are effective in building meanings, driving transformations,

and fostering the emergence of creative solutions thanks to the algorithmic structure of rules they are built upon. It has been contested that such an understanding of games pretends to predict players' behaviors, giving too much emphasis on the role of designers without considering the actual moment of play and the importance of players' interactions (Sicart, 2011). Following a play-centric approach, Ludic Design has been proposed as an alternative attitude to address design issues (Gaver, 2002; Morrison et al., 2007). Instead of pursuing persuasion and aiming toward problem solutions through play mechanics, a ludic approach offers an alternative attitude to design that is more open to questions and doubts, encouraging cooperation and participation through playfulness. In accordance with such approach, this contribution focuses on prototyping as a process in design research that embeds and enables a playful attitude that can foster critical reflection and creativity.

Playfulness constitutes an attitude rather than an activity: whereas an activity is defined by a defined chain of operations that lead to a certain output, an attitude is a "psychological, physical, and emotional perspective we take on activities, people, and objects" (Sicart, 2014, p. 22). It is, however, necessary to acknowledge the differences between adults and children's playfulness and its expression in relation to different personality constructs (Van Vleet & Feeney, 2015). This contribution presents a case study with qualitative analysis that does not delve into the characterization of the participants' personalities, thus potentially limiting the interpretation of the outcomes. Therefore, the case study is presented as a preliminary application of the theoretical framework that is used to situate prototyping as a playful attitude in anticipatory and speculative design practice.

In this contribution, it is argued that the playful material attitude that emerges in the iterative process of assembling and manipulating shapes, textures, colors, and volumes can allow reasoning not only about formal qualities but can also foster critical reflection of the potential functionalities and meanings materialized by the prototyped artifact. The ambiguity of the prototype opens to interpretations, confrontation, and problem discovery. Prototypical artifacts emerge from the negotiation between the informed rational thinking coming from research, the mechanical behavior of the material, the human body ergonomics and dexterity, and the serendipitous discoveries happening in the process. This attitude appears to be particularly relevant for design research that addresses anticipation since they often deal with undefined complex scenarios in which problems and design goals are not clearly defined (Celaschi, 2015; Celi & Formia, 2015). To investigate how play and prototyping intersect to generate ideas in anticipatory and speculative settings further, a design workshop in which international students of two product design degrees participated will be presented as a case study.

APX.2.2. Design and Prototypes

Across the different areas of design, prototyping is a fundamental part of the creative process. Scholars and practitioners have defined prototypes addressing their use both in design practice (Camburn et al., 2017; Lichter et al., 1994; Otto & Wood, 2001) and in research (Wensveen & Matthews, 2014). In design practice, prototypes are largely used to explore ideas and evaluate decisions in multidisciplinary design teams. Prototypes can be described from the perspective of their scope in presenting specific design features of complex systems: the artifact's role in the user's life, the look and feel of the final product, the technical

implementation through which the artifact will actually work (Houde & Hill, 1997). In design research, prototypes can function as the means through which research is conducted (Wensveen & Matthews, 2014): prototype can function as experimental components; as a means of inquiry, like technology probes (Hutchinson et al., 2003) or "provotypes" (Mogensen, 1992); as research archetype that physically exemplify research concept. However, shifting the focus from the prototype artifact to the process of making the prototype, Matthews and Wensveen argue that prototyping itself can constitute the method of inquiry in design research. The use of prototypes as epistemological instruments of knowledge construction in design practice is characteristic of the research through design approach (Stappers & Giaccardi, 2017). Documenting the construction process and the decisions made allows for critical reflection driven by the experience of making rather than the final outcome. A methodology that builds on the critical analysis of the process is the Method for Design Materialization (MDM) proposed by Khaled and Barr as a methodological evidence-based approach in video game design (Khaled & Barr, 2023). When committing a change in the source code, instead of the brief description of what has been modified (that is the common practice of a software engineering approach), in MDM, the change is largely discussed, and considerations are made by the developer to foster design reflection on the work. In this way, starting from small changes, the designer is encouraged to deepen the reasoning on the impact that minor changes could have on the broader meaning of the project. Contextual reflection on the committed design choices directly connects theory and practice. The prototypes become the materialization of the design hypothesis.

Prototypes play a major role in anticipatory and speculative design. Advancements in technology need to be developed within their social context and prototyping has become the driver of innovation (Schrage, 2000). In speculative design, the materiality of the artifacts is the means that encourages a critical reflection that challenges presumptions and preconceptions about the future (Dunne & Raby, 2013). In science fiction prototyping (Johnson, 2011), prototypes suggest how the artifacts will actually work and live in the imagined future. In design fiction (Bleecker, 2009; Sterling, 2013), in conjunction with other worldbuilding elements, prototypes are used to develop narratives around future scenarios in which speculative artifacts are the materialization of the transformation happening in culture, value, and technologies. Such prototypical artifacts are often called diegetic prototypes: "cinematic depictions of future technologies" that exist in the fictional world (Kirby, 2010). Games as fictional artifacts in a narrative world can evoke speculation about alternative futures (Gualeni & Fassone, 2022).

One of the main goals of speculative and critical approaches to design is to include more and diverse perspectives into the discourse about the design of the future. For this reason, participatory and co-design practices are particularly relevant in future-oriented design research. Making emerges as the characteristic method for doing design research and is pivotal in participatory design (Sanders & Stappers, 2014). To support co-design, prototypes can be used to collect data and information in the form of cultural probes (Gaver et al., 1999), to facilitate collaborative activities as generative toolkits (Sanders, 1999). Playfulness has an important role in facilitating collaboration and engagement. Through physical interaction with artifacts, like probes and prototypes, designers can activate playful dynamics that can foster creativity.

In design fiction and anticipatory practices, prototypes are most often presented in their final form, and less emphasis is given to the prototyping process as a speculative moment itself. Also, such prototypes are often displayed as exhibition artifacts with which it is not possible to interact. Both these aspects prevented consideration of and solicited by materiality and physical interaction. For this reason, the contribution's aim is to consider how speculation unfolds often in behind-the-scenes phases of prototyping and how it develops in creativity.

APX.2.3. Prototyping as Play, Prototypes as Technologies of Play

The contemporary product-service system is largely based on computing. Technological solutions brought into everyday life the values of the workspace from which it developed, defining the standards and the parameters of daily activities according to criteria of optimization and efficiency (Gaver, 2002). The mediation of human experience through digitized and gamified interfaces constantly redefines the distinction between playful and working time. The real world itself appears as a gamespace that resembles "an imperfect form of the computer game" in which the nuances of the analog have been violently replaced by binary decisions and output of the digital (Wark, 2007). However, humans are playful creatures (Huizinga, 1938), and Gaver suggests that designing for homo ludens means evading the assumption that the scope of technology is only that of providing effective solutions to defined problems. Hence, a design methodology that produces artifacts that encourage exploration and embrace curiosity should incorporate more subjective and open forms of inquiry, together with strategies of appropriation and re-functionalization, and should pursue pleasure and engagement instead of performance and clarity (Gaver, 2002). Such methodology proposes a radical approach to design that questions the established assumptions of efficiency on which human-computer interactions are based upon. Such assumptions are based on the systems that reduce human psycho-physical behaviors to computable and predictable models. Subverting the perspective from which designers observe phenomena and propose solutions, this methodology proposes an alternative way to critically encourage creativity. The playful design is ambiguous, open to interpretation, and shifts the focus from the designer's intention to the possibilities that emerge from the user's understanding of the artifact (Sicart, 2014).

As discussed in the previous section, prototypes can serve different design needs, and hence, they can be understood according to different categories. However, if we consider that playfulness may emerge during the making of the prototype, how do we situate the resulting artifacts in relation to other technologies of play? What are the characteristics of such playfulness since it emerges in the context of design practice? How does it apply in the context of speculative design and anticipation? This paragraph frames the theoretical concepts used to define the connection between play and prototyping and situate prototypes in relation to toys, games, video games, and other technologies related to the experience of play.

Research has investigated the benefits of a playful approach to design and how it be activated by introducing technologies of play, such as games, video games and toys in the design practice. For example, the co-creation of playful objects has proved to encourage the emergence of a shared space of collaboration and dialogue (Holflod, 2023) with positive impacts on participatory

and collaborative design processes. According to Jagoda, games can be observed as experimental artifacts both in formalist terms, as they represent a simplified model of reality in which experimentation takes place, or, from an alternative player-centric perspective, as processes or occasions for play in which experimentation can go over the predesigned affordances of a simulation (Jagoda, 2020). In fact, whereas gamification and simulation approaches set their experiments in models of the real world, games, as an "alternative form of experimental art-science" can serve as an alternative method for problem-making, rather than a problem-solving instrument (Jagoda, 2020, p. 142). Drawing from Jagoda's definition of the experimental qualities of games, prototyping could be seen as an experimental process that intertwines conceptual and technical reasoning with manual skills and sensorial-driven dexterity in an explorative practice that embeds and encourages a playful attitude.

Another concept that is functional to define the duality of prototypes as the technology of play and as artifacts for speculative inquiry is that of plaything. Adopting a materialistic ontology approach, Sicart understands the technologies of play (such as games, video games, and playgrounds) as epistemological structures of knowledge formation and as cultural constructs rather than ontological categories (Sicart, 2023). According to Sicart, such things become playthings in the moment their materiality is activated when we play with them. Following this conceptualization, it could be argued that prototypes are playthings that came into existence as knowledge construction tools through the process of prototyping. They inform the material practice of shaping forms and, as discussed later in the paragraph, encourage the exploration of possible affordances.

Prototyping offers a space to evaluate and, above all, challenge design ideas. The play has been considered in relation to its capability to encourage divergent thinking and in relations to prototyping (Loudon & Deininger, 2011). Within rules and constraints designers develop creative solutions often relying on alternative ways to approach design problems. In speculative design, rules are not those set by current technologies or by actual market and production constraints. In anticipatory practices, designers need to develop their own set of rules, and the boundary definition is part of the design process itself. During prototyping, the physical qualities of the material enable or limit the capability to represent forms and shapes. Mechanical properties can become the trigger of design strategies, and serendipitous discoveries can occur through physical interaction with the material and by observing of the shapes gradually taking form.

It is possible to observe that the making of prototypes shares commonalities with play. Since childhood, building is a form of play that allows the development of sense-perceptual abilities and dexterity. Crafted objects become tools, characters, and fictional artifacts. During play, things acquire new meanings through contextualization and appropriation (Sicart, 2014). Objects become props that encourage the emergence of play, even though their physical qualities do not necessarily correspond to those of the represented artifact. Similarly, initial prototypes are rarely built with the same material as the final product. Cheap and easy-to-work materials allow for fast iterations of design ideas. In this phase, designers make their evaluation projecting the look and feel of the final material and finishes on the prototype. Without a preliminary introduction, when these kinds of prototypes are shown to people outside the design team, they may cause misunderstandings and confusion. Depending

on the audience, prototypes require to be contextualized by a description of the design choices and consideration. Observers need to be introduced to the design world, the scenario where the prototype lives with its rules and constraints. Also, the prototype should provoke reactions and questions in the observers, inviting them to consider radical solutions. Prototypes live, like toys, in an ecology in which they perform a specific function and represent defined cultural values.

Toys, prototypes, and diegetic prototypes enable us to tell stories through objects that can help to envision alternative versions of the present reality or to speculate about possible future scenarios. Toys and prototypes define gateways between the fictional/speculative world and the actual one. To properly and effectively function as a tool for critical reflection on both future (speculative futures) and contemporary technologies (alternative presents), speculative design needs to balance the limits of its inquiry to be sufficiently speculative, but not end up in unrelatable or implausible proposals (Auger, 2013). Drawing from Auger's proposed methodology for speculative design, prototypes and toys can function as "perceptual bridges" between the familiar everyday reality of the player/designer, and the reflection proposed by the speculation by soliciting reaction in the human mind. Critically engaging with play and toys is a design attitude. Playfully approaching design problems is a critical attitude to design.

APX.2.4. Playing Speculation through Prototyping: A Case Study

Figure 1. Students' prototypes

In order to investigate the interplay between playful approaches to design and prototyping, a group of fifteen students from the second year of the master's degree in Product Design from the University of Bologna and the National University of Colombia were invited to participate in a workshop. The workshop, titled "Prototyping Artifacts for Future Food Rituals", aimed to investigate how artifacts will mediate the relationship between food and the human body in the future. The workshop was designed to experiment at the intersection of speculative design, game design, and prototyping, alternating between game mechanics and manual work to stimulate creativity.

Workshop Structure

Due to time constraints, the total duration of the workshop was 3 hours. The workshop was divided into two parts of respectively 2 and 1 hour.

In the first part of the workshop, the students were given two sets of cards. From each set, students were asked to pick one card: the first contained a hint about a future food-related topic (such as the growing interest for entomophagy in Western countries for human consumption, ethical issues about animal-based food products, food and water scarcity); the second contained one of the five human senses. Using clay, students were challenged to prototype an artifact that both addressed that topic and had a relation to the picked sense. All students had to work individually but they had the opportunity to engage with the tutors or to search for information about their own design topic online. To emphasize the physical relation to the human body, the prototype had to be realized on a one-to-one scale. The object could be designed without limits regarding its use: it could be made for eating, cooking, harvesting, storing, or every other activity involving human interaction with food.

In the second part of the workshop, each student presented the prototype to the rest of the class, declaring only the topic that served as a prompt. The other students were invited to ask question and make guesses about the possible use of the artifact.

Two main reasons have motivated the use of clay during the workshop. The first reason is of diegetic nature: clay has mediated human relationship with food since prehistoric times and, at the same time, it is the base material for today's advanced technical applications. This suggestion guided the choice to use clay not only as a prototyping medium but also as the final construction material of the object. The second one is connected to the material's workability: the students, except for one single case, were not familiar with clay working. This presented a challenge, but also an opportunity to engage with the mechanical behavior of the material. Since it was expected that most student would not have familiarity with clay working, it became interesting to observe how their sensibility and the dexterity acquired handling other mediums could transfer into an unfamiliar setting.

Since the workshop had to be completed in a relatively short timeframe, the topic was chosen to both be familiar but also to provide a certain degree of challenge. Food cultures are rich and diverse. They provide discussion topics across different nationalities and ages. Also, food is deeply connected to the human body and to the environment. The many connections that can be articulated from this topic, offered the students enough freedom to diverge and interpret the picked design theme. In fact, the first card had the scope to offer a starting element to trigger ideas and was not designed to provide a mandatory design challenge. After the workshop, students were invited to answer some questions about the experience.

Outcomes and Discussion

All students produced an artifact within the timeframe (Figure 1). The majority of the students, after some initial tinkering with the material, started working on the first concept directly using clay. A few preferred to draw sketch ideas on paper. From the questionnaire, it emerges that, despite being a novel experience, working with clay was a positive experience. A student described the prototyping activity as relaxing, while others appreciated working with a malleable material and being able to work both by adding and subtracting material.

Another aspect that emerged as challenging was the constraint to work on the prototype on a one-to-one scale. Considering the real scale of the object while defining its use allowed for direct connection not only with the physical body but also with the surrounding environment in which the object had to be used. One example is the project inspired by the topic of entomophagy and the sense of hearing. In this project, the student adopted the technique of coil building to shape an artificial habitat for home harvesting insects for consumption purposes. The structure was designed for channeling sound and noises coming from the artificial nest (Figure 2).

The playful approach, fostered by the card-based mechanics and by the way topics were presented, allowed students to freely explore ideas. The speculative setting allowed students to develop concepts without being constrained by problems of feasibility or cultural biases. One example is the prototype developed by a student, which started from the topic of mushroom-based products and the sense of sight. The artifact was inspired by a particular pair of glasses used by the ancient indigenous popu-

Figure 2. Home harvesting nest for insects. Prototype by Raissa Tič, Master's Student in Advance Design, University of Bologna.

lation of the Artic. Traditionally used to protect sight in the extremely bright condition of Artic environments, such glasses are characterized by a thin slit through which hunters could see and focus their sight. The project is set in a future scenario in which the consumption of mushrooms with psychoactive effects is socially accepted and functional to improve focus and creativity. The designed pair of glasses functions both as a tool for serving the mushrooms, evoking a form of ritualistic consumption, and also as a visual aid to channel the sight and support focusing.

In the second part of the workshop, students showed their artifacts to the rest of the group. The scope of this phase was to trigger serendipitous ideas coming from misinterpreting the intended use. The most interesting aspect that actually emerged was the group discussion about the speculative scenario in which the artifact would have been used. This allowed students to further develop and articulate their initial concept. In the case of the artificial nest for insect farming, it was suggested that, since the object was made with clay, it was suitable for baking and, subsequently, for serving. Such consideration broadened the debate about the ethical implications of eating living creatures regardless of their species but also the way artifacts and food processing alter our attitude towards what we eat.

The discussion has also contributed to broadening the boundaries of the speculation. Some projects explored solutions to the proposed scenarios following technological solution that seemed plausible to achieve with current or not too futuristic technologies. Others were more open to embracing a more metaphoric and poetic attitude. For example, a student prototyped a bottle cap and a straw in which a porous ceramic structure hosts microbial organisms that depurate water. On the same topic of water scarcity and adaptation, another student designed a set of jewels that allowed nomadic on-body micro-cultivation. The shape of the jewel facilitates plants watering with the user's tears. The two projects solicited a discussion on the way other living beings, even if invisible to our eyes, such as the yeast in the process of fermentation, are crucial in food technology and how ecosystemic transformation could impact and alter this symbiotic coexistence. On the other hand, the idea that the human body can nurture other living beings overturning the anthropocentric exploitative perspective has developed in a discussion on design practice and industrial systems in the post-Anthropocene.

