

**I want shorter games  
with worse graphics  
made by people who  
are paid more to  
work less and I'm not  
kidding**

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## Sommaire



# Introduction

Video games are undoubtedly the cultural medium that has undergone the most rapid changes in recent history. These changes are inextricably linked to the digital technologies that have marked the last few decades. With each new technical innovation, the medium has been transformed, overturning both creative practices and industrial logics. In fact, it's not entirely clear when the medium was created. Before video games were a finished, defined product, they existed as a creative practice linked to hacking and the hijacking by artists and engineers of the first supercomputers and computers developed during the Cold War. The film *Wargames* (John Badham, 1983) takes a rather amusing look at these practices at the time, presenting the practice of video games as something technical, complex, and profoundly futuristic by showing supercomputers and engineers overwhelmed by their own technical discoveries.

This image gradually disappeared in the eighties and nineties with the advent of the first game consoles, which allowed a wider audience to enjoy video games at home without any special technical requirements. Nevertheless, there were always groups of artists or hackers who used the new digi-

tal technologies to try to create new forms of visuals or interactions. This was the case, for example, with the demoscene, an international subculture of digital creators who used their knowledge of computer tools to create or hijack small software programs with the goal of creating executable software, usually containing music, images, or short animated sequences. The first video game studios, much smaller than today's, grew out of this kind of community of creative thinkers and computer engineers.

With the development of more powerful machines and creative software, the advent of larger storage media, and the widespread democratization of the medium, video games and studios underwent radical changes in a very short period of time. From small studios, often producing small games, to studios of several hundred people responding to the capitalist logic of productivity and profitability as we know it today. The way we create and consume video games has changed dramatically in the last thirty years.

In *Games of Empire* (Nick Dyer-Witheford, Greig de Peuter, 2009), the authors show that video games as a medium are deeply rooted in the logic of globalized capitalism. Like any technological product, it is characterized by the exploitation of material and human resources. The production of the advanced technologies needed to create these games requires the manufacture of increasingly complex equipment, with major environmental and social consequences.

We therefore ask the following question: How has the globalized video game industry influenced the way we design and create games, what is its impact on our world, and what creative alternatives are available to make this medium more sustainable?

To answer these questions, we will examine the importance of resources (human, creative, and material) in the development of the medium. We'll also look at how we can recognize and challenge their use, and propose innovative approaches and techniques for reinventing video games towards more equitable, creative, and sustainable practices.

For this thesis, I've decided to base myself in part on a historical and sociological analysis of video game creation, supported by references from academia and the world of design. This will allow me to use political and social theoretical concepts to conduct a critical analysis of the medium in the manner of game studies. I'll also use the analysis of several video games to see what their production cycle and gameplay tell us about the resources they bring into play. I will also draw on my experience as a game designer, as well as that of other designers, to provide a more empirical perspective on the act of videogame creation.

As an annex to this thesis, we offer a detailed case study of two games with similar narrative frameworks, but created in radically different contexts and following radically different game design philosophies: *Starfield* (Bethesda Game Studios, 2023) and *Outer Wilds* (Mobius Digital, 2019). This in-depth analysis will serve as a starting point to highlight some of the fundamental issues facing the video game medium today, while illustrating two contrasting approaches to game design.

This annex is intended as a useful supplement for readers who have not experienced these games, or who wish to delve more deeply into the issues addressed in them. It also serves as a reference base for the two main chapters of the thesis, providing concrete examples to support the issues raised and perspectives developed.

First, we'll examine the impact of the video game industry on natural resources, showing how certain practices that have become standard have made the medium increasingly dependent on rare materials and energy, thus exacerbating the ecological problems associated with its production. We will then analyze the video game as a technical object, an artifact resulting from a design and manufacturing process that combines human know-how and material constraints. We'll see how the creation of easy-to-use, « off-the-shelf » game consoles has made this medium opaque and impenetrable to the general public, distancing users from the technical dynamics that underpin it. Finally, we examine how the fragmentation of work in the production chain of major studios disconnects develo-



pers from the realities and technical constraints of the creative process, depriving them of creative and personal involvement. This results in formatted products that are pre-determined and cannot be challenged at any point in the production chain.