From a material and formal point of view, some projects have embraced clay's physical characteristics and workability to shape a solid structure. One example is the coil-building technique used to prototype the artificial nest. Other projects challenged the mechanical proprieties of the material to seek formal qualities and ergonomic characteristics that could suggest specific affordances and gestures during the use. A representative example of this latter approach is the case of the flower-shaped jewels for on-body harvesting, which presented thin clay petals that were curved to facilitate the collection of tear droplets. It was possible to observe collaborative dynamics between the students who helped each other in trying to understand which tools to use and how to manipulate the medium to achieve a determinate shape. The overall atmosphere of the workshop favored a playful experimentation environment where transformation could be observed in the collaborative attitude engaged by the need to understand how to work with clay. The failed attempts, the clumsy shapes, and the resulting laughter defined a safe space of experimentation in which tacit knowledge were constantly achieved and passed on. It can be argued that the

most transformative aspect of this workshop experience was mediated by playfulness and resulted in the collaborative exploration of the medium's malleability.

APX.2.5. Conclusions

In this contribution, prototyping and prototypes have been situated in the context of playful design and speculation. A design workshop has been presented in order to explore how playful dynamics can intertwine with the prototype process. The workshop aimed to investigate how game mechanics and physical manipulation during prototyping invite a playful attitude in speculative design.

Qualitative outcomes showed that the materiality of the prototypes, emphasized by the adoption of particularly tactile and plastic material like clay, solicited in-action reflection on the relationship between the human body, the artificial artifacts, and the environment. From the questionaries, it emerges how of a novel prototyping medium under time constraints can present a challenging yet intriguing experience. It has been observed that the discussion that happened in the second part of the workshop helped the working group to elaborate on the ideas that drafted during the prototyping phase and encouraged them to explore more extreme perspectives. The guessing game about the prototype function was both an ice-breaking mode of engagement and a form speculation enabled by the artifact. A second prototyping iteration would have provided further insight into the transformative dynamics activated during the workshop.

Possible ways of utilizing the prototype were not only described verbally but were also demonstrated through mimicking gestures, suggesting the need to investigate the affordance of physical prototypes. For example, further experimentation could investigate how using prototypes in a fictional setting could engage students in playful and speculative co-design dramatization.

Based on this initial discussion, further investigation will explore how a playful attitude could intervein and bring value even in more advanced stages of the design process. More experimentation will also be developed to consider how digital prototyping and models can be integrated into play-driven design approaches to innovation and anticipation.

Acknowledgments

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Section Bibliography

Auger, J. (2013). Speculative Design: Crafting the Speculation. *Digital Creativity*, 24. https://doi.org/10.1080/14626268.2013.767276

Bekker, T., Sturm, J., & Eggen, B. (2010). Designing playful interactions for social interaction and physical play. *Personal and Ubiquitous Computing*, 14(5), 385–396. https://doi.org/10.1007/s00779-009-0264-1

Bleecker, J. (2009). *Design Fiction: A Short Essay on Design, Science, Fact and Fiction* (p. 49). https://blog.nearfuturelaboratory.com/2009/03/17/design-fiction-a-short-essay-on-design-science-fact-and-fiction/

Bogost, I. (2007). *Persuasive games: The expressive power of videogames*. MIT Press.

Camburn, B., Viswanathan, V., Linsey, J., Anderson, D., Jensen, D., Crawford, R., Otto, K., & Wood, K. (2017). Design prototyping methods: State of the art in strategies, techniques, and guidelines. *Design Science*, 3, e13. https://doi.org/10.1017/dsj.2017.10

Cecil, L. M., Gray, M. M., Thornburg, K. R., & Ispa, J. (1985). Curiosity-exploration-play-creativity: The early childhood mosaic. *Early Child Development and Care*, 19(3), 199–217. https://doi.org/10.1080/0300443850190305

Celaschi, F. (2015). AdvanceDesign Points of View. In M. Celi (Ed.), *Advanced Design Cultures: Long-Term Perspective and Continuous Innovation* (pp. 3–17). Springer International

Publishing. https://doi.org/10.1007/978-3-319-08602-6_1

Celi, M., & Formia, E. (2015). Advanced design practices for sharing futures: A focus on design fiction. *The Value of Design Research - 11th International European Academy of Design Conference*, 16. https://doi.org/10.7190/ead/2015/141

Deterding, S., Sicart, M., Nacke, L., O'Hara, K., & Dixon, D. (2011). *Gamification: Using game design elements in non-gaming contexts.* 66, 2425–2428. https://doi.org/10.1145/1979742.1979575

Dunne, A., & Raby, F. (2013). *Speculative everything: Design, fiction, and social dreaming.* The MIT Press.

Flanagan, M. (2013). *Critical Play. Radical game design. MIT Press.* (Original work published 2009)

Gaver, W. (2002). *Designing for Homo Ludens.* I3 Magazine, 12.

Gaver, W., Dunne, A., & Pacenti, E. (1999). Design: Cultural Probes. *Interactions*, 6, 21–29. https://doi.org/10.1145/291224.291235

Gualeni, S., & Fassone, R. (2022). *Fictional Games: A Philosophy of Worldbuilding and Imaginary Play.* Bloomsbury Academic.

Holflod, K. (2023). Objects-To-Relate-With: Exploring Playful Learning Experiences of Students in Interprofessional Higher Education Co-Creating and Playing with Objects. *The Journal of Play in Adulthood*, 5(1), 40–46. https://doi.org/10.5920/jpa.1259

Houde, S., & Hill, C. (1997). What do Prototypes Prototype? In *Handbook of Human-Computer Interaction* (pp. 367–381). Elsevier. https://doi.org/10.1016/B978-044481862-1.50082-0

Hughes, F. P. (1999). *Children, play, and development* (3rd ed). Allyn and Bacon.

Huizinga, J. (1938). *Homo Ludens* (2002nd ed.). Einaudi.

Hutchinson, H., Mackay, W., Westerlund, B., Bederson, B. B., Druin, A., Plaisant, C., Beaudouin-Lafon, M., Conversy, S., Evans, H., Hansen, H., Roussel, N., & Eiderbäck, B. (2003). Technology probes: Inspiring design for and with families. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 17–24. https://doi.org/10.1145/642611.642616

Jagoda, P. (2020). *Experimental Games: Critique, Play, and Design in the Age of Gamification.* University of Chicago Press. https://doi.org/10.7208/chicago/9780226630038.001.0001

Johnson, B. D. (2011). Science Fiction Prototyping: Designing the Future with Science Fiction. *Synthesis Lectures on Computer Science*, 3(1), 1–190. https://doi.org/10.2200/S00336ED1V01Y201102CSL003

Khaled, R., & Barr, P. (2023). Generative Logics and Conceptual Clicks: A Case Study of the Method for Design Materialization. *Design Issues*, 39, 55–69. https://doi.org/10.1162/desi_a_00706

Kirby, D. (2010). The Future Is Now: Diegetic Prototypes and the Role of Popular Films in Generating Real-World Technological Development. *Social Studies of Science - SOC STUD SCI*, 40, 41–70. https://doi.org/10.1177/0306312709338325

Lichter, H., Schneider-Hufschmidt, M., & Zullighoven, H. (1994). Prototyping in industrial software projects-bridging the gap between theory and practice. *IEEE Transactions on Software Engineering*, 20(11), 825–832. https://doi.org/10.1109/32.368126

Loudon, G., Wilgeroth, P., & Deininger, G. (2012). The importance of play and creativity in the design curriculum. *Design Education for Future Wellbeing.* 14th International Conference on Engineering and Product Design Education, Antwerp, Belgium.

Loudon, G., & Deininger, G. (2011). The Relationship Between Play, Prototyping and Creativity. *DESIRE '11: Procedings of the Second Conference on Creativity and Innovation in Design*. DESIRE '11, 2nd International Conference on Creativity and Innovation in Design, Eindhoven, Netherland.

Mogensen, P. H. (1992). Towards a Prototyping Approach in Systems Development. *DAIMI Report Series*, 21(412). https://doi.org/10.7146/dpb.v21i412.6725

Morrison, A. J., Mitchell, P., & Brereton, M. (2007). The lens of ludic engagement: Evaluating participation in interactive art installations. *Proceedings of the 15th ACM International Conference on Multimedia*, 509–512. https://doi.org/10.1145/1291233.1291358

Otto, K., & Wood, K. (2001). Product Design: Techniques in Reverse Engineering and New Product Development. Prentice Hall.

Sanders, E. B.-N. (1999). Generative Tools for Co-designing. In S. A. R. Scrivener, L. J. Ball, & A. Woodcock (Eds.), *Collaborative Design* (pp. 3–12). Springer. https://doi.org/10.1007/978-1-4471-0779-8_1

Sanders, E. B.-N., & Stappers, P. J. (2014). Probes, toolkits and prototypes: Three approaches to making in codesigning. *CoDesign*, 10(1), 5–14. https://doi.org/10.1080/15710882.2014.888183

Sawyer, B., & Rejeski, D. (2002). *Serious games: Improving public policy through game-based learning and simulation*. Woodrow WilsonInternational Center for Scholars.

Sawyer, B., & Smith, P. (2008). Serious games taxonomy. *Serious Games Summit at the Game Developers Conference*, San Francisco, USA, 23–27.

Schrage, M. (2000). *Serious Play: How the World's Best Companies Simulate to Innovate*. Harvard Business Press.

Sicart, M. (2011). Against Procedurality. The International Journal of Computer Game Research, 11(3). http://gamestudies.org/1103/articles/sicart_ap

Sicart (Vila), M. (2014). Play matters. MIT Press. Playful Thinking.

Sicart, M. (2023). Playthings. In M. Sicart, *Playing software: Homo ludens in computational culture* (pp. 53–73). The MIT Press.

Stappers, P. J., & Giaccardi, E. (2017). Research through Design. In M. Soegaard & R. Friis-Dam (Eds.), The Encyclopedia of Human-Computer Interaction (2nd ed., pp. 1–94). The Interaction Design Foundation. https://www.interaction-design.org/literature/book/the-encyclopedia-of-human-computer-interaction-2nd-ed/research-through-design

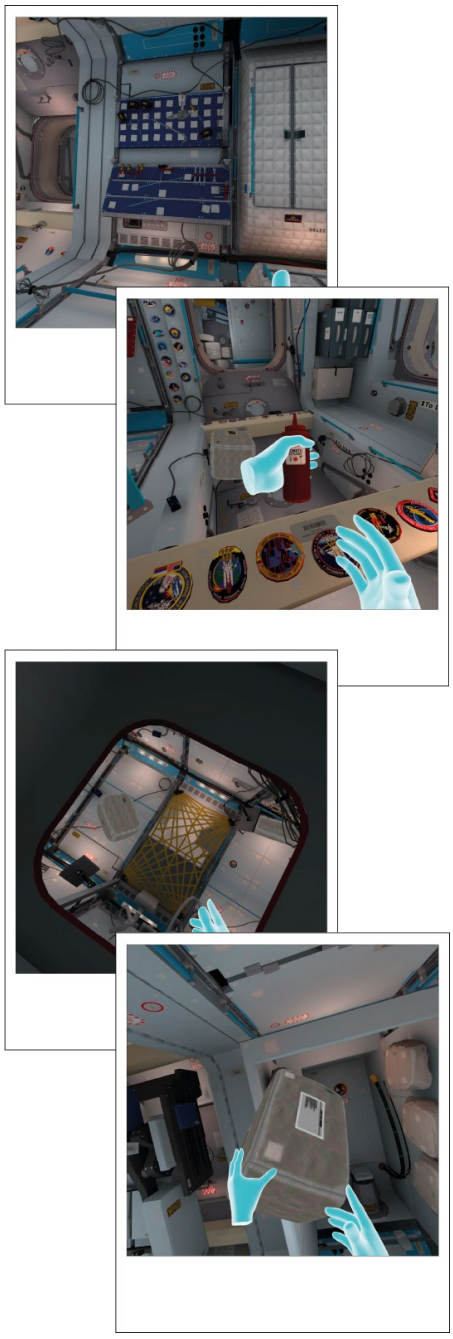
Sterling, B. (2013). Patently untrue: Fleshy defibrillators and synchronised baseball are changing the future. *Wired UK*, 11. https://www.wired.co.uk/article/patently-untrue

Van Vleet, M., & Feeney, B. C. (2015). Play Behavior and Playfulness in Adulthood. *Social and Personality Psychology Compass*, 9(11), 630–643. https://doi.org/10.1111/spc3.12205

Wark, M. (2007). *Gamer Theory*. Harvard University Press. https://www.jstor.org/stable/j.ctvjnrv27

Wensveen, S., & Matthews, B. (2014). Prototypes and prototyping in design research. In P. A. Rodgers & J. Yee (Eds.), *The Routledge Companion to Design Research* (1st ed., pp. 262–276). Routledge. https://doi.org/10.4324/9781315758466-25

APX.3. Polaroids from Space: Making Sense of Extreme Outer Space Environments



Examples of the printed screenshots.

Date: April 2024

Project Abstract: This experimental application has been developed within a broader research project, *Beyond the Space Life: Digital Living Lab for Human Life in Space*, financed by the Italian Ministry of University and Research with funds granted by the European Union under the *Next Generation EU* Program. The project is still in its development it has the goal to develop novel design solutions to support the future of human life in outer space. The project involves the Advanced Design Unit of the University of Bologna and Italian company Thales Alenia Space. This presented experimentation was developed during the research phase of the project with the goal to support designers in building knowledge about the specific characteristic of the orbiting modules.

The case study investigates how Virtual Reality (VR) technologies can be used to support designers' understanding of extreme environments. Rather than designing and developing a custom VR experience, a commercial game application was chosen as test environment. On a practical level, such decision depended on the need to limit time investment on the preparation for the workshop activity. From a research standpoint, using a commercial video game provided the opportunity to evaluate the applicability of existing consumer VR experience in a research setting, evaluating strategies of re-mediation and re-functionalization for design research.

During the activity, participants were asked to take screenshot of spatial, infrastructural, and design elements that caught their attention. After this activity, participants were asked to answer a questionnaire about the experience. The screenshots were later printed and used in a following workshop in which they pictures were used to develop design analysis maps.

Project Insights: Participants to the workshop were asked to answer a questionnaire about how they experienced the VR test, whether they founded it useful for developing newer or more profound knowledge about the orbital modules' environments, and how and if taking screenshot during the activity was a useful design research practice.

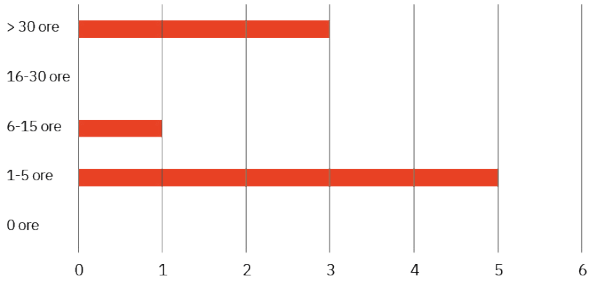
The case study was approached as a qualitative analysis of the perceived impact of the activity. Although 12 participants were involved, only 8 answered the questionnaire. These data will be used for designing future quantitative investigations.

Participants considered participating to the experience having a largely positive impact on their previous knowledge about interior environments of orbiting space modules (Q17). Despite the rather limited experience with VR (Q1) and video games (Q2), participants managed to freely explore the virtual environments and taking in-game pictures. However, some of them witnessed motion sickness during or after the activity. For some participants, taking in-game pictures mirrored a real-live design-related activity (D-5).

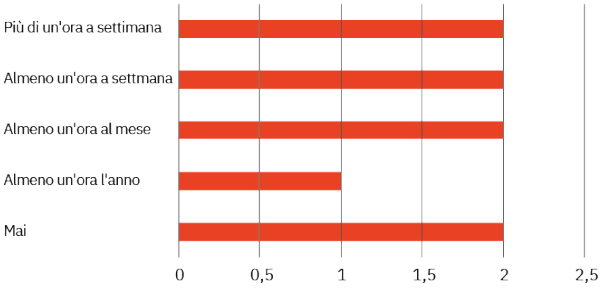
Despite participants argued that the VR experience lacked more refined and accurate simulation and interaction features(Q12), they managed to gather useful information for the following design process (Q17). At the moment of writing, the concept design phase is still ongoing. Therefore, it is not possible to describe the impact of this activity on the rest of the project. However, further analysis will be carried on by expanding the number of participants and adopting standardized methods for evaluating the impact on applicative design phases.

In the following, an excerpt from the questionnaire answers is provided.

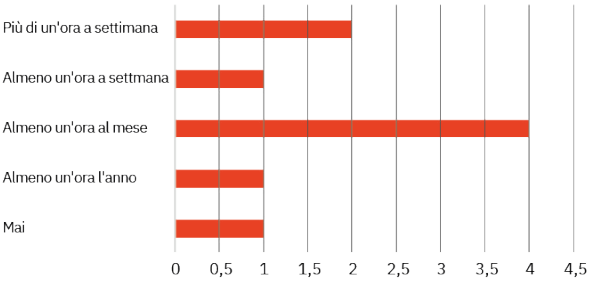
Q1 - Quanta ore hai già speso in ambiente VR complessivamente?



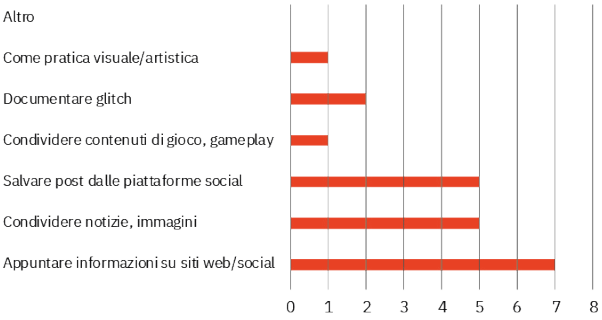
Q2 - Con che frequenza utilizzi video giochi (smartphone, VR, PC, Console)?



Q3 - Con che frequenza fruisci di media di intrattenimento a tema science-fiction, non considerando video giochi (fil, libri, podcast, fumetti)?



Q4 - Durante l'utilizzo di software digitali e la navigazione web, sei solita/o fare screenshot per... (più risposte possibili):



D5: Raccogli e utilizzi screenshot nell'ambito delle tue attività legate al design? Se si, come?

R5.1: Ne faccio uso quando mi imbatto in determinate informazioni o possibili ispirazioni di progetto per condividerle con i membri del gruppo.

R5.2: Si, attraverso i salvaschermi raccolto informazioni che mi interessano, soprattutto schemi, immagine di metodologie e immagini di casi studio per inserirle in presentazioni o per archiviarle all'interno delle mie cartelle di ricerca

R5.3: Si, per avere un promemoria visivo di ciò che ha catturato la mia attenzione; se si tratta di elementi di design prendo anche appunti nelle note allegando la foto

D6: Utilizzi la fotografia nell'ambito delle tue attività legate al design? Se si, come?

R6.1: Spesso la utilizzo per documentare il lavoro svolto, o per documentare contesti su cui lavorare, specie se coinvolgono contesti in cui è necessario analizzare azioni, comportamenti ecc.

R6.2: [si, per fare attività di osservazione del contesto in cui vado a lavorare oppure per documentare attività che faccio]

R9 - User experience del dispositivo VR (utilizzo visore, controlli, gestualità, intuitività dell'interazione, sensazioni e percezioni rispetto all'utilizzo della tecnologia ecc):

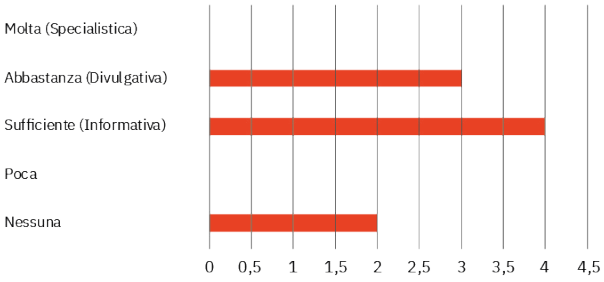
R9.1: Molto interessate, durante l'esperienza ho potuto notare diverse cose tra cui: alterazioni dei sensi, sensazione di stare fluttuando, di utilizzare gli oggetti

R9.3: Mi sono trovato bene, ma ammetto di aver già avuto esperienza con il dispositivo utilizzato. Migliorabile la gestione di alcuni feedback di errore, attualmente assenti.

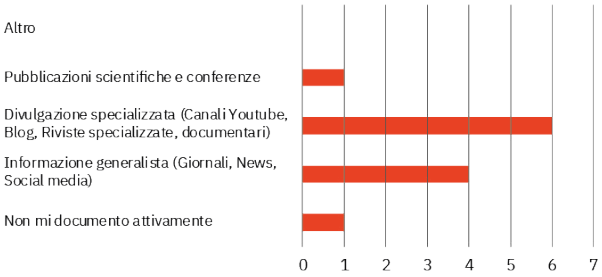
R9.4: Non subito chiaro l'utilizzo. Troppi tasti nel joystick. Interessante entrare e poter afferrare e aggrapparsi ai vari elementi, bella l'esperienza. Sensazioni di nausea dopo l'esperienza.

R10.5: All'inizio mi sono sentito in uno stato di disorientamento, per poi piano piano adattarmi muovendomi quasi naturalmente; ho trovato intuitivo l'utilizzo del puntatore laser utile ad indicare vari dispositivi e riceverne informazioni.

Q7 - Quanta familiarità hai con temi legati all'esplorazione spaziale e le sue tecnologie (ad esempio, quanto sai di nuovi sistemi di lancio, navicelle, satelliti, missioni, start-up)?



Q8 - Come ti documenti e segui gli aggiornamenti sui temi legati all'esplorazione spaziale?



D10: Sensazioni percettive e fisiche legate all'uso del dispositivo VR (suoni, vista, orientamento, ecc..)

R10.1: I sensi vengono alterati, tra questi la vista che si allieva nella esplorazione, i suoni sono molto invasivi, orientamento molto fluido con facile padronanza, il corpo percepisce nella realtà virtuale la fluidità e l'"assenza di gravità"

R10.2: L'utilizzo di questi dispositivi a primo impatto crea sempre un po' di disorientamento, ma dopo un breve momento di confusione, grazie molte a suoni all'interno dell'applicazione che rendono più facile l'orientamento, ci si riesce ad immedesimare abbastanza bene.

R10.3: Ho gradito particolarmente l'effetto audio che aumenta di intensità all'avvicinarsi alle estremità. Ho gradito particolarmente l'effetto vertigine legato alla modalità di spostamento che a mio avviso ha reso piuttosto bene.

D11: User experience dell'applicazione Mission: ISS (intuitività d'uso, controlli, coinvolgimento, ecc..)

R11.1: L'esperienza all'interno della ISS è ottimale grazie all'utilizzo di suoni e elementi interattivi

R11.2: la user experience è interessante, sarebbe bello interagire maggiormente con gli elementi (inserire oggi nei rack o negli elementi elastici, spingere pulsanti, fare manovre particolari, ecc.

A11.3: Dopo i primi 5 minuti di prove non ho avuto particolari problemi anzi, il tutto risultava quasi naturale; avrei preferito ci fossero più oggetti il cui funzionamento fosse legato alla stazione stessa come la cloche

Rispetto ai contenuti dell'esperienza fatta, quali commenti hai su:

D12: Aspetti legati al design degli elementi presenti nella stazione spaziale (qualità architettonica, aspetti ergonomici e funzionali, materiali utilizzati, aspetti acustici e ambientali, ecc..)

R12.1: l'architettura presenta varie problematiche, tra cui la presenza di cavi in aria, la poca usabilità e senza le frecce ce difficoltà di orientamento, il suono è sopportabile

R12.2: Tutto l'ambiente è caratterizzato da uno stile estremamente funzionale, per certi versi quasi concepito per essere abitato da dei robot, piuttosto che da esseri umani.

R12.3: Si vede che sono studiati per essere il più semplici e funzionali possibile, ma comunque il tutto sembra un grande laboratorio; quindi, un luogo studiato apposta per dei professionisti in cui la maggior parte delle persone si sentirebbe fuori luogo. Mi dà l'impressione che anche un'apparecchiatura conosciuta (semplice e quotidiana) risulta sconosciuta.

R12.4: sono interessanti i temi dell'orientamento all'interno della navicella e dello stoccaggio di oggetti e attrezzi. Per quanto riguarda i materiali utilizzati per gli interni sembrano strettamente funzionali

R12.5: Sono rimasto colpito dall'elevata concentrazione di oggetti all'interno di uno spazio ristretto e posizionati con accuratezza mantenendo ordine nella stazione.

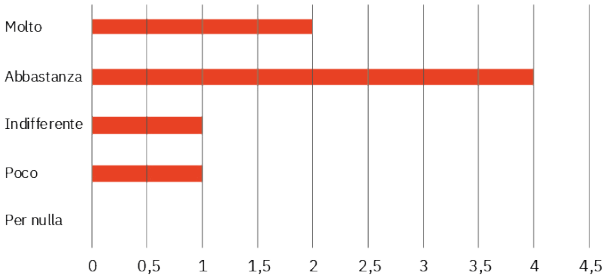
R12.6: I supporti necessari per muoversi all'interno dell'abitacolo peccano in ergonomia e a volte mi sono sembrati troppo distanti tra di loro. Ho notato poi diversi cavi e strumenti in giro per l'abitacolo che contribuivano a creare molta confusione e disordine.

D13: Modalità di navigazione all'interno della stazione spaziale (orientamento nell'abitacolo, wayfinding)

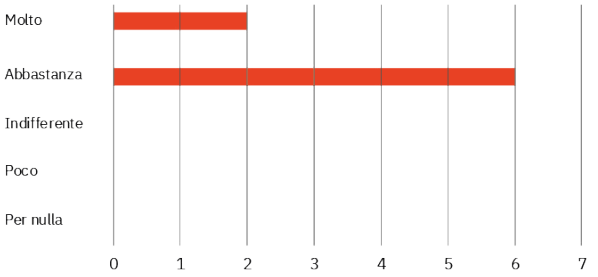
R13.1: L'orientamento risulta piuttosto ostico a causa della conformazione dei moduli, fondamentalmente tutti estremamente simili tra loro. Il wayfinding, però è estremamente semplificato dalla pianta a croce della ISS.

R13.2: Non sempre è stato facile capire in che zona della stazione mi trovassi: ritrovarsi più volte nello stesso punto con un orientamento della visuale diverso faceva sembrare lo stesso modulo un posto completamente differente, forse anche a causa dell'utilizzo di materiali e colori molto simili tra di loro che rende difficile individuare dei punti di riferimento.

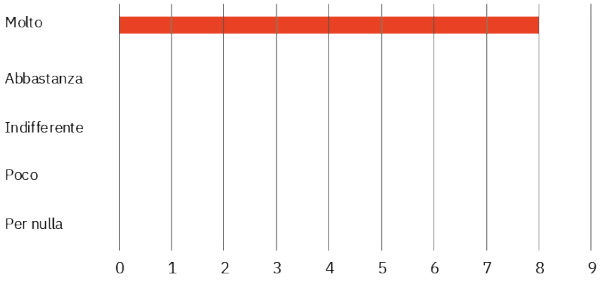
Q14 - Rispetto all'esperienza fatta, quanto pensi che abbia favorito un approccio ludico all'esplorazione?



Q15 - Rispetto all'esperienza fatta, quanto pensi che abbia favorito una modalità libera di esplorazione?



Q16 - Rispetto alla tua precedente conoscenza sul design degli abitacoli spaziali, credi che questa esperienza abbia contribuito...



D17: Relativamente a quest'ultimo aspetto, se ritieni che abbia avuto un contributo positivo, in che modo lo ha fatto?

R17.1: Capisco meglio la discretizzazione dei moduli e come effettivamente siano trasposte le attività di routine quotidiana

R17.2: È stata molto utile per capire effettivamente quanto spazio ci sia a disposizione per gli astronauti e per comprendere meglio limiti ed opportunità del muoversi in un ambiente a 0g.

R17.3: Il livello di interazione è molto diverso dal vedere un video su schermo, e la possibilità di soffermarsi e vedere certi particolari è una cosa molto positiva

R17.4: Sperimentare le modalità di spostamento mi ha fatto comprendere meglio dinamiche come, ad esempio, i tempi necessari per muoversi all'interno della stazione.

D18 - Se ritieni non abbia avuto un contributo, perché?

R19: -

D19: Quali ritieni siano i limiti di questa esperienza rispetto alla capacità di apportare conoscenze utili al progetto degli ambienti spaziali?

R19.1: Il fatto di non poter interagire con gli "strumenti", ma solo con alcuni oggetti

R19.2: Probabilmente la mancanza di una vera e propria microgravità, la quale permetterebbe di comprendere ulteriormente le sfide legate all'ambito, per quanto riguarda il feeling che si ha nell'interfacciarsi con ambiente e oggetti.

Participant during the VR Test.

Workshop activity during which participants used the printed images to share their inisghts from the VR test.

D20 - Quali ritieni siano i limiti dell'utilizzo di esperienze VR per produrre conoscenze utili al progetto di design?

A20.1: Dopo la giornata di oggi sicuramente la motion sickness. In realtà forse proprio la dimestichezza con lo strumento.

A20.2: Il principale limite, allo stato attuale, credo sia dato in gran parte dall'ambiente in cui si è immersi e dalle sensazioni tattili. Certo, esistono esperienze VR in grado di simulare corrugazioni di superfici e temperatura di queste, tuttavia sono tecnologie ancora da affinare per un uso che possa essere effettivamente inquadrato in una vera e propria ottica di utilizzo al di fuori dell'ambito pioneristico.

A20.3: penso che sia importante l'integrazione tra questo strumento, la ricerca e dove possibile l'osservazione sul campo. In questo caso è fondamentale perché non è possibile entrare in contatto con l'ambito problematico.

D21: Se occasionalmente o abitualmente usi video giochi, in che modo ritieni possano contribuire a fornire conoscenze utili al progetto o alla ricerca di design (non solo in ambito space design)?

A21.1: Sicuramente trovo particolarmente interessante il tema simulativo e di sperimentazione di esperienze in ambiente controllato/sicuro. Anche la dimensione ludica e di "divertimento" a mio avviso aiuta al rendere impattante l'esperienza e più facilmente assimilabile.

A21.2: non utilizzo spesso videogiochi, però credo che possano essere molto utili quando ci si deve interfacciare con scenari e ambienti difficili da raggiungere o fuori dalla nostra portata (per fattori economici, ambientali, di tempo, spaziali)

A21.3: Sicuramente nella fase di prototipazione e testing di un progetto per la possibilità di testare in un ambiente controllato, ricevere feedback immediati e perfezionare il prototipo.

D22: Se non usi video giochi, ritieni che possano contribuire a fornire conoscenze utili al progetto o alla ricerca di design (non solo in ambito space design)?

A22.1: Credo che l'approccio apportato dai videogiochi possa essere di notevole importanza, dato che per certi versi è un tipo di progettazione che si svincola maggiormente dal limite tecnico, e va maggiormente verso una progettazione legata all'esperienza d'utilizzo. Il videogioco potrebbe essere impiegato anche in attività di training degli astronauti.

APX.4. Bestiary: Infographic Design as Worldbuilding

Date: August 2024

Project Abstract: This activity was developed after the collection and analysis of the game-forms presented in Chapter 6. In this activity I explored a playful approach to data visualization and infographic design inspired by worldbuilding and character design. Such data visualization is meant to complement the analytical analysis of Tables 6.2.

The goal of the experimentation was that of visualizing the game-forms as lively creatures, characterized by a unique personality derived from the different kinds of engagements they enable. In the analysis, in fact, each game-from have been described according to one or more kinds of user engagement (economic, political, artistic, ...). This aspect emerges as a relevant one, since it gives information about the possible contexts of application and about the possible connections *game-forms* can enable. Therefore, a visual design system has been defined to represent how different kinds of engagements can coexist within the same game form.

Each creature illustration has been subdivided into four parts: Head, Body, Mouth, Over Head (Figure A.8.03.1). Each value of the *Type of Engagement* parameter from Table 6.2 has been associated to a specific graphic element for all creatures' body part (Figure A.8.03.2).

A Python3 script was used to combine creatures' body parts according to the *Type of Engagement* parameter value. 54 creatures were generated using data from the game-form analysis (Figure A.8.03.3).

Figure A.8.03.2 - Creature's bodyparts for each Type of Engagemente parameter's value.