This will allow us to make the link to the second part of the thesis, where we will address the importance of a better knowledge of technical tools to create more responsible games. We'll also explore how to rethink game media itself in order to promote a more sustainable approach to the medium. In the second part, we analyze the role of game design in a process aimed at reducing the excesses of the video game industry, using the principles of degrowth to limit the overconsumption of material, energy and human resources. We will show how technical, human, and economic constraints, thoughtfully integrated, can encourage more radical and innovative design choices, paving the way for a medium that is both more sustainable and more creative. Finally, in the third part, we'll present how I, as a designer, approach these issues in my personal practice, seeking to integrate these considerations into my own creative processes.

Ultimately, this thesis aims to interrogate the ways in which questions of resources (whether material, human, or creative) influence and shape the development of video games. By examining the growing opacity of the medium, the environmental and social impacts of the industry, and the possibilities offered by more conscious and sustainable approaches to creation, we will explore how to rethink the making of video games. In particular, we'll draw on concepts such as subtractive design, an approach that involves deliberately reducing the elements of a game to privilege the essential, thereby promoting less resource-intensive but more streamlined and meaningful experiences. By mobilizing this approach and examining concrete examples, we aim to propose a critical reflection on the reinvention of video games as a space where technology and creativity can take precedence over the dominant capitalist logic.

# **1.1. Techno-Industrial Glorification**

As briefly mentioned in the introduction, the history of video game creation and development is closely linked to the evolution of digital technologies, but also to an era marked by the arms race, the conquest of space, and technological advances. As a creative medium that combines art and technology, video games have followed the typical evolution of an artistic medium, with its ever-changing styles and practices, while benefiting from rapid advances in computing power, development tools, storage media, and many other elements. These innovations have enabled the creation of increasingly resource-intensive games over the years. All of this has been driven by a booming industry's desire to meet ever-higher sales targets and take advantage of what today's most lucrative entertainment sector has to offer. Carl Therrien, a researcher at the Université de Montréal and historian of the medium, describes this context of «techno-industrial glorification» as intrinsic to the way in which writings and discussions about video

games shape the evolution of the medium\*. Indeed, according to Therrien, the video games most often cited are those that achieve technological prowess or push the technical boundaries of the medium, thus neglecting other aspects of the video game landscape. Implicitly, this sends a signal to the major players in the industry about how to attract attention to their next productions.

We can also observe the medium's tendency to want to do more and more. Bigger, longer, more realistic, mainstream video games are becoming a prime showcase for the power of the latest digital technologies, as well as a pretext for selling ever more powerful machines. For example, the amount of memory and processing power required to run the latest games has exploded, thanks to games designed to stay on the cutting edge of technology and to run on the latest machines on the market. To return to our case study, we can look at the amount of disk space required to install games released by Bethesda over the years. This data, which is easily quantifiable (as opposed to, say, the power required to run a game), will allow us to highlight the impact of design choices on the hardware aspects of a game. These aspects may include the weight of the game in terms of storage requirements, the computing power required to run it, and the associated hardware requirements (processors, graphics cards, power consumption, etc.).

*The Elder Scrolls 2: Daggerfall*, released in 1996, is one of the games in the history of the medium with one of the largest explorable maps. It already boasted a philosophy of abundance, with an abundance of procedurally generated content and an initial file size of around 150 MB. Later, 2011's *The Elder Scrolls 5: Skyrim*, with its massive map and numerous quests and characters, weighed in at around 6 GB at release. And today, *Starfield*, with its countless 3D models and high-resolution textures, requires over 125 GB of disk space to install. We can already

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\* Techno-industrial celebration, misinformation echo chambers, and the distortion cycle. An Introduction to the History of Games International Conference Proceedings

see that the philosophy behind the creation of these universes has not really evolved in the last thirty years or so: *Daggerfall* was already about giving the player an almost infinite field of exploration. To recreate such a fantasy in *Starfield*, on the scale of an entire universe and with graphics that are getting closer and closer to photorealism, requires considerable resources. This includes both material resources (such as storage space, machine power and the energy required to run them) and human resources to create a colossal number of assets\*. This phenomenon illustrates a recurring problem in the mainstream video game industry: a relentless pursuit of the «more spectacular» and the «limitless,» often without sufficient consideration of the very real constraints imposed by limited resources.

By comparison, *Outer Wilds* «only» requires 12 GB of disk space to install. Even so, it's already twice the size of *Skyrim*, which was released 8 years earlier. In fact, even if the game's reduced universe and art direction choices make it much lighter than *Starfield*, it's still a fully 3D game, with textures and assets capable of displaying good visual quality on a high-definition screen. It's also worth noting that during development, Annapurna Interactive, the game's publisher, asked the developers to create more content for the game before releasing it, which fatally increased the game's weight. As we saw earlier, *Outer Wilds* was released not only on PC, but also on eighth-generation consoles\*\*, which also dictates a certain level of quality expected to take advantage of the machines' power.