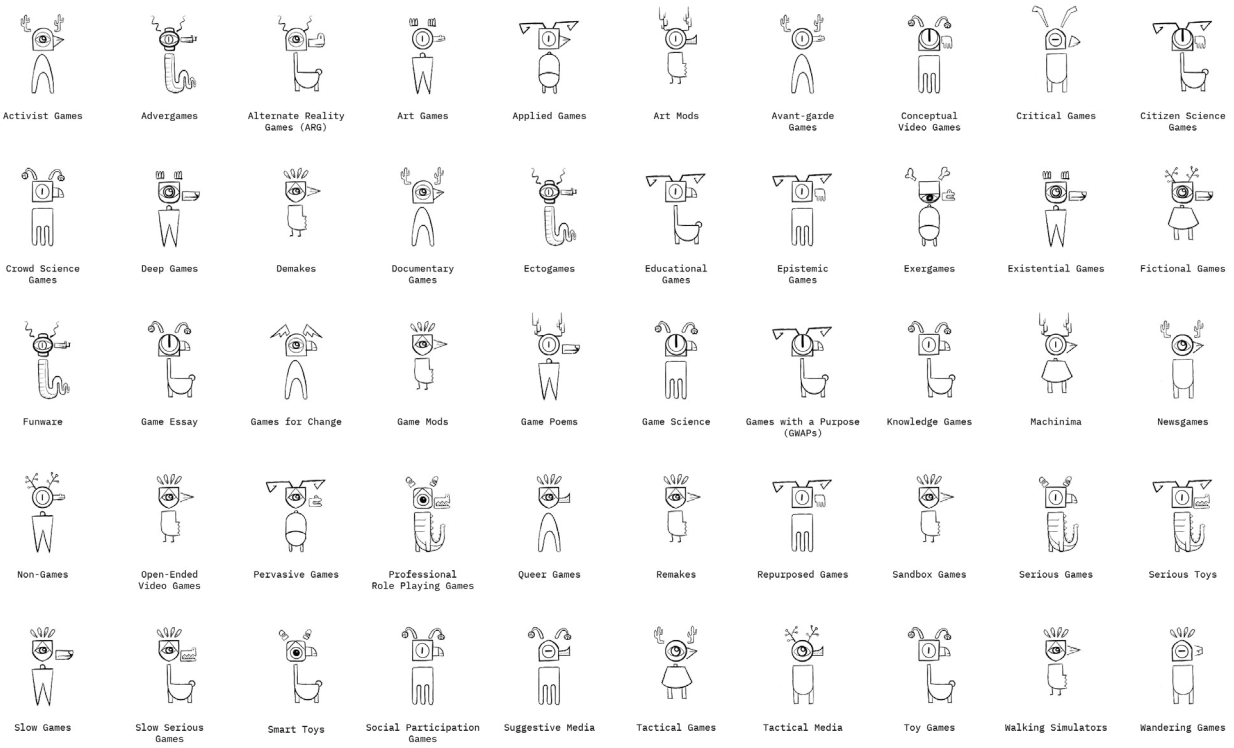


Figure A.8.03.3 - Game-forms creatures

Python Code

```
import pandas as pd
from PIL import Image
import os

# File paths
excel_file = '/Users/alberto/Desktop/Creature/
parameters.xlsx'
head_folder = '/Users/alberto/Desktop/Crea-
ture/components/Head'
body_folder = '/Users/alberto/Desktop/Crea-
ture/components/Body'
mouth_folder = '/Users/alberto/Desktop/Crea-
ture/components/Mouth'
overhead_folder = '/Users/alberto/Desktop/
Creature/components/OverHead'
output_folder = '/Users/alberto/Desktop/Crea-
ture/generated'

# Create the output folder if it doesn't exist
os.makedirs(output_folder, exist_ok=True)

# Read the Excel file
df = pd.read_excel(excel_file, sheet_name=0)

# Check the column names
print(df.columns)

# Assuming the column names are 'Creature
Name', 'Head', 'Body', 'Mouth', 'OverHead'
for index, row in df.iterrows():

    creature_name = row['Name']
    head_param = row['Head']
    body_param = row['Body']
    mouth_param = row['Mouth']
    overhead_param = row['OverHead']

    # Load each component image
    head_image = Image.open(os.path.join(head_
folder, f'Head_{head_param}.png'))
    body_image = Image.open(os.path.join(body_
folder, f'Body_{body_param}.png'))
    mouth_image = Image.open(os.path.
join(mouth_folder, f'Mouth_{mouth_param}.
png'))
    overhead_image = Image.open(os.path.
join(overhead_folder, f'OverHead_{overhead_
param}.png'))

    # Assuming that all images are the same
size and in RGBA format
    combined_image = Image.alpha_composite(-
head_image, body_image)
    combined_image = Image.alpha_composite(-
combined_image, mouth_image)
    combined_image = Image.alpha_composite(-
combined_image, overhead_image)

    # Save the combined image
    save_path = os.path.join(output_folder,
f'{creature_name}.png')
    combined_image.save(save_path)

print("Creature images generated and saved
successfully.")
```

APX.5. Ruins

Date: June – August 2024

Project Abstract: This case study demonstrates the outcomes of the development process of a commercial video game vertical slice and reflects on the challenges and opportunity encountered during its design and production from the perspective of a design researcher. This project was indeed developed by me as a as a self-learning and evaluation activity.

My primary goal was to reflect on how the theoretical and applied research conducted over the three years of my doctoral studies could be transferred into a video game prototype that could suit both research and commercial purposes.

The project constrains I defined were, indeed 1) designing a game proposal that met the application requirements of the Bologna Game Farm acceleration program (including that of being a proposal for the B2C market); 2) design a game that could be used as platform for design research, both during development and after completion.

In regard to the second aspect, the game was designed in order to: 1) be re-functionalized as a *game-form* for design research (cf. Ch.7); 2) offer connections with other research activities related to video games and design research (see EX.09 Playable Heritage); 3) offer applicative and research connections with other design-related disciplines such as Architectural Representation, Architectural Design and Restoration, Art and Cultural Heritage.

During the project implementation, I directly experienced the technical, and production-related challenges and constrains of video game development, and how they transfer into design choices. Moreover, working on this project it was possible to draw a parallel between design education and game development-required skills and knowledge.

A gameplay video of the developed prototypye is accessible at: https://www.dropbox.com/scl/fi/hmccoap92diep7w8jut9w/VideoGameplayPrototipo.mp4?rlkey=daa1api9230x85sskgvcnpsux&dl=0
A playable demo version of the game is accessible at: https://www.dropbox.com/scl/fo/jmqsgpvp3yxbpfc1ix4di/ANVx9httwuzrExt9aPf9-_k?rlkey=uy6xtst1vkexne7ly45o1nmzj&dl=0

APX.6. (De)Colonizing Outer Space. Speculative Frontiers of Outer Space Exploration in Video Games

This article was developed as a theoretical grounding work for the EX.02 case study. It was presented during Comunusl Conference 2024 in Budapes, Unghery, between May 15th and 17th.

The article has been peer-reviewed and will be published in the conference's proceedings.

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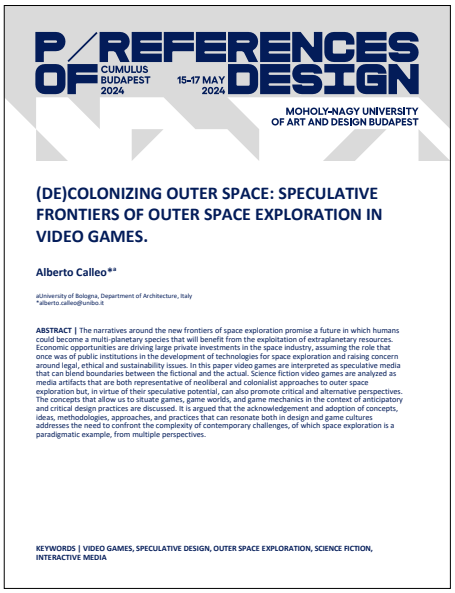

Figure APX.6.1 - Conference proceedings camera ready cover. To be published in 2025.

ABSTRACT | The narratives around the new frontiers of space exploration promise a future in which humans could become a multiplanetary species that will benefit from the exploitation of extraplanetary resources. Economic opportunities are driving large private investments in the space industry, assuming the role that once was of public institutions in the development of technologies for space exploration and raising concern around legal, ethical and sustainability issues. In this paper video games are interpreted as speculative media that can blend boundaries between the fictional and the actual. Science fiction video games are analyzed as media artifacts that are both representative of neoliberal and colonialist approaches to outer space exploration but, in virtue of their speculative potential, can also promote critical and alternative perspectives. The concepts that allow to situate games, game worlds, and game mechanics in the context of anticipatory and critical design practices are discussed. It is argued that the acknowledgment and adoption of concepts, ideas, methodologies, approaches, and practices that can resonate both in design and game cultures addresses the need to confront the complexity of contemporary challenges, of which space exploration is a paradigmatic example, from multiple perspectives.

KEYWORDS | VIDEO GAMES, SPECULATIVE DESIGN, OUTER SPACE EXPLORATION, SCIENCE FICTION, INTERACTIVE MEDIA

APX.6.1. Introduction: trajectories and narratives of the space economy

On February 6, 2018, at 15.45 EST, the Falcon Heavy FH-001 was launched from Launch Complex 29A at Kennedy Space Center in Florida (Uri, 2023). The launch, like the other SpaceX missions, is live streamed, offering the audience an informative yet entertaining overview of all the salient characteristics of the new rocket being tested. In fact, the Falcon Heavy is one of the most powerful super heavy-lift launch vehicles ever built, capable of delivering nearly 64 metric tons to low Earth orbit (SpaceX, 2021). SpaceX's Falcon Heavy and the Starship, which is currently under development, address the growing market demand for reliable and cost-effective launchers capable of carrying materials, satellites, and humans to orbit. It has been estimated that the satellite payload market size will reach

24.51 billion USD by 2029 (Satellite Payload Market Size Report, 2024), demonstrating private interest in the commercial opportunities of the space economy. During the streaming, every stage of the startup sequence that is successfully completed is cheered by the crowd of SpaceX engineers attending the launch from the mission control room. The broadcasting conveys the excitement and the tension of the moment. During the minutes leading to the launch, the mission profile is presented in detail by representatives of the company's departments. Finally, when the countdown reaches zero, the Falcon Heavy rocket successfully lifts off from the launch pad with a deep, powerful roar. The crowd cheers and shouts loudly with joy. Cameras alternate views from the ground and from the rocket itself, offering dramatic perspectives of the rocket lifting from Earth. After reaching an altitude of 60 km, 2 minutes, and 38 seconds into the flight, the side busters shut down and separated from the main rocket. They will successfully perform a choreographic synchronous vertical landing on Landing Zone 1 and 2 in the famous Cape Canaveral Space Force Station. A few seconds later, the central core engine is turned off and dethatched from the upper stage of the rocket that contains the payload. Cheers of celebration. The onboard camera shows the upper stage's engine glowing while the Earth profile moves in the background. After 3 minutes and 45 seconds of flight, the crowd's cheering and the mission control audio is suddenly drowned out by the sound of an electric guitar and by the lyrics of David Bowie's song Life of Mars. The camera is now framing Starman, an astronaut mannequin comfortably and boldly sitting at the wheel of Elon Musk's own red Tesla Roadster mounted on a support system inside of the upper stage fairing, the protective shell that contains the material to be shipped to orbit. The fairing is finally deployed, revealing a spectacular view of Starman riding his supercar into the universe with the Earth in the background.

In the described mission, Musk's Tesla has been used as a dummy payload, a nonfunctional mass that simulates the loading capacity of a spacecraft during test launches. Dummy payloads are used to evaluate the spacecraft's behavior when loaded with material's, equipment's, and crew's weight. Dummy payloads are generally used during test flights since the high chance of failures. Although any object with comparable size and weight would have effectively served as a dummy payload, using a Tesla Roadster offered an unprecedented marketing opportunity for both Elon Musk's companies, SpaceX and Tesla.

The new frontiers of space exploration promise a future in which humans could become a multi-planetary species that will benefit from exploiting extraplanetary resources. This vision and the economic opportunities it prospects are driving large private capital investments in the space industry, assuming the role that once was of national institutions in the development of technologies for space exploration. The growth of private capital flows in such a strategic industry is raising concerns around legal, ethical, and sustainability issues (Iliopoulos & Esteban, 2020). The dramatization of outer space operations offers a spectacle of private companies' technological achievements underplaying the complex issues of power and control that derive from the private ownership of such technologies. Moreover, such spectacle contributes to the construction of the contemporary narrative about human space endeavor that shows to gather impulse from neo-colonialism modes of approaching space exploration (Mitchell et al., 2020). A narrative that exposes the utilitarian and neoliberal perspective of private interest in developing human access to outer space.

Together with the cinematic commercials of private companies, contemporary media artifacts concur to the construction of the space culture narrative, both dramatizing the real events of past and contemporary space exploration and using fiction to project the future speculative frontiers of space travel. Considering works of fiction, in fact, the conquest of space colonies, the visions of space tourism, and the story of intergalactic wars for resources and territory control are widely depicted in numerous sci-fi novels, movies, and video games. Science fiction novels have largely contributed to inspire scientists and engineers in the development of new technologies. The influence of science fiction novels on real-world space artifacts has been discussed in the analysis of the design for future space habitats (Ceylan, 2018, 2022), new technologies and interfaces (Figueiredo et al., 2015; Kendrick, 2002) , and new forms of outer space commercial travels (Ceuterick & Johnson, 2019).

In this context, however, alternative and diverse ways of approaching space exploration are being discussed to challenge the dominant spaceflight culture and narrative to acknowledge diverse and underrepresented perspectives (Schwartz et al., 2023). Fictional representations of space exploration, and science fiction in particular, play a significant role in the diffusion of space culture and shaping people's opinions on emerging technologies. Isaac Asimov, considered one of the seminal authors of the genre, considers science fiction novels a form of response to the transformations happening in technology and society (Asimov, 1982). From a critical design point of view, the analysis of future-oriented narrative artifacts offers the opportunity to reflect on emerging attitudes toward technological and cultural transformations. In particular, examining contemporary science fiction media, it can be observed which political and economic values are emerging as drivers that motivate the future human presence outside Earth's boundaries. This paper discusses how video games, and science fiction video games in particular, can be understood as interactive forms of design fiction that speculate on the future of outer space exploration. It is argued that, despite the dominance of a neo-colonialist and exploitative rhetoric, video games can advocate for a critical perspective on the future of human space presence in outer space that is driven by values alternative to that of neoliberal capitalism. Play is a form of expression of ideas and values, a creative form of production, and not a mere form of consumption (Sicart, 2014). A critical perspective towards future scenarios can be developed through the experience of play, and video games solicit such an attitude through the distinctive qualities of the medium that will be discussed in the next paragraphs.

APX.6.2. Methodology

The introduction of this paper reports a specific SpaceX's mission streaming as a representative example of the current dominant narrative on human endeavor for outer space exploration. Being a highly experimental field, it requires powerful and evocative depictions to drive investors' interest to the space economy. Such representations not only serve this purpose but also shape the dominant narrative on space exploration in Western countries. This paper aims to analyze science fiction video games as media artifacts that are both representative of neoliberal and colonialist approaches to outer space exploration but, in virtue of their speculative potential, can also promote critical and alternative perspectives. For doing so, literature on games and play has been reviewed to bring out the concepts that allows to situate games, game worlds, and game mechanics in the context of anticipatory and critical design practices. The identified

defining ideas of speculative design are confronted with related concepts specific to the medium of video games. The discussion is presented in paragraph 2. It constitutes the theoretical premise that allow to observe science fiction video games as materialization of actual and future perspectives on outer space exploration, which is discussed in paragraph 3. Paragraph 4 uses two case studies to exemplify the ways video game can address science fiction scenarios without adopting narrative and visual clichés. The two games have been chosen as case studies to exemplify how both commercial and non-commercial games can offer alternative perspectives on the discussed topic of outer space exploration. Moreover, unlike the other games mentioned which are products developed by established game companies, the selected games are representative of two bottom-up design processes: a workshop activity and a thesis project that developed in a successful commercial product.

APX.6.3. Video games as speculative media

In contemporary technocultural society, the specificities of video games bear an "aesthetic potential which allows for speculation over the very structure of knowledge and contemporary technology" (Luersen & Paula, 2023). In this paper, video games are interpreted as speculative media that can blend boundaries between the fictional and the actual. Several scholars have addressed the multiple connections between video games and speculative practices, discussing how worldbuilding and diegetic elements intertwine with the mechanics of play themselves and the effect on player experience and critical reaction.

Games have reflected the cultural and ideological values of society since ancient times. Video games represent the interaction and the conflicts of social and technological transformations. They are both cultural objects (Dovey & Kennedy, 2006; Schrank, 2014), materialization of the commodity from (Celaschi, 2000) in the contemporary market exchange system (Jagoda, 2020), and products of a complex industrial system (Dyer-Witheford & De Peuter, 2009; Woodcock, 2019). Through the practice of appropriation and re-functionalization, ludic artifacts can suggest and invite critical reflections on social, ethical, and political issues. The manipulation of the game structures and affordances in avant-garde games (Schrank, 2014), the adoption of "radical" (Flanagan, 2009/2013) and critical (Grace, 2014) approaches to game design, and the appropriation and re-functionalization of the medium, such as in the case of machinima and game mods (Joseph DeLappe, 2018), are some of the methodologies and practices that have been adopted to address political and social issues through games.

As a medium, it can be argued that video games can be considered an interactive form of design fiction. Despite being commercial products (whereas design fiction and speculative artifacts generally are not), games are inherently speculative. The in-game decisions players are continuously faced with and the layering of slight interactions that add up during the gaming experience force a constant speculation on the possible outcomes of one's decision (Kunzelman, 2022). With a particular focus on science fiction games, Kunzelman describes the "mechanics of speculation" as the "ways that games specifically ask us to engage in speculative practices while playing them" (Kunzelman, 2022, p. 22). As presented by Kunzelman, those mechanics are specific to the medium and can produce several effects on the players, from Brechtian estrangement to the stage of the differences between the actual and the fictional world, between

one ideology or the other. In design fiction, the narrative is functional to the representation, in the form of prototypes, of the transformed or alternate world (Sterling, 2013). In game worlds, mechanics can be considered narrative devices that produce real-time events and responses to player action (Dubbelman, 2016). Game mechanics determine the limits of the action and the type of affordances accessible in the game world but also activate mechanics of speculation within it.

Compared to linear media, games are defined by rules within a system in which players engage (Salen & Zimmerman, 2004). Such a system constitutes a possibility space that is discovered and interpreted by players through their performance (Squire, 2008). The frame of rules and objectives that regulates the game world combine with the possibility and the indeterminacy of play, characterizing video games as experimental artifacts (Jagoda, 2020). As argued by Jagoda, games are experimental both in formalist terms for their capability to model alternative forms of reality and for offering players a possibility space (Squire, 2008) where the uncertainty of play can encourage the emergence of difference and unpredicted outcomes. Games offer a space for experiencing an alternative vision of the world and exploring the dynamics of alternative control and power structures. In their book on fictional games, Gualeni and Fassone (2022) explore the role of fictional ludic artifacts that only exist in narrative worlds. Fictional games lack complete game rules or can function only through technological or magical elements that make them impossible to play in the real world. It can be argued that fictional games act as forms of diegetic prototypes (Kirby, 2010), that are contextualized as real functioning (playable) artifacts within the narrative. They emerge as the materialization of social and cultural values or, by contrast, as ludic forms of reaction to the established dominant powers. In fact, fictional games can act as transformative tools, questioning the socio-political environment depicted in the fictional world and becoming utopian tools. They can transform, through the indeterminacy of game dynamics, dystopian narratives into acts of critique (Gualeni, 2021). Even within the grim and undesirable characters of a dystopian narrative, critical dystopias open a space of contestation and propose the hope of a positive alternative, if not within the narrative itself, at least outside of it (Baccolini & Moylan, 2003).

Besides its capability to address social conflicts and issues through the materiality of design, design fiction is a design practice that can be adapted to support the development of new real-world technologies. The diegetic prototypes of design fiction conceptualize and enable reasoning about the impact and possible applications of new technologies (Bleecker, 2009). The artifacts of science fiction prototyping (Johnson, 2011) represent the design concept of the things that one day will be possible to build. Games artifacts materialize such prototypes situating them both as functional and interactive means, and as technocultural expression of the fictional world.

Effective speculative design needs to build “perceptual bridges” between the observer’s reality and the speculative future (Auger, 2013). Auger suggests that such perceptual bridges can be inspired by different fields, such as psychology and comedy, that offer insights into the way the human mind works. In games, these perceptual bridges are constantly built through the complex combination of aesthetic, kinesthetic, and sensorial experiences of game feel (Swink, 2009). The sensation deriving from the feeling of directly and precisely controlling the avatar, from the physical interaction with the simulated world, and from the effects that polish and enhance the interactions, act on players’ nonconscious cognition as affective experiences

(Jagoda, 2020, p. 116), and constitute the medium-specific perceptual bridges to the speculation.

The concepts that have been briefly discussed in this paragraph constitute a reference framework that situates games as a form of speculative media. The next paragraph introduces science fiction games as a genre that is particularly representative of the speculative qualities of video games and problematizes the dominance of colonialist themes that, it is argued, are representative of contemporary space endeavors.

APX.6.4. Speculative scenario of outer space exploration in Sci-Fi video games

Science fiction and games have been sharing themes and visual iconography since the origin of the video game medium. From Spacewar! (Russell, 1962) and Space Invaders (Taito, 1978), to the Halo series (343 Industries et al., 2001-2021) and the recently published Starfield (Bethesda Game Studios, 2023), games have represented science fiction and space exploration narratives with increasing visual accuracy and technical sophistication. Science fiction games have developed in a wide variety of subgenres, among which space simulators are one the most representative because of the game mechanics it has introduced. Space simulations can be subdivided into two main categories of space combat simulation and space exploration simulations (Tringham, 2013, p. 413). As reported by Tringham, Star Raiders (Atari, 1979) can be considered one of the first examples of the space combat form that introduced the fundamental features, such as the presence of strategic mechanics and resource management systems, that characterize the genre still today. Regarding exploration games, Elite (Barben & Bell, 1984) is considered the first prototypical example of space exploration simulation presented as an open-ended large real-time 3D explorable universe where to collect, trade and fight for resources. The idea of procedurally generated game words introduced by Elite has developed in numerous game genres. A recent example of a science fiction game that largely uses procedural generation is No Man's Sky (Hello Games,2016) whose explorable universe is constituted by 18 quintillion planets, each characterized by a unique geology, flora, and fauna.

The peculiarity of science fiction video games, compared to other game genres and other mediums, has been observed in their capability to "convey a more active sense of futurity" (Frelik, 2014, p. 230). Moreover, as a medium, games reach a vast and diverse audience, making the ideas and concepts of science fiction more accessible. Frelik identifies four intersections between the medium of video games and the mode of science fiction. Video games "as narratives of space [...]", "as integral elements of distributed narratives spanning multiple media and forms", "as instanced of visual science fictions invested in the pictorial portrayal of futurity", "as performative simulation, conveying a sense of malleability of the future" (Frelik, 2014, p. 230).

In discussing the argument of this paper, the spatiality of science fiction video games is particularly relevant. As suggested by Frelik, in science fiction games, spatiality emerges in two specific aspects. The first one is worldbuilding. Through the construction of coherent and complex fictional scenarios, players are confronted with visions of alien planets, extraterrestrial settlements, and advanced technologies. Compared to movies, which also provide strong and descriptive visual cues, games enable players to freely navigate such fictional universes, providing an "affective experience of the genre's sense of

alterity" (Frelik, 2014, p. 231). Speculative practices heavily rely on worldbuilding and environmental narratives. Speculative cinematic narratives, such as Planet City (Young, 2021), guide observers through the architecture, the rituals, the technologies, and the identities of fictional future scenarios in which humanity addresses the environmental crisis in a radical way. In Plane City speculation, humanity gathers in a hyper densely populated city, leaving the rest of the planet to nature. The project, in addition to a cinematic representation, uses essays and costumes to explore the technical, environmental, social, and cultural implications of such a scenario. The video game series Mass Effects (BioWare, 2007, 2010, 2012) offers a parallel to a similar speculation. In the game, the Citadel is a hyper-dense galactic settlement where humans and alien species coexist under the government of the Citadel Council. The massive galactic infrastructure resembles that of an O'Niell Cylinder, a conceptual outer space infrastructure proposed by Gerard K. O'Neill in the 1970s (O'Neill, 1977/2000) that generates artificial gravity through centrifugal acceleration. Compared to O'Niell design, the lateral surface structure of the Citadel is not continuous, but it is constituted by five 43.6 kilometers of arms (the Wards) that extend from a central pentagram-shaped ring with a diameter of 7.2 kilometers. The Citadel portrays the organizational structure of the social system that relies upon advanced technology. In the same way, Plane City suggests a critical reflection of how the political and social structure could operate in combination with technological infrastructures in a complex superorganism. The spatiality of games allows the exploration of such natural and artificial speculative environments, soliciting players to explore the architecture, the technologies, and the affordances offered by such artifacts and the dynamics of different social structures.

Another spatial-related mode, Frelik suggests, is represented by the narratives of conquer and exploitation of extraterrestrial worlds and living beings. Such trait, as already discussed, is recursive in both fictional media, but also suggested by the commercial narratives of the space industry. With few exceptions, most science fiction video games propose imperialistic narratives and forms of exploitation and control (Frelik, 2014). The main themes revolve around spaceship flight and combat, military strategy, survival of dangerous and dreadful extraplanetary environments, and new worlds colonization (Majsova, 2014). Such narratives have been present in science fiction video games since the origin of the medium, which roughly coincides with the years of the Space Race and the Cold War between the United States of America and the Soviet Union. The competition between the two blocks drove large investments in technological innovation for developing military and defense applications. During this period, the emerging video game industry offered a space to programmers where to develop game technologies without military implications (Izushi & Aoyama, 2006). Although the entertainment, technical, and artistic value of this production is acknowledged, it is argued that the abundance of such themes is representative of the utilitarian, exploitative, and neo-colonialist attitudes that have animated, and still animate, past and contemporary perspectives on outer space exploration. If during the Space Race period, science fiction video games' themes reflected the political and military tension between nations, today's neoliberal values that nurture private companies' efforts to access outer space are mirrored in the science fiction game mechanics of resource accumulation, management, and crafting. For Roberts, understanding something as science fiction depends on the moment and the context of reception (Kunzelman, 2022, p. 6; Roberts, 2005/2016). As an example, Blade Runner (Scott, 1982) movie portrays climate

crisis as an energetic, continuous anthropogenic process driven by capitalist interests that destroy the environment and voraciously consume resources. In Blade Runner 2049 (Villeneuve, 2017), the world's resources have ended and the world has been consumed. It can be argued that today, in light of a different perception of climate issues influenced both by the ecological debate and by the witnessing of the effects of climate change, 2049 climate dystopia resonates more with contemporary concerns about climate crisis compared to 1982's movie. In this sense, today's science fiction video games solicit a strong connection with the future of outer space exploration prospected by contemporary narratives of private companies.

APX.6.5. Escaping science fiction speculation cliché's orbit

It has been argued that the adoption of strong dystopian visual clichés in movies (and games) may represent a limit of the medium's capability to invite a critical reflection from the viewers, since they can passively rely on the genre's canonic categories to shape their interpretation (Dunne & Raby, 2013, p. 75). The effort that is required for the reader of science fiction novels is to visualize the story in a process that moves from one word to the other. The subjunctive level of science fiction, being the possibility that certain events could or could not happen, requires a progressive correction process of the visualization that happens in the readers' mind that is coherent with their understanding of the physically explainable universe (Delany, 2009). In visual media, viewers don't need to make a visualization effort. Yet, the critical understanding of the artifacts within the fictional world and their relations with the speculative environment are still there to be made. Visual clichés narrow down the speculation process toward beaten tracks. Hence, when considering science fiction video games as speculative media, original critical and speculative enquires can arise from game worlds that propose alternative narratives and different perspectives that avoid recurring genre clichés. Games can evade stereotypes and clichés by radicalizing the boundaries of the speculation. Still maintaining the "perceptual bridges" with the player's world, visual references can be metaphorized by the worldbuilding and articulate speculation on a more abstract but fundamental level. In science fiction narratives, readers, viewers, and players are constantly invited to make parallels with their own reality. Both scenarist and narrative cliché weaken the speculative potential of science fiction since not much effort is required to situate one's own values within the alternate reality of the fictional world.

Two examples have been chosen to discuss how extreme or radical speculative scenarios can be vehicles to bring different values into the space exploration discourse and, therefore, to broaden the boundaries of inclusion. He Ao Hou: A New World (Na Anae Mahiki Collective, 2017) is a game developed during the 2017 SKINS 5.0 workshop as part of the activities promoted by the Initiative for Indigenous Futures . During the three week workshop, Hawaiian indigenous people were given tools and knowledge to develop a video game on the topic of indigenous narratives in a setting of indigenous futurism (Dillon, 2012). As discussed by one of the workshop coordinators Rilla Khaled (Kahled, 2022), the game addresses questions related to the decolonialization of space exploration. The developed game is a point-and-click adventure game in which players explore different worlds inspired by Mo'olelo, the traditional Native Hawaiian stories. The progress in the game is achieved through the knowledge of Mo'olelo and through the Aloha 'Āina, the ecolo-

gical principle of spiritual, cultural, and social Native Hawaiian identity. In the game, the kukui nut, a symbol of knowledge for Hawaiian indigenous people, is used as an artifact that allows interactions with the world. The game developed from a radical perspective in which economic or political reasons do not foster space exploration but is a discovery and growth process in accord with the foundational values of the indigenous population. Despite not speculating on practical technologies and solutions to align the contemporary attitudes of space economy to the game proposed values, it points out how underrepresented and unacknowledged such perspectives are. In this act of reactualization, designers intervein as mediators of knowledge and sensibilities in a co-design process of materialization of these values in game environments, mechanics, and narratives. Moreover, this project stands out as a form of reaction against the Western politics of settler colonialism that are inherent to indigenous' territory occupation for the construction space research facilities (Sammler & Lynch, 2021; Smiles, 2020). Mauna Kea is a quiescent volcano in the Hawaiian archipelago and, in virtue of the characteristics of the site, is the location of a dozen observatories. Since 2014, local communities have started protests and legal battles against the construction of the Thirty Meter Telescope (TMT) since Mount Kae is the most sacred mountain to Hawaiian people. With the growing interest of private companies in the space economy, there is a growing risk for underrepresented and indigenous community to undergo exploitative politics. From this case study, it emerges the importance to include marginalized perspectives in the design of speculative artifacts in order to disrupt the hegemonic perspectives that are often represented in the mainstream visions of the future.

Another game that can considered an example of science fiction that avoids visual clichés is Outer Wilds (Mobius Digital, 2019). Outer Wilds is a successful commercial video game that proposes an exploration adventure of a fantastic solar system. The game, developed from Alex Beachum's Master Thesis project at USC Interactive Media & Games Division (Beachum, 2013), combines elements of science fiction and fictional archeology. The gameplay is based on a 22-minute loop that recursively brings the players to their planet of origin. The game progression is not based on the usual mechanics of skills' acquisition or mission achievements. The element that drives progression in the game is the acquisition of information that players need to elaborate to understand the events happening the game universe and how to proceed in the exploration. It has been argued that in Outer Wilds "the experience of learning and knowing proceeds from an obstinate tension toward the unknown" that constitutes a game mechanic that "values curiosity and exploration over achievements" (Luersen & Paula, 2023, p. 17). As well as the previous example, the artifacts players can use are probes to investigate the world and gather clues that contribute to form speculation about the game universe. These artifacts do not propose a self-reflective speculation on technology itself but depict technology as a means to access information and develop knowledge. As discussed by Luersen and Paula, in Outer Wilds, the devices players can use to explore the solar system (such as the signal scope that detects acoustic signals, the probe that allows the survey of inaccessible areas, and the translation tool that translates the inscriptions of the extinct alien civilization) establish with the data they produce and the player a meaningful relationship that drives the experience of discovery (Luersen & Paula, 2023). Reflecting such critical observation on our actual reality, the instruments that have been sent to orbit over the years have produced knowledge about the universe and the Earth. Military technologies and ser-

vices based on space infrastructure have become accessible to a greater number of people. However, contemporary conflicts, social and climate challenges make orbital infrastructures and satellite data a strategic and critical asset. In this context, the contribution of critical design is to balance the economic value of space operations with the social one adopting speculative artifact as means of representation, analysis, and critique. Critical design needs to advocate for a just and responsible distribution of the positive impacts of the space endeavor, broadening the discussion and reflecting on the ways designers can contribute to this process.

If the dominant narratives of the majority of science fiction video game impose a top-down perspective of the futures, countergaming (Galloway, 2006/2022) practices propose alternative ways of engaging with such scenarios, turning them into platforms for divergent speculation. For Galloways, countergaming is a form of critical engagement with the game medium that questions the hegemonic practices of the game industry. Game mods are a form of countergaming. Modifying the game code to alter the gameplay mechanics, the control system, the visual representation of the 3D environment, is a form of appropriation and re-functionalization that establishes a negotiation between the imposed narrative of the game world and the players' sensibilities. Another way to open up and subvert confined game narratives is through the making of machinima (Berkeley, 2006). Machinima can be seen as another form of countergaming. Machinima are linear media such as short movies, video essays or feature-length films that are produced within the game environment and recorded through the game rendering engine. Authors of machinima often remediate the game system into a tool for telling stories unrelated with the original game narrative. Some machinima authors even intervein on the game code to introduce new 3D models, custom visual effects, or additional camera's viewpoints. Although games propose their own representation of fictional and speculative futures through worldbuilding, narrative and gameplay, an approach that leverages on critical engagement and countergaming practices suggests that video games can be adopted as speculative platforms in anticipatory design practices.

APX.6.6. Conclusions

In this paper, it has been argued that video games, and science fiction video games in particular, can be understood as speculative artifacts that can propose alternative perspectives on outer space exploration, which is currently dominated by neoliberal and neocolonialist ideals. It has been discussed how both private companies' self-narration and science fiction media concur to represent future scenarios in which human presence in outer space is primary driven by exploitative interests and implemented through forms of neocolonialism. However, it is argued that both commercial and non-commercial games can become platforms for developing critical reflections and promote forms of reaction to the values and means that drive contemporary outer space exploration. Such critical artifacts, rather than suggesting technical solutions or practical approaches, fictionalize novel perspectives emerging from the alternative ideals that aim to nurture the space endeavor. It emerges the need to involve marginalized and underrepresented communities in the co-design of speculative artifacts, which come to be empowering tools that challenge the hegemonic perspectives on future technologies and their use. For their capability to reach and engage with a vast audience, video games can be adopted as speculative platforms that contribute to including more people, a

wider range of sensibilities and more diverse identities in the public discourse on space exploration politics. The commercial narratives proposed by private space operators, based on the exploitative premises of the space economy, restrict the boundaries of inclusion towards those who don't share such a vision. Understanding video games as speculative media enables designers to adopt game design approaches to explore new methods for speculative enquiries and to engage with games as critical artifacts that can reflect and develop in design practice. The acknowledgment of concepts, ideas, methodologies, approaches, and practices that can resonate both in design and game cultures addresses the need to confront the complexity of contemporaneity from multiple perspectives. The adoption of video game as tools and methods for broadening the discussion on such relevant topics, is synergic with other co-design practice. In fact, the inclusion of underepresented communities in the co-design of speculative games, as the He Ao Hou case study demonstrates, allows to escape science-fiction clichés promoting the development of divergent speculative scenarios. Forms of countergaming, re-mediation, re-functionalization, and appropriation allow designers and non-designer to critically engage with the game worlds, promoting bottom-up critical and creative processes. Future development of the arguments presented in this paper will investigate how design can act as a mediator in developing a promising research field at the intersection between game design and cultures, playful design, speculative and anticipatory design practices, and critical theory.

Section Bibliography

343 Industries, Bungie, Creative Assembly, & Ensemble Studios. (2001). Halo Series [Computer software]. Xbox Game Studios.

Asimov, I. (1982). Asimov on science fiction. Avon Books.

Atari. (1979). Star Raiders [Atari systems]. Atari.