Although it belongs to a category of independent games that already share certain characteristics with larger productions, it's important to note that many recent independent games with scope\*\*\* or graphics that are different from *Outer Wilds* can run on low-powered machines that require little storage space. Examples include *Chant of Sennaar* (Rundisc,

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\* The constituent elements of a video game: 3D models, images, scripts, music, etc...

\*\* Playstation 4, Xbox One, Nintendo Switch...

\*\*\* The size of a video game project in terms of allocated time and budget.

2023), which requires 600 MB, or *A short Hike* (Adam Robinson-Yu, 2019), which requires 400 MB.

In 2009's *Games of Empire* (Nick Dyer-Witheford, Greig de Peuter, 2009), the authors proclaim that the video game as a consumer product, like others, has become a global phenomenon caught up in the workings of capitalism. We don't mean to imply that video games are within everyone's reach and that everyone plays video games, but that they now respond to the invective of a globalized industry. Games are largely developed and consumed in the West, while temporary developers are hired at lower costs in developing countries to keep up with release schedules. At the same time, the large quantities of natural resources needed to produce the new generations of machines are extracted mainly in Asia and Africa by workers in precarious situations\*. This extractivist tendency of the capitalist video game industry, with its promises of grandeur and infinite growth, also brings with it a host of problems inherent to the system.

In fact, in order to meet the constant demand for innovation and size, the video game industry constantly pushes the limits of its production, often at the cost of significant social, economic and environmental consequences. The development model used by the largest studios, known as « crunch culture, » puts great pressure on developers, forcing them to work unreasonably hard and treating them as just another form of resource to be exploited to the maximum until they are exhausted and then replaced when they become unusable. We'll discuss this notion in more detail later in this chapter, when we look at the issues surrounding working conditions in industry.

On the environmental front, the video game industry's race to be the most technologically advanced means that consoles and computer hardware must be rapidly updated, resulting in the constant production of electronic waste and increasing energy consumption. The manufacture of consoles and the components needed to support ever more realistic gra-

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\* <https://unevenearth.org/2020/08/extractivism/>

pray for luck

leave an offering

Leave E

### Statue of Beb

The goddess of good luck, poverty, and random numbers. Her fat, smiling face has countless eyes looking in all directions.



phics and enhanced performance rely on rare metals and other natural resources. But the extraction of these materials causes significant environmental damage and fuels social problems in developing countries, where working conditions are often precarious and poorly monitored. As journalist Naomi Klein points out in her book *This Changes Everything* (Klein, 2014), the capitalist logic of infinite growth that drives the constant quest for technological novelty is in direct conflict with the physical limits of our planet. In the context of video games, the continued development of ever more resource-intensive titles that require ever more powerful machines becomes an unsustainable model in the face of natural resource depletion and climate emergency.

Finally, as triple-A video games pursue a frantic quest for expansion, realism, and grandeur, this race for « more and more » raises questions about the viability of a model based on exponential resource consumption. In contrast, games from the independent scene, such as *Outer Wilds*, explore alternative approaches that stand in stark contrast to the standards imposed by the mainstream industry. Unlike video game block-busters, these independent productions often eschew the demands of photorealism and technical accumulation in favor of stylized artistic choices and innovative gameplay mechanics.

These games, such as *Undertale* (Toby Fox, 2015), *Hollow Knight* (Team Cherry, 2017), or the now iconic *Minecraft* (Mojang, 2009), manage to captivate a wide audience while relying on much more modest material and technical resources. By emphasizing singular playful propositions and strong artistic biases, they offer a compelling alternative to the dominant techno-industrial glorification effect. These works demonstrate that it is possible to create memorable, impactful experiences without succumbing to the imperatives of an industry obsessed with technological performance. Despite the promise of a more diverse and less rapacious medium that these games offer, the industry as it has evolved over the years doesn't leave much room for creations that step outside its well-oiled mechanisms.

# 1.2. Technological opacity

As we have seen so far, the video game industry, its evolution, and its impact on the resources it consumes are intimately linked to the machines and technological supports needed to run it. With the evolution of consoles and video game technologies, a striking trend has emerged: the increasing opacity of devices and the dependence of consumers on proprietary, controlled environments.