Auger, J. (2013). Speculative Design: Crafting the Speculation. Digital Creativity, 24. https://doi.org/10.1080/14626268.2013.767276

Baccolini, R., & Moylan, T. (2003). Introduction. Distipya and Histories. In R. Baccolini & T. Moylan (Eds.), Dark horizons: Science fiction and the dystopian imagination (pp. 1–12). Routledge.

Barben, D., & Bell, I. (1984). Elite [Computer software]. Acornsoft (Acorn/BBC).

Beachum, A. (2013). Outer Wilds A Game of Curiosity-Driven Space Exploration [Univesity of Southern California]. https://www.proquest.com/openview/e3b7de730e51cc42bebd7256172a0854/1.pdf?pq-origsite=gscholar&cbl=18750

Berkeley, L. (2006). Situating Machinima in the New Mediascape. Australian Journal of EmergingTechnologies and Society, 4(2), 65–80.

Bethesda Game Studios. (2023). Starfield [XBox Series X/S, Microsoft Windows]. Bethesda Softworks.

BioWare. (2007). Mass Effect [Xbox 360]. Microsoft Game Studios.

BioWare. (2010). Mass Effect 2 [Xbox 360]. Microsoft Game Studios.

BioWare. (2012). Mass Effect 3 [Xbox 360]. Electroic Arts.

Bleecker, J. (2009). Design Fiction: A Short Essay on Design, Science, Fact and Fiction (p. 49). https://blog.nearfuturelaboratory.com/2009/03/17/design-fiction-a-short-essay-on-design-science-fact-and-fiction/

Celaschi, F. (2000). Il design della forma merce. Il Sole 24 Ore.

Ceuterick, M., & Johnson, M. (2019). Space Tourism in Contemporary Cinema and Video Games (pp. 93–115). https://doi.org/10.1108/S1571-504320190000025005

Ceylan, S. (2018). Space, Architecture, and Science Fiction: An Architectural Interpretation of Space Colonization. The International Journal of the Constructed Environment, 9(2), 1–17. https://doi.org/10.18848/2154-8587/CGP/v09i02/1-17

Ceylan, S. (2022). Architectural evolution of space settlements in cinema and television. Journal of Design for Resilience in Architecture and Planning, 3((Special Issue)), 66–78. https://doi.org/10.47818/DRArch.2022.v3si072

Delany, S. R. (2009). About 5,750 Words. In S. R. Delany & M. Cheney, The jewel-hinged jaw: Notes on the language of science fiction (Rev. ed, pp. 1–15). Wesleyan Univ. Press.

Dillon, G. L. (2012). Walking the clouds: An anthology of indigenous science fiction. University of Arizona Press.

Dovey, J., & Kennedy, H. W. (2006). Game cultures: Computer games as new media. Open University Press.

Dubbelman, T. (2016). Narrative Game Mechanics. 39–50. https://doi.org/10.1007/978-3-319-48279-8_4

Dunne, A., & Raby, F. (2013). Speculative everything: Design, fiction, and social dreaming. The MIT Press.

Dyer-Witheford, N., & De Peuter, G. (2009). Games of empire: Global capitalism and video games. University of Minnesota Press.

Figueiredo, L. S., Pinheiro, M., Neto, E. V., Chaves, T., & Teichrieb, V. (2015). Sci-Fi Gestures Catalog: Understanding the Future of Gestural Interaction. In J. Abascal, S. Barbosa, M. Fetter, T. Gross, P. Palanque, & M. Winckler (Eds.), Human-Computer Interaction – INTERACT 2015 (Vol. 9297, pp. 395–411). Springer International Publishing. https://doi.org/10.1007/978-3-319-22668-2_30

Flanagan, M. (2013). Critical Play. Radical game design. MIT Press. (Original work published 2009)

Frelik, P. (2014). Video Games. In R. Latham (Ed.), The Oxford Handbook of Science Fiction. Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199838844.013.0018

Galloway, A. (2022). Gaming. Saggi sulla Cultura Algoritmica (G. Pedini & M. Salvador, Eds.). Luca Sossella Editore. (Original work published 2006)

Grace, L. (2014). Critical Games: Critical Design in Independent Games. Proceedings of the 7th Digital Games Research Association Conference (Digra 2014), Salt Lake City, Utah, USA. https://doi.org/10.13140/2.1.2607.3603

Gualeni, S. (2021). Fictional games and utopia. Science Fiction Film & Television, 14, 187–207. https://doi.org/10.3828/sfftv.2021.13

Gualeni, S., & Fassone, R. (2022). Fictional Games: A Philosophy of Worldbuilding and Imaginary Play. Bloomsbury Academic.

Iliopoulos, N., & Esteban, M. (2020). Sustainable space exploration and its relevance to the privatization of space ventures. Acta Astronautica, 167, 85–92. https://doi.org/10.1016/j.actaastro.2019.09.037

Izushi, H., & Aoyama, Y. (2006). Industry Evolution and Cross-Sectoral Skill Transfers: A Comparative Analysis of the Video Game Industry in Japan, the United States, and the United Kingdom. Environment and Planning A: Economy and Space, 38(10), 1843–1861. https://doi.org/10.1068/a37205

Jagoda, P. (2020). Experimental Games. Critique, Play, and Design in the Age of Gamification. The University of Chicago Press.

Johnson, B. D. (2011). Science Fiction Prototyping: Designing the Future with Science Fiction. Synthesis Lectures on Computer Science, 3(1), 1–190. https://doi.org/10.2200/S00336ED1V01Y201102CSL003

Joseph DeLappe (Director). (2018, July 10). Elegy: GTA USA Gun Homicides. https://www.youtube.com/watch?v=VazQ3RdeyDs

Kahled, R. (2022, April 29). Speculation and Resonation. Stanford HCI Group, Human-Computer Interaction Seminar. https://hci.stanford.edu/seminar/speaker.php?date=2022-04-29

Kendrick, M. (2002). Space, technology and Neal Stephensbn's science fiction. In R. Kitchin & J. Kneale (Eds.), Lost in space: Geographies of science fiction (First published). Continuum.

Kirby, D. (2010). The Future Is Now: Diegetic Prototypes and the Role of Popular Films in Generating Real-World Technological Development. Social Studies of Science - SOC STUD SCI, 40, 41–70. https://doi.org/10.1177/0306312709338325

Kunzelman, C. (2022). The World Is Born From Zero: Understanding Speculation and Video Games. De Gruyter. https://doi.org/10.1515/9783110719451

Luersen, E., & Paula, J. (2023). Exoplanetary Exploration and the End of the World in 22 Minutes: Philosofiction in Outer Wilds. Games and Culture, 15554120231200396. https://doi.org/10.1177/15554120231200396

Majsova, N. (2014). Outer space and cyberspace: An outline of where and how to think of outer space in video games. 51, 106–122.

Mitchell, A., Wright, S., Suchet-Pearson, S., Lloyd, K., Burarrwanga, L., Ganambarr, R., Ganambarr-Stubbs, M., Ganambarr, B., Maymuru, D., & Maymuru, R. (2020). Dukarr lakarama: Listening to Guwak, talking back to space colonization. Political Geography, 81, 102218. https://doi.org/10.1016/j.polgeo.2020.102218

Mobius Digital. (2019). Outer Wilds [PC]. Annapurna Interactive.

Na Anae Mahiki Collective. (2017). He Ao Hou: A New World [PC]. Skins 2017.

O'Neill, G. K. (2000). The High Frontier. Human Colonies in Space (3rd ed.). Apogee Books. (Original work published 1977)

Roberts, A. (2016). The History of Science Fiction (2nd ed.). Palgrave Macmillan UK. http://link.springer.com/10.1057/978-1-137-56957-8 (Original work published 2005)

Russell, S. (1962). Spacewar! [PDP-1].

Salen, K., & Zimmerman, E. (2004). Rules of Play. MIT Press.

Sammler, K. G., & Lynch, C. R. (2021). Apparatuses of observation and occupation: Settler colonialism and space science in Hawai'i. Environment and Planning D: Society and Space, 39(5), 945–965. https://doi.org/10.1177/02637758211042374

Satellite Payload Market Size Report. (2024). [Satellite Payload Mar]. Mordor Intelligence. https://www.mordorintelligence.com/industry-reports/satellite-payload-market

Schrank, B. (2014). Avant-garde Videogames. Playing with Technoculture. MIT Press. https://doi.org/10.7551/mitpress/8132.001.0001

Schwartz, J. S. J., Billings, L., & Nesvold, E. (Eds.). (2023). Reclaiming Space: Progressive and Multicultural Visions of Space Exploration. Oxford University Press. https://doi.org/10.1093/oso/9780197604793.001.0001

Scott, R. (Director). (1982). Blade Runner. Warner Bros. Pictures.

Sicart, M. (2014). Play Is. In M. Sicart, Play matters. The MIT Press.

Smiles, D. (2020). The Settler Logics of (Outer) Space. https://www.societyandspace.org/articles/the-settler-logics-of-outer-space

SpaceX. (2021). Falcon User's Guide. https://www.spacex.com/media/falcon-users-guide-2021-09.pdf

Squire, K. (2008). Open-Ended Video Games: A Model for Developing Learning for the Interactive Age. In K. Salen (Ed.), The Ecology of Games: Connecting Youth, Games, and Learning. MIT Press.

Sterling, B. (2013). Patently untrue: Fleshy defibrillators and synchronised baseball are changing the future. Wired UK, 11. https://www.wired.co.uk/article/patently-untrue

Swink, S. (2009). Game feel: A game designer's guide to virtual sensation. CRC Press.

Taito. (1978). Space Invaders (Arcade) [Computer software].

Tringham, N. (2013). Science Fiction Video Games (1st ed.). CRC Press. https://doi.org/10.1201/b17460

Uri, J. (2023). 5 Years Ago: First Flight of the Falcon Heavy Rocket—NASA. Nasa.Gov. https://www.nasa.gov/history/5-years-ago-first-flight-of-the-falcon-heavy-rocket/

Villeneuve, D. (Director). (2017). Blade Runner 2049. Warner Bros. Pictures (North America), Sony Pictures Releasing International (International).

Woodcock, J. (2019). Marx at the arcade. Consoles, Controllers, and Class Struggle. Haymarket Books.

APX.7. Heritage Documentation in Digital Built Environments through In-Game Photogrammetry: A Preliminary Case Study

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This article was developed as a practical application of the theoretical grounding developed in Chapter 5 - A Map of Video Games in Technoculture. It will be presented at the 30th International Symposium on Electronic/ Emerging Art ISEA2025 in Seoul, South Korea, in May 23rd-29th, 2025.

The article has been peer-reviewed and will be published in the conference's proceedings.

Heritage Documentation in Digital Built Environments through In-Game Photogrammetry: A Preliminary Case Study

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Abstract

This short paper introduces the premises, approach, and initial considerations of an ongoing research project on experimental photographic practices within digital game worlds. In-game photography allows players and artists to engage with video game media in novel, experimental, and creative ways. As both a documentation and expressive practice, photography in video games re-mediates, re-purposes, and appropriates the fictional spaces of digital worlds. In-game photogrammetry, in turn, enhances these forms of engagement, bridging playful, expressive, and explorative investigations of digital built environments. This paper presents an initial application of in-game photogrammetry, laying the groundwork for its adoption as an archeogaming strategy to document the cultural heritage of digital built environments.

Keywords

Digital Cultural Heritage, Photogrammetry, In-Game Photography, Digital Games, Archeogaming, Digital Worlds.

Introduction

As video games have become one of the most representative expressive media of contemporary technocultural society [1], there is a growing interest for the creative and artistic value of digital environments, and for the documentation and preservation of their cultural heritage. This short paper introduces the context, the approach, and the initial outcomes, and the future developments of an ongoing research project about experimental photographic and photogrammetric practices in digital game worlds. The aim is to explore creative strategies for documenting, analyzing, and designing digital environments.

Creative Spatial Practices in Virtual Worlds

The spatial quality of computer games is one of the defining aspects of the medium [2] that enable a variety of creative engagement with game environments in the form of performative, artistic and critical practices. As argued by Aroni, architecture in digital games has the capability to influence players' perception due to its aesthetic and symbolic role that directly impact gameplay dynamics [3]. Indeed, every environmental element in video games is designed and staged by someone to guide players through the game. Level designers use game architecture, urbanism, and natural environments both as narrative and gameplay elements with the aim of crafting meaningful spatial experiences. Sandra Youkhana and Luke Caspar Pearson analyze game architectural systems through maps, plans, diagrams, and illustrations drawing from their background in architecture and urbanism.

However, players develop their own understanding of the game environmental affordances, engaging with game spatiality according to different gaming approaches, creative strategies, and documental practices. In their performative practice, for example, artists often appropriate and subvert the game spatiality. The artist Joseph DeLappe bridges the experience of moving through the physical and digital space by reenacting Mahatma Gandhi's 1930 Salt March in Second Life [4]. He does so by walking the 230 miles of the original march on a treadmill connected to the game avatar control systems.

In-game photography and machinima are used as expressive and documental forms that remediate [5] the video game medium. In doing so, they leave traces in the non-game world of the social and cultural dynamics that take place in digital game environments. In the machinima *Knit's Island* [6], for example, the three documentarists enter the game space to interview and record the social relationships that bond online players. In doing so, they narrate the complex social systems that articulate the overlaps between the fictional and the actual worlds. In-game photographer Alan Butler documents the digital life of homeless non-playable-characters of *Grand Theft Auto V* [7] in his photographic series *Down and Out in Los Santos* [8]. Such practices can be framed in what Barbara Grespi and Federica Villa define as the *Postphotographic* [9]. *Postphotographic* is the esthetic quality of contemporary photography, but it also encompasses the complex inter-medial context in which they are produced. Therefore,

Documenting the Digital Built Environment

Among the approaches that investigate the various aspects of spatiality and architecture in games [3], [10], [11], [12], archeogaming situates as a critical approach towards the documentation and analysis of digital environments. Archeogaming is "the archaeology both in and of digital games" [13, p. 2]. As argued by Reinhard, the digitally built environments can be approached and analyzed as

Figure APX.7.1 - Conference proceedings camera ready cover. To be published in 2025.

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APX.7.3. Documenting the Digital Built Environment

Among the approaches that investigate the various aspects of spatiality and architecture in games [3], [10], [11], [12], archeogaming situates as a critical approach towards the documentation and analysis of digital environments. Archeogaming is "the archaeology both in and of digital games" [13, p. 2]. As argued by Reinhard, the digitally built environments can be approached and analyzed as archeological sites that can reveal knowledge about both the in-game and the extra-game world.

For archeology, as well as in architectural restoration, representation of the existing environment is crucial. Eidotypes are simplified sketches of architectonic or archeological sites that are used to annotate measurements and details during survey. In physical spaces, eidotypes are often drawn on sites, and measurements can be recorded both via direct (calipers, metric tapes) and indirect tools (laser measurement, total stations). In digital environments, however, alternative strategies need to be developed for drawing scaled representations of the digital space. For example, in their archeological survey of the Church of Elleh and Stormgate Catacombs from the Elden Ring [14] game, Smith

Nicholls and Cook [15] used player's footstep as the measurement unit for drawing the sites eidotypes. Video games, indeed, do not generally provide measuring tools and, as Smith Nicholls and Cook argue, there is an interest for creative plan making strategies from the archeogaming perspective.

APX.7.4. In-Game Photogrammetry

Photogrammetry and laser scanning technologies allow to capture real-world data and generate accurate point clouds and 3D models. Over the course of the last decade, photogrammetry has also become a viable technique for produc-ing highly realistic 3D assets both for major game studios and smaller indie teams [16]. Largely employed in the documentation of cultural heritage [17], photogrammetry has grown in popularity among artist, like Ryoichi Kurokawa, Andrea Muniáin, and Frederik Heyman, who have integrated it in their creative practices.

From a general point of view, the photogrammetry of digital spaces does not differ from that of real ones. In short and with some simplifications, a series of overlapping photos of a subject are taken from various angles. Specialized software is used to align photos in the tridimensional space and faithfully reconstruct the subject's original geometry and color. Despite not being a largely popular practice, in-game photogrammetry can have several applications. The developers of Cyberpunk 2077 [18], for example, used in-game photogrammetry techniques to generate sparse 3D point clouds to represent the characteristic look of the braindance sequences in the game [19].

Another promising field of application of in-game photography is that of archeogaming. As introduced in the previous paragraph, archeological investigations require eidotypes and base drawings. Photogrammetry allows to obtain a high level of accuracy. Moreover, it is easy to derive sections, elevations, and plans from the obtained 3D model.

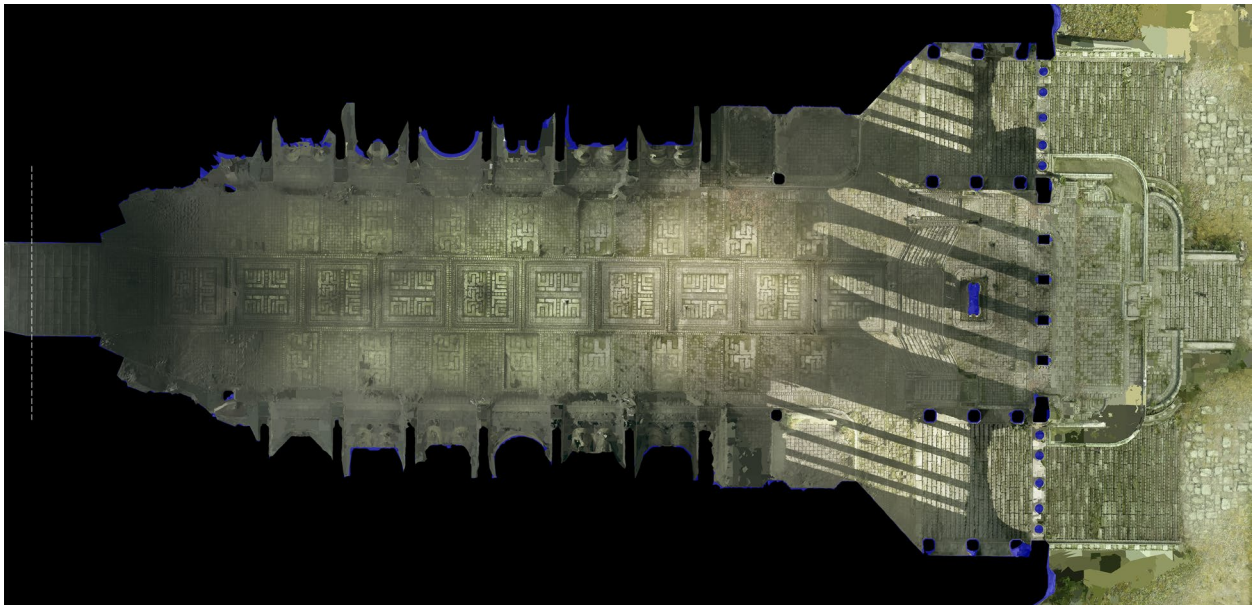
Figure APX.7.2 - Point Cloud of the Shrine of Worship. It is possible to observe the camera positions.

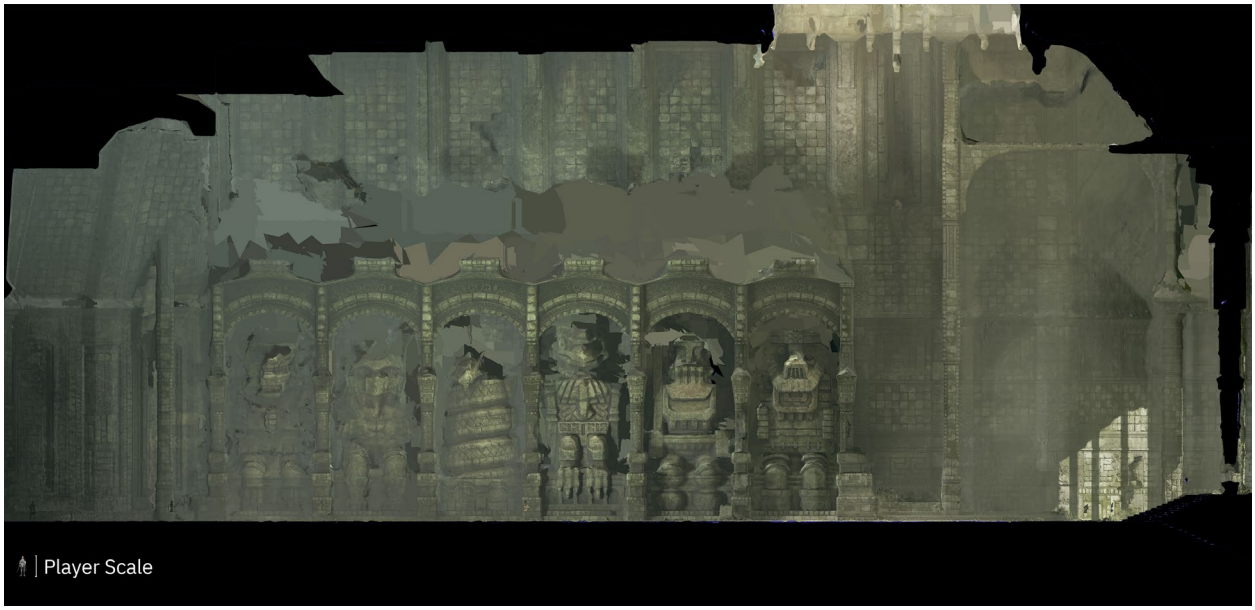
To evaluate the possible limits and opportunities of in-game photogrammetry for archeogaming documentation, an in-game photogrammetric survey was implemented. The selected area was the main hall of the Shrine of Worship in the 2018 remake of Shadow of the Colossus [20] (see Fig-ure 1).

In this experimentation, over 1000 pictures of the Shrine of Worship's cylindrical room and main hall interior spaces were taken. The main hall, which base plan is shown in Figure 2, was reconstructed from the alignment of 701 images.

From this experimentation, some initial consideration can be made. A major aspect to be considered for in-game photogrammetry is how in-game photos are captured. Depending on the game, these can be taken either by screen-shots or through a simulated camera. When using screen-shots, field of view is depended on the game camera (first person, third person, isometric). Simulated camera, like in the case of Shadow of the Colossus, can allow to adjust the focal length and, therefore, control the image field of view. Players' capability and accessibility to different point of views around the object to be captured impact

Figure APX.7.3 & APX.7.4 - Ground plan and elevation of the Shrine of Worship. Both have beed generated form the elaboration of the point cloud in a 3D mesh.





on the geometrical detail and quality of the final model. Some in-game cameras allow to freely move in the game world in all direction, making it possible to easily take all required images (Figure 3). In case of hard-to-access point of view, performing in-game photogrammetry is directly dependent on the operators gaming skills.

Another aspect to be considered, is the contextual inter-ference that may occur during the photogrammetric survey. These can be dynamic simulated environmental phenomena, day-night cycles, the presence of enemies, interferences with other players' activity. These pose both practical and ethical questions about how archeogaming and, more generally, digital worlds documentation practices can interfere with the digital lives of their inhabitants.

As for real-world photogrammetry, photo alignment can easily be achieved when surfaces are non-reflective and have superficial details. However, color accuracy is hardly obtainable since visual and environmental effects cannot be generally excluded, as well as real-world methodologies for achieving color accuracy cannot be implemented [21].

APX.7.5. Conclusions

The cultural significance of the digital heritage is a topic of growing interest. With a growing number of artistic, cultural, and social practices taking place in digital built envi-ronments, there is a need to explore and evaluate strategies for their preservation and documentation. The re-mediation and re-functionalization of practices like photography, pho-togrammetry and movie-making in virtual worlds can contribute to develop novel modes of preservation, analysis and artistic engagement with the heritage of digital environments.

Future development will consider how in-game photogrammetry can be applied in other gaming contexts, such as online multiplayer and sandbox games where players intervention actively shapes and transform the digital environment. Also, Neural Radiance Field (NeRF) and Gaussi-an Splatting methods will be compared to photogrammetry as alternative strategies for digital environments surveys.

Section Bibliography

[1] Henry Jenkins, “Games, the New Lively Art”, in *The Wow Climax* (New York, NY, USA: New York University Press, 2006), 19–40.

[2] Espen Aarseth, “Allegories of Space: The Question of Spa-tiality in Computer Games”, in *Cybertext Yearbook 2000*, ed. Markuu Eskelinen and Raine Koskimaa (University of Jyväskylä. Department of Arts and Culture Studies, 2001) 152–171.

[3] Gabriele Aroni, *The Semiotics of Architecture in Video Games* (London, UK: Bloomsbury Academic), 2022.

[4] J. DeLappe, *The Salt Satyagraha Online: Gandhi’s March to Dandi in Second Life*. 2008. [Mixed Reality Performance]. Available: https://www.delappe.net/gandhisecondlife

[5] Cindy Poremba, “Point and Shoot: Remediating Photog-raphy in Gamespace”, *Games and Culture*, Vol. 2, No. 1, 49–58, Jan. 2007, doi: 10.1177/1555412006295397.

[6] Ekiem Barbier, Quentin L’Helgouac’h, and Guilhem Causse, *Knit’s Island*, (2024).

[7] Rockstar North, *Grand Theft Auto V*. (2013). Rockstar Games.

[8] Alan Butler, *Down and Out in Los Santos*. 2015. [Pho-tography]. Available: https://www.alanbutler.info/down-and-out-in-los-santos-2016

[9] Barbara Grespi and Federica Villa, ed., *Il postfotografico: dal selfie alla fotogrammetria digitale* (Torino: Einaudi, 2024)

[10] Christopher W. Totten, *An architectural approach to level design*. (Boca Raton, FL: CRC Press, 2014).

[11] Steffen Peter Walz, *Toward a ludic architecture: framing the space of play and games* (ETC Press. Pittsburgh, PA, USA, 2010. [Online]. Available: 10.1184/R1/6686981)

[12] Friedrich von Borries, Steffen Peter Walz, and Matthias Böttger, *Space time play: computer games, architecture and urbanism, the next level* (Bäsel: Birkhauser Verlag, 2007).

[13] Andrew Reinhard, *Archaeogaming: an introduction to archaeology in and of video games* (New York: Berghahn, 2018)

[14] FromSoftware, *Elden Ring*. (2022).

[15] Florence Smith Nicholls and Michael Cook, “The Dark Souls of Archaeology: Recording Elden Ring”, *Proceedings of the 17th International Conference on the Foundations of Digital Games* (New York, NY, USA: Association for Com-puting Machinery, 2022) 1–10.

[16] Nataska Statham, João Jacob, and Mikael Fridenfalk, “Photogrammetry for Game Environments 2014-2019: What Happened Since The Vanishing of Ethan Carter”, *Proceedings of DiGRA 2020 Conference: Play Everywhere*, Jan. 2020. Ac-cessed: Aug. 29, 2024. [Online]. Available: https://dl.digra.org/index.php/dl/article/view/1225

[17] Fabrizio Ivan Apollonio, Filippo Fantini, Simone Garag-nani, and Marco Gaiani, “A Photogrammetry-Based Workflow for the Accurate 3D Construction and Visualization of Museums Assets” (*Remote Sensing*, vol. 13, no. 3, 2021), 486.

[18] CD Projekt RED, *Cyberpunk 2077*. (2020). CD Projekt.

[19] Peter Ankermann, Oskar Swierad, and Krzysztof Krzyscin, “*The Tech and Art of Cyberspaces in Cyberpunk 2077”, ACM SIGGRAPH 2021 Talks* (Virtual Event USA: ACM, 2021), 1.

[20] Bluepoint Games and Team Ico, *Shadow of the Colossus [Remake]*. (2018). Sony Interactive Entertainment.

[21] Christos Stamatopoulos, C. S. Fraser, and Simon Cronk, “Accuracy Aspects of Utilizing RAW Imagery in Photogram-metric Measurement”, *The International Archives of the Photogrammetry*, Remote Sensing and Spatial Information Sciences, vol. XXXIX-B5, pp. 387–392, Jul. 2012.

APX.8. Interviews

Brian Baglow

Scottish Game Network, writer, game designer

brian.baglow@scottishgames.net

December 6th, 2022, online

ac - Can you tell me about the Scottish game network?

bb - In Scotland there's a number of universities that are approaching games in the area of creative computing. Games are still seen as part of the computing area and the creative industries is entirely separate and there's still little overlap. Things are changing. In the west of Scotland university are bringing the notion of putting together games and computing under the area of creative computer (animation + audio + game). There's still a long way to go but I think this it is the direction to take to take advantage of the underlining use of technology in this sector. One of the things I'm doing with Scottish Game Network and the Scottish Games Week is addressing the isolation of videogame. There's a key issue: games are seen as standing alone. Games are not always taken seriously. Looking at the application of games, technics and tool in industrial sector outside entrainment is still not common. I don't think there are many institutions and universities taking it seriously despite the fact that there's a growing demand for people with game-based education.

ac - On the other hand, it seems difficult to onboard videogame professionals into other industries as well.

bb - Yes, I think it's both side: it's not that nobody takes games seriously. I think is equally as much that the game sector sees itself very separate and specialist. I think that people want to make the blockbuster franchise game they have been growing up playing. There's not much interest in the application of games outside the entertainment market on the game side either. We have to address both sides.

ac - Italian videogame industry is characterized by very small studios and their main approach is to develop games and application for other industries only to fund the development of their own titles.

bb - You're seeing a trend which is reflected across the whole sector. We've got fewer and fewer large-scale studios capable of employing multiple tens of employees. More and more of studios are micro studios and are never going to grow beyond 5 or 10 people. I think that that's a common trend because so many of the opportunities to make games are at the smaller end of the market: the mobile sector doesn't require the massive teams that console development does. The challenges developers are facing have change hugely from the mid 2000. It's no longer content creation the primary challenge. Making a thing is the base line. It's all the other challenges: getting to the market, acquiring users, monetizing your content. That's what where you start to see a major issues for developers. We have a lot of opportunities for entrepreneurialism at the entry level: from the colleges to universities it's easier to make your own game and publish it, but it's more challenging getting players because content is not scares anymore. There are so many games out there. It's only the business aspect the primary skill required. If you look at the hyper casual market which exist on mobile: there're really small, simple mechanics games, with no high production value but they are all focused on cost-per install, long term value, monetized by interstitial advertising. It's a completely different market to that of premium content and steam market. We're getting a lot of small more discrete niches.

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ac - Innovation in business models and monetization strategies is a big topic in the game industry. Now a big debate is around the use of blockchain technologies in games and play-to-earn games.

bb - In the global games market that is entirely focused on changed and evolution there's a real issue with embracing these new changes and opportunities. It's not just blockchain, nft and crypto. It's the rise of the metaverse, the embrace of web3. We're at a point now where the business models are now part of the design challenge. For a lot of game creators and studios, they are really not interested develop opportunities and are not engaging with that. That's an issue. You're seeing a lot of sectors across the world that are leapfrogging in the bigger market because they don't have the same kind of biases or prejudices. For example, the market in Turkey has really exploded in the last five years and they are focusing on a lot of this new technology because there's not the same competition in the market. The larger market are not doing the same maybe because they don't see this as an opportunity but as a threat.

ac - What made Scotland so important in the game industry?

bb- I've been discussing a lot this topic with friends and collogues that have been in the sector as long as I have. I think it's a combination of causes. A thing that happened specifically in Dundee was that the UK as a whole went to the home computer revolution in the mid/early '80s. We had a home-grown company, the Sinclare, which produced the ZX Spectrum. It was an affordable home computer on the market for the first time. In Dundee specifically is where those machines were manufactured. The folklore around is that is that quite a few devices found their way into family homes. Machine that didn't meet quality standard or that quietly removed from the factory. A lot of people and teenager discovered that once you own a computer you couldn't use it for your homework (it's 25 years from Wikipedia), you can only play games. Magazine the the UK had game code printed and you could copy the code in your computer and write your game. Getting computers in the hands of young people and discovering that games were actually a good fun. And in Dundee because is where they were manufactured there was a higher density per population than anywhere else. A lot of the computer clubs had multiple people collaborating to build games and really things went from there. I think the reason that Dundee specifically became something of a cluster is that games were not taken seriously. Games were seen as a proper industry as other media. So they were allowed to remain. Out of 6 games studios in Scotland in mid '90s, 3 of those were in Dundee. As much the same way the printing company DC Thomson, game studios are home grown success in the city of Dundee. DC Thompson was printing kids comics and since they were not taken seriously they could remain and didn't have to go to Edinburgh, Glasgow or London. And I think that for games was the same. Nobody looked at it as something as important for the future of technology. They never had any government or public support for the game sector like film or performing arts had. Games don't have that legacy so they were allowed to do their own things. I think that we had the multiplier effect because once we had 3 game studios in the city, as people started to leave and set up on their own we had more game studios which then highlighted the new Abertay university to have the opportunity to support the sector

that was clearly growing and doing interesting things. They created the world's first game degree. That led to more graduates setting out in the setting up in the city and build that sort of cluster reasonably quickly from '97 when we had 6 studios in Scotland up to 145 across the country right now.

ac - And considering Scottish population these number are significant in terms of impact.

bb - I think there's a lucky combination of circumstancing. There's a number of clusters around the UK (Lemington, Newcastle, Brighton, Leeds) that had similar sort of stories with young and ambitious people working exactly at that point in the industry trying to create a game that could become a breakthrough. You can see all this little clusters but in Scotland, thanks to those early successes and raw models a lot of people were inspired and encouraged to develop a career in to games. There's a real passion and enthusiasm for it. Where we found us now, that passion and enthusiasm has remain, but we don't have the commercial sensibility, we don't have the business element required to succeed. There still much creativity and technical expertise, but I think the challenges have changed and continue to change so we're going to have to find ways to supplement that creative and technical drive in a more of a business sense.

ac - What are the skills needed in the industry?

I think that the issue is that the whole games industry and ecosystem has changed and continues changing so the skills you learn in game courses are now applicable in a huge range of other areas but many of the courses are still focused on the idea of games which are either AAA or premium content and are producing graduates that are solid employees not entrepreneurs. So, we're not looking at games like a core set of skills that can be applied in many different ways. We're not looking at any of the elements of taking the content, the game you've created, and put in to the marked. Nothing is being thought so we're missing all the business monetization skills, we're missing the community management and user experience skills, we're missing the whole area of liveops, in terms of running live games as commercial endeavors, so we're entirely focused in this very narrow range of skills in the content creation and nothing else. And we're still holding up the AAA market as the one true pinnacle of game creations. I think that's very narrow-minded and kind of miss so many elements of the bigger picture. So, I think that's for me one of the really huge scales gaps and something that needs to be addressed in the education pipeline and became a fundamental part of it.

ac - And this transition for the game sector is part of a new approach to game design.

bb - It's a fundamental shift in the way we look at videogames and it has to be integrated and collaborative. We have to have the links in the animation sector, digital design. Marketing and advertising companies are looking for people with skills in the games sector. So is the animation and the movie industry. But the games sector is still not seeing this as an opportunity but a threat. We really do need to have a fundamental rethink about what games actually are and looking at them as a transformative technology.