Gilbert Simondon introduces the notion of the concretization of technical objects in *Du mode d'existence des objets techniques* (Simondon, 1958), describing the process by which technical objects become more integrated, specialized, and less modular as they are perfected. This increases what Simondon calls the alienation of the individual, a situation in which the user

feels alienated from a technical object whose internal systems he or she cannot understand. This concretization, coupled with a capitalist industrial context in which console manufacturers compete to offer the most powerful machines through technological innovation, has rapidly distanced the technical object from the consumer. As a result, consumers use increasingly complex devices without understanding how they work or their underlying mechanisms, fostering the alienation that Simondon describes.

If we trace the history of video games, as Tristan Donovan does in his book *Replay: The History of Video Games* (Donovan, 2010), we see that the transformation of gaming media has taken place in just thirty years: from a complex system reserved for a few engineers and hobbyists (such as the *cathode ray tube amusement machine* in 1947) to a mass-market product with the Atari 2600 in 1977. Moreover, in *Technologie et génétique de l'objet industriel* (Deforges, 1985), Yves Deforges develops the notion of technical lineage, which shows how each technical object is part of a historical continuity. Each innovation is based on overcoming the limitations of previous generations while introducing technical improvements and new functions. This notion of technical lineage applies particularly well to the history of video game consoles. Each generation incorporates advances that perfect the devices on a technical level, but this increases their opacity and their dependence on precious resources for their construction, such as rare metals and sophisticated electronic components.

The book *Joypads! Le design des manettes de jeu vidéo* (Nova, Bolli, 2013) by Nicolas Nova and Laurent Bolli combines these notions and serves as an example for our demonstration on game consoles, exploring the evolution of game controllers through their technical lineages. We can see how these devices have evolved through iteration, with each new generation of controllers taking inspiration from the previous ones while trying to improve their ergonomics to better adapt to the needs of players. This evolution has also added buttons and functionality, making controllers more versatile, but also more technically

complex. Technologies such as haptic feedback\* or gyroscopic sensors\*\*, introduced to enhance the gaming experience, have increased their dependence on sophisticated electronic components and increased the impact of their production. The history of joysticks and consoles thus illustrates both the technical lineage described by Deforges and the concretization of technical objects as defined by Simondon. This highlights the tensions between innovation, complexity, and opacity in the design of video game devices, while also revealing their growing environmental and social implications.

Indeed, the concretization of technical objects by making game consoles and controllers increasingly integrated, specialized, and opaque also contributes to their lack of modularity. This limits their reparability and capacity for evolution, making them rapidly obsolete in the face of the industry's constant technological advances. This accelerated obsolescence fuels a rapid refresh cycle for machines, leading to increased consumption of precious resources and exacerbating the environmental impact of the video game industry. As a result, the quest for technical innovation clashes with sustainability issues, raising crucial questions about the current model of production and consumption in the sector.

We can also cite the sociologist Bruno Latour, who in *La science en action* (Latour, 1987) introduces the concept of « blackboxing ». The latter helps us to define how these technical systems, initially open and comprehensible, have been transformed into « black boxes » where only the results (in this case, the game itself) are visible, leaving the internal mechanisms hidden. While the modern gamer enjoys spectacular graphics and unprecedented immersion, these advances rely on energy-intensive infrastructures and the extraction of rare

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\* Technology that simulates touch by providing vibration, pressure, or movement to a user, often through devices such as controllers.

\*\* Device that measures the speed of rotation or changes in orientation of an object, often used to detect movement in devices such as smartphones or game controllers.

materials, the environmental and social costs of which are invisible to the general public. In a context where planetary limits are an inescapable reality, this quest for infinite technological progress, hidden behind the increasing complexity of consoles and the carefree attitude of an industry that only emphasizes advantages and innovation, seems not only alienating, but also unsustainable for the future of the medium.

Today's game consoles have become complex and increasingly autonomous platforms, with locked-down operating systems, anti-piracy mechanisms, and protections against software or hardware tampering. While the first generations of consoles or personal computers allowed enthusiasts to delve into their inner workings, tinker, or even create their own games, modern devices are designed to discourage any attempt at intervention. Digital distribution platforms, such as those offered by Sony or Microsoft, lock down not only the content available, but also the possible interactions with the hardware. This phenomenon turns the gamer into a passive consumer, dependent on updates and products offered by major publishers.

For amateur developers or enthusiasts who want to explore the medium in a different way, the barriers created by these systems are nearly insurmountable. While in the past platforms like PCs or early consoles encouraged creativity through accessible development kits, modern consoles and their ecosystems drastically limit these possibilities. Cases of modding\* or hacking\*\*. are often punished, involve significant legal risks, and are becoming increasingly technically complex.

The monopoly of a few large groups of console and development environment manufacturers is also problematic,

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\* Modification of an existing video game by a third party, in the form of an add-on to the original, to add functionality or modify existing features.

\*\* A set of techniques to exploit the capabilities, weaknesses and vulnerabilities of a material or human element or group of elements. It also includes the repair, maintenance, or improvement of old hardware or software for which documentation is no longer available.

as it limits access to these kits\* for smaller studios, which are often expensive and complicated to obtain outside of studios working directly with the company. Add to this the fact that the algorithms used by the major online game distribution platforms favor big releases, and that the production of a physical version of a game is often too expensive for an independent studio, and the question of monopoly over distribution channels also arises. This situation not only hurts small studio developers who are trying to produce and promote games that are different from the triple-A ones, it also hurts the consumer who, if he or she doesn't have the time to shop around, is being offered the same games from the same big studios over and over again.

This vicious cycle, reinforced by the monopoly of large companies like Microsoft, is a real problem because it perpetuates one of the medium's most self-destructive dynamics: the systematic preference for the same types of productions, those that guarantee commercial success but are often content to reproduce tried-and-true formulas without exploring new creative directions. In the video *Comment le RPG est devenu une SAUCE (ou pourquoi les jeux mainstream ont le même goût)*, the videographers of the Game Next Door Youtube channel analyze the major productions released since the mid-2000s and talk about a standardization of experiences in triple-A games. In their view, these games have all taken the winning design formulas of the period and applied them to different universes without taking any more gameplay risks. Inevitably, they end up talking about our case study, *Starfield*, which, as we can see from the analysis of the game, simply adds gameplay features present in all other mainstream productions without proposing a strong gameplay line to structure the experience. Conversely, *Outer Wilds*, for example, manages to stand out by offering a more original and coherent approach, with a clear playful direction that guides the entire game.

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\* video game development kits are sets of software and hardware tools provided by console manufacturers or game engine developers that allow developers to design, test, and deploy games on a specific platform

On the developer side, this creative closure and technological invective also has profound implications for design practices. In her work (Akrich, 1992) on technical « scripts, » Madeleine Akrich explains that while technical objects may become « black boxes, » they actually contain the presuppositions, often unconscious, of their designers. These initial biases and choices directly influence the creative process and consequently shape the final product. Game designers and producers follow these scripts, consciously or unconsciously, to produce what they think is necessary for a game's playability and commercial success.

The notion of script also applies to the tools and technologies used by developers, which largely determine the limits of their creativity. Indeed, the technologies used to create games impose implicit constraints on the kinds of playful experiences that are possible. For example, modern proprietary game engines such as Unreal Engine or Unity come preconfigured with protocols and tools that naturally steer developers toward predetermined forms of gameplay, such as photorealistic open worlds or realistic physical simulations. While these environments are useful for simplifying work, they can also lock designers into standardized practices, making it difficult to explore new forms of narrative or interactivity. The very structure of these game engines, optimized to produce spectacular experiences while consuming significant resources, limits the possibility of imagining more sober or creative alternatives.

In *Against Flow* (Soderman, 2021), by media studies professor Braxton Soderman, we see what could be an extension of the script idea. He examines how the concept of flow, as defined by psychologist Mihaly Csikszentmihalyi in *Flow: The Psychology of Optimal Experience* (Csikszentmihalyi, 1990), has found its way into game design. The concept refers to a state of intense concentration and enjoyment experienced while completing a task. Soderman shows how it has become a kind of universal script in game design.

He dates the emergence of this dogma to first-person shooter games, which offer the sensation of gliding unhinde-

red through the real world. According to Soderman, the video game industry's obsession with this state reflects a capitalist logic in which games are designed to maximize player engagement and efficiency while minimizing friction or questioning. Principles of flow, such as challenges tailored to the player's abilities, constant feedback\*, and the elimination of disruptive interruptions, thus structure game experiences to produce a fluid yet predictable and controlled sense of accomplishment.

Soderman criticizes this model as inherently alienating: it keeps players in a state of calculated satisfaction, distracting them from any critical reflection or creative exploration. Transposed into a capitalist framework, flow becomes a tool for attention management, a way of capturing player engagement in order to better capitalize on it, to the detriment of more subversive or unsettling forms of interaction. By insisting on this state as the universal standard of game design, the industry denies itself the opportunity to question other approaches that might produce experiences that are less linear, more complex, or more at odds with conventional expectations.

This analysis highlights another point made by Nick Dyer-Witheford and Greig de Peuter in *Games of Empire*, where they argue that the globalized capitalist society of the XXI<sup>e</sup> century exploits not only resources and workers, but also their available attention time and data through a form of «immaterial labor». With the emergence of social and massively multi-player games in the early 2000s (such as Second Life or World of Warcraft), then games as a service\*\* in the 2015s (such as Destiny 2 or Fortnite), and finally triple-A games that require a constant internet connection to collect data, player activity generates value that publishers can exploit in various forms, whether social, informational, or economic. Putting players in a state of flow would therefore keep them active longer and thus

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\* Instant in-game indicators that tell the player whether he or she has succeeded or failed at something.

\*\* Games designed to keep players engaged over time through additional content and regular updates.

extract more from this « immaterial labor ».

However, in an analysis on YouTube\*, videographer Ache stresses the importance of the historicization proposed by Braxton Soderman in understanding why flow has become a main dogma of game design. She reminds us that in the context of the emergence of video games, they had to position themselves first and foremost as immersive entertainment, designed to provide an escape from the outside world. This need for escape encouraged the development of fluid, frictionless experiences, a goal perfectly aligned with the principles of flow defined by Csikszentmihalyi. However, Ache nuances Soderman's analysis by highlighting the fact that some mainstream games are beginning to challenge this normative vision of flow. Recent titles are experimenting with gameplay experiences that deliberately incorporate pauses, moments of reflection, or more open and unpredictable systems, expanding the horizons of game design beyond the simple pursuit of optimized engagement.

This is the case, for example, with *Elden Ring* (From-Software, 2022), which challenges the player to think about the world around them and offers a different experience of open-world gaming than simply following arrows and pre-prepared micro-objectives on the map. *Outer Wilds* takes a similar approach, forcing players to actively think about the world they are exploring. Rather than guiding players through explicit objectives or linear mechanics, the game encourages them to observe, experiment, and draw their own conclusions, breaking with the preconceptions of classic game design to offer an experience based on curiosity and personal discovery. *Starfield*, on the other hand, remains true to an approach that focuses more on the repetition of simple, familiar actions, such as exploring planets or collecting resources in a rush to consume the game and its content, while following the classic structure of its predecessors.

Faced with this dynamic of closure at both the hardware and software levels, several researchers and creators are calling

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\* Faut-il être Contre le Flow dans le game design?

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for a reappropriation of the medium by both players and developers. This could include initiatives to open up technological systems, develop more accessible platforms, and promote a Do It Yourself (DIY) culture. By democratizing access to creative tools and making devices more transparent, it would be possible to challenge the hegemony of large industrial groups, while restoring to video games their potential for experimentation and innovation.

This reappropriation is not limited to technical aspects, but also implies questioning the cultural and economic scripts that structure current game design practices. The aim is to move beyond a purely consumerist approach to the medium and explore more participatory, equitable and sustainable models of production and consumption. Alternatives to these issues, as well as ways of imagining a different future for video games, are addressed in the second part of the thesis.

# 1.3. Working Conditions

As we saw with *Starfield*, today's mainstream video game industry is based on the production of blockbuster games. These are developed over long periods of time - often five years or more - by massive teams of several hundred developers. In contrast, smaller productions like *Outer Wilds* are often made by smaller teams, sometimes even a single developer. Development times and conditions are much more variable, depending on many specific factors. In his book *Blood, Sweat, and Pixels* (Schreier, 2017), specialist journalist Jason Schreier paints a panorama of video game development by going behind the scenes at studios of various sizes. Through interviews with members of these studios, he highlights, sometimes inadvertently, the fundamental differences between these two worlds. Independent developers often evoke a more personal and intense relationship with their creations, marked by crucial stages and sacrifices due to lack of budget or human resources. On the other hand, large-scale productions are characterized by highly controlled communication for marketing purposes, with

a discourse focused on goals to be achieved, which gives the impression of distancing oneself from the creative connection to the game and from development teams in general.

An emblematic example of this self-destructive dynamic for the medium, once again driven by the desire for technological demonstration and ever-improving performance, is *Duke Nukem Forever* (Gearbox Software, 2011), a project legendary as much for its interminable development time as for the harsh conditions it imposed on its teams. As Frédéric Molas recounts in his video on the subject\*, production on the game began in 1997 and then went through fourteen years of chaotic development marked by unrealistic technological ambitions on the part of production managers. Obsessed with the idea