Christos Michalakos

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december 13th, 2022, online

ac - In doing my research I'm looking at the evolution of virtual economies, from peer-to-peer exchange models to second life, to NFT and blockchain. You have been working on the application of blockchain technology in the field of music production. Can you tell me more about that?

cm - As you mention second life, my colleague Aikaterini Antonopoulou has been working on virtual spaces for recreating social meet-ups.

My background is in math, physics and then music. I did a PhD at the University of Edinburgh in interactive music. I worked in the industry as an audio programmer. I started working a Abertay because my PhD had a lot to do with games. The blockchain research is more recent. Basically, we're trying to organize ways from royalties to generation of streams of incomes. When we have users collaborating in virtual spaces, everyone brings their own asset and samples, it's all tracked with smart contract, so you know in what is the workflow and the profit that they generated. We had a couple of grants. We have been working with Algorand, Tezos. The project is still not public because of the crypto crush. The grant I'm working on now is a 7 year grant to develop the VR infrastructure. We believe that VR headset will be available for everyone at a cheap price and also sound designers will take advantage of this technology. We're building this platform for collaboration between sound designers. I'm doing this with my brother, he was senior audio programmer at Rockstar games.

ac - How do you see this project different from other projects that are using blockchain technologies?

cm - I don't see what we're doing as something where we place sounds and wait for them to increase in value just to be resold. It's a creation platform that happens to have blockchain tracking element within it. It can have users using the platform without using the blockchain features. It's an audio company not a blockchain company. At the beginning you get a lot of speculation and scam, but the technology is interesting and it has a big potential in the industry.

ac - Is that somehow related with the emergence of virtual worlds and the debate around what the metaverse is and could be?

cm - Most people are moving to an online digital version ore themselves. It's more important what you do online than in real life. People will spend more many on a skin for a game like League of Legends than buying a real jacket because they may use it way more often than the real jacket. Looks like people are living more isolated lives, so they are willing to spend more money in virtual life because it is where they have more social interactions.

In terms of music and sound, I'm thinking about how is music defined: is it tangible or is it intangible? Is it the album you're holding in your hands, or is it the performance you attend as a listener? What is the difference between going into a bar and listen to music or going into some sort of virtual space and listen to a concert. I think there's a big spectrum of assets that are tangible, like clothes, that can be made into digital version but also a grey area of assets or media, like music that even in the real world aren't easy to define as tangible or intangible. One of the problems is that now some virtual worlds liked to crypto and blockchain, like Decentraland, feels really empty and low quality.

ac - From the perseptive of sound design, how do you see the current use of audio in VR technologies and interactive digital media?

cm - I think that the use of sound is still very underrated in VR experiences. For example, you have experiences that are mostly silent and then you have some sounds that play when there is an interaction. But it is the same sound over and over. It is very difficult to predict what user will do in all possible situation in those environment and associate audio to it but it is very underrated how just having sound even on a few objects makes the environment feel real. You never realize that is actually because of the sound that object feels tangible, in a way, even not through tactile feedback. Whit the use of sound effects in VR the user can actually feel that there is something there. There is a huge potential for sound in VR and AR and part of the grant is to develop tools, workflows, and research for this environment to develop expressive audio for that. Also, for music performances in virtual reality. If you are in virtual reality and you're trying to recreate an existing physical instrument I think would be a worst version of the real instrument. I think that it is more interesting to design the virtual equivalent of the real instrument that takes into account the affordance of the virtual reality space rather than making a VR version of a guitar that has not the tactile feedback of the real instrument.

Paolo Ruffino
Senior Lecturer,
Communication and Media, University of Liverpool
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november 14th, 2022, online

ac - Dal tuo punto di vista vedi una convergenza sui temi del gioco tra le discipline del design, dell'architettura, le scienze sociali e i media studies? E allo stesso modo il rapporto tra utenti e progettisti che, in alcune tipologie di videogioco sono categorie con molti elementi in comune?

pr - Il mio ambito è legato ai media studies e game studies ma è molto vicino agli ambiti del design e dell'architettura. È una storia ampia e articolata quella che fino a poco tempo fa si definiva del prosumer. Negli studi sulla unser experience si è cercato per molto tempo di insistere sulla idea che il consumatore, soprattutto di digital environmensts, in qualche modo producesse anche contenuti. Questo si è inoltre unito abbastanza presto con anche un interesse puramente economico. La produzione di contenuti significa produzione di dati. E la produzione di dati è funzionale al capitalismo digitale che cerca di estrarre dati dall'attività degli utenti per scopi economici. L'esempio più banale sono i social media. A svolta dei social media è che non offrono contenuti ma invitano l'utente a produrlo. Nel momento in cui produci contenuto diventi identificabile, le tue attività producono dati che ti identificano online. È successo anche nel mondo del gaming, forse in maniera meno evidente ma è pressoché impossibile giocare senza fare un log-in. Si è connessi sempre online e la propria attività è monitorata. Questo diventa forse più evidente ed accelerato sui giochi mobile. Su mobile esiste una quantità di giochi clone che non hanno una particolare innovazione dal punto di vista del design. Il loro business model prevede che il gio-

co sia gratuito e il loro obiettivo è mantenere l'utente il più possibile connesso perché produca dati che il producer possa rivendere o utilizzare per promuovere altri prodotti.

Nel settore e-racing succede una cosa molto interessante perché c'è una forte comunità amatoriale di produzione di hardware e interfacce per rendere sempre più realistiche la presentazione della guida della macchina da corsa. Il gaming ha spesso fatto ponte di incontro tra il settore sportivo del racing e le produzioni amatoriali. La cosa interessante che accadeva durante la pandemia è che questi due mondi convergono perché la gara reale Nascar viene spostata nel gioco e a tutti gli effetti non c'è più differenza tra la gara ufficiale e quella che gli appassionati corrono da casa loro.

Il ludico è spesso presentato come un mondo libero di sperimentazione ma non va neanche romanticizzato troppo. Le culture che spesso girano attorno a questi mondi sono spesso tutt'altro che liberi e spensierato. È stato scritto di come la cultura del gaming sia spesso a tratto molto aggressiva, mascolinizzata, iper-competitiva. Le produzioni di mod di giochi famosi che spesso vengono visto come dei passatempi in realtà sono spesso prodotte in contesti molto competitivi ed organizzati da persone che cercano di entrare nell'industria. Ci sono alcuni giochi che sfruttano un po' questa cosa. Un esempio è Roblox: praticamente è un gioco simile a Second Life, Minecraft, indirizzato principalmente a bambini, dove però c'è un'economia del gioco nella quale si può entrare con valuta reale. L'utente può creare contenuti che possono essere acquistati con monete virtuali che possono essere vinte giocando. Ci sono diversi articoli che si pongono la domanda sul fatto che forse ci sia uno sfruttamento dei giocatori, in questo caso bambini, che vengono spinti a produrre contenuti che siano profittevoli per qualcun altro. Spesso ci sono queste aree grigie in cui non è chiaro se stai giocando, lavorando, producendo valore e giochi come Roblox sfruttano questa poca chiarezza.

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ac - Quel cerchio magico di cui parla Huizinga si rompe?

pr- La produzione di videogiochi è stata spesso anche all'avanguardia di nuove frontiere del capitalismo e di nuovi modi di produzione di valore. Il "cerchio magico" dell'attività ludica, anche se in qualche modo è presente, non è visto come puro e incontaminato. Magari per molti giocatori è un luogo puro, è un altrove, ma rimane molto comunque inserito nell'economia reale.

ac -Quali sono secondo te gli elementi di vicinanza e le differenze tra le industrie videoludiche italiana, scozzese e, ingenerale, UK?

pr - La Scozia è un caso molto particolare. Non è una nazione ricchissima che ha una capacità importante di investimento che superi le capacità di una regione come l'Emilia-Romagna o tantomeno dell'Italia. Prima ancora di Rockstar, come tutta l'UK, aveva una produzione vivace di piccoli produttori paragonabili in un certo senso a quelli presenti in Italia tuttora. Azzardando un po' si potrebbe dire che l'Italia ora ricorda un po' la situazione che c'era in Gran Bretagna nei primi anni '90. Cioè tanti piccoli imprenditori che magari non si occupano direttamente dalla distribuzione. Oggi li chiamiamo indipendenti ma allora erano i bedroom coder o piccole case di 5-10 lavoratori di diverso tipo come programmatori e artisti, che poi sono diventate le aziende più famose. Penso a Sensible software, DMA Design. C'erano questi gruppi che hanno reso molto visibile la produzione del videogioco in tutta la Gran Bretagna. In alcune zone come la scozia e l'Irlanda c'è stato un piano statale a tutti gli effetti. Anche in Canada questo è molto evidente. C'è stato ad un certo punto la volontà di incentivare la produzione digitale con dei sussidi, varie forme di facilitazione anche economica e tassativa, che hanno favorito l'emergere di queste società. Non è che in Scozia ci sia infrastrutture avveniristiche rispetto ad altre parti del mondo. C'è stato in generale una sinergia a livello di preparazione della forza lavoro di cui Abertay nel tempo ha contribuito in forma abbastanza notevole. C'è anche una forte cultura del design nell'ambito digitale. Ci sono una serie di fattori che hanno favorito la situazione attuale.

ac - Quali sono le discipline che in italia e nel mondo contribuiscono maggiornmente alla ricerca nei game studies?

pr - Collaborando con DiGRA Italia, nell'ambito delle conferenze molti partecipanti vengono dai dipartimenti di storia, pedagogia. Media e film studies rappresentano il gruppo equivalente di chi si occupa di game studies a livello internazionale. In Italia in genere sono i dipartimenti di comunicazione, cinema, DAMS. C'è anche informatica e ingegneria informatica ma in genere non sono le persone che generalmente partecipano alle conferenze di DIGRA Italia perché DiGRA ha un approccio più umanistico e di scienze sociali. La cosa interessante del gioco è che taglia in maniera abbastanza trasversale le diverse discipline. I game studies a livello internazionale sono comunque percepiti come qualcosa che ha a che fare con media e comunicazione. Per capire il regno unito e il loro approccio alla produzione e allo studio del videogioco. Negli anni 90 c'è stata una confluenza interessante tra i dipartimenti di computer science e arte. Si è creata quest'idea della digital art e infatti ci sono numerosi programmi di studio di digital art. Da lì è fuoriuscita molta gente che ha lavorato nell'industria del videogioco e questo forse in Italia è meno presente.

Altre associazioni e conferenze: Fonduation of Digital Games (FDG). Phylosophy of computer games. Altre università in UK Staffordshire.

ac - Rispetto alle modalità di relazione che si instaurano attraverso il media videoludico, quali modalità di scambio possono definirsi? Qual è poi il rapporto con il corpo con la macchina e le intelligenze artificiali?

pr - C'è un lungo dibattito su in che misura la digitalizzazione degli scambi comunicativi annulla il corpo. Vedi ad esempio gli studi di Katherine Hayles sull'intelligenza artificiale. L'obiettivo dei primissimi studi di AI era quello di slegare dal corpo lo scambio di informazione. Passare da una comunicazione a uno scambio di informazione in un ambiente in cui non esiste più la corporeità e non esiste più tutto ciò che può filtrare lo scambio di informazioni. È una questione complessa ma la critica che viene fatta a questa visione è che è una visione che in qualche modo fallisce. Anche quando giochiamo a Second Life siamo in fisicamente presenti. La materialità di quella interazione ha una sua importanza evidente a partire dal fatto con cui noi interagiamo con l'interfaccia, la velocità di connessione, la nostra abitudine, il nostro background culturale influenza il modo in cui giochiamo, ciò che cerchiamo in quella esperienza. È molto interessante la radice antropologica di questa ricerca. Ti consiglio di leggere gli studi sulle game economies (Castronova, Seth Giddins), lo special issue di Games and Culture su Virtual Economies. Le meccaniche dei social sono proprio basate sulle forme di scambio.

Sean Taylor

InGAME Managing Director

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1 dicembre 2022, InGame, Vision Building, Dundee

Notes: A number of waves made the videogame industry in Scotland and in Dundee evolve: a first wave was made by bedroom coder just meeting in computer clubs to develop games which eventually developed into the first succesfull companies, like DMA Design. When Abertay started the Game Development program, professionals from local companies started teaching young students at Aberty and graduates funded their own game studios that started a second wave of studios. One of the biggest and most successful studios from this wave is Digital Goldfish, acquired by Ninja Kiwi in 2012 that was started by students at Abertay. The third wave today is represented by Hyper Luminal Games, a studio of 50+ employees.

There's some kind of resistance for game companies to develop business partnership with industries, whereas industries is really interested in videogame technology and skills. For smaller companies, Industry could be a safer partner because there is a lot less competition.

Mikael Jakobsson

MIT Game Lab, Research Scientist

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June 27th 2024 – MIT Play Lab, Cambridge, MA, USA

mj/ Puertorico is a famous board game considered the "chess of boardgame design". It is "historically accurate" in therm of colonialist and exploitative practices.

From Puertorico, mj and his research group developed an "alternative version", Promesa, based on Portorican problems with american colonialism and the nation's debt (black gems).

The other gems represent investment that are allocated on infrastructures and education. To allocate the gems, players have to pile them on top of the other black gems, which could cause them falling down on the map – this represent natural catastrophies.

ac/ the mechaninc of gems allocation combine both a "strategic" thinking and a physical interaction with the game.

mj/ portorican players recognize elements of the game that are not recognizable by other players (map element, the gem box cap made from house roofs)

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ac/ it works like a layering of information that are accessible in different ways to different players

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mj/ game development often starts from external request (government, industries,..). It's often a matter to modulate expectation. It's important to be involved since the beginning of the project otherwise it ends up being a boring useless "gamification".

It's important to have a collaborative design process that is not tied to technological, material, interfaces,... specifications. Companies often underestimate the effort in making game.

ac/ commercial games have raised the bar so high that people expect such level of detail and quality to be easily achievable

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ac/ do you see a growing interest in games that address sustainability, social issues?

mj/ yes, there are many games that address sustainability issues, often in terms of optimization problems. I don't find them to be interesting/innovative. I see more interesting games that address social sustainability games (UN sustainability development goals).

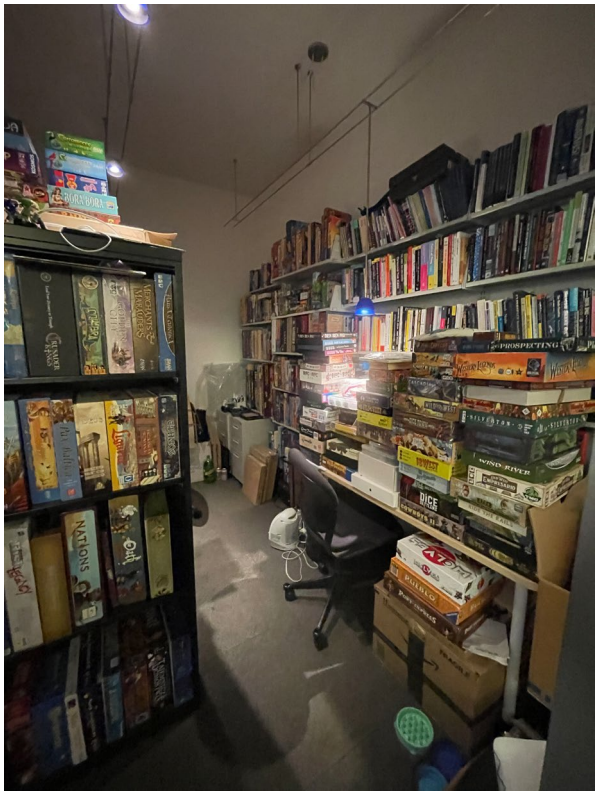
There are several board games that can be compared to the video game indi scene that are interesting to this regard.

ac/ like for indi games, I guess it is also a matter of demographic of people that are more exposed to this kind of issues and therefore are looking for these kind of political games. Maybe it is a kind of agency that people feel when play political games. An agency they don't feel in the real politics

mj/ games against oppression – workshop at mit

Corteo – è un sacco alternativo https://www.artecontemporanea.com/product/19265/

Up against the wall MFK



Mikael's office at MIT PlayLab

ac/ Italian game company made the RIOT game https://en.wikipedia.org/wiki/Riot_(video_game)

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ac/ are you aware of board game that have been appropriated by players?

mj/ Folk games get reappropriated often.

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ac/ these kind of political games are different from games like Train, for example.

mj/ Train is more like and art/exhibit piece. Mary Flanagan talks about that

ac/ do you see a space for this kind of games?

mj/ yes, but are a different kind of games since you are playing with players expectation

ac/ as a player you're exposed and vulnerable. With some technologies it can happen to feel like you've been gamed (extraction of value).

mj/ perspective shift – from players to pawn

Now, let's try to stop Colombo!

After the interview, Mikael, Rik Eberhardt and I, played the Italian tabletop game "Fermate Colombo!" (Alex Randolph & Hajo Bucken, 1992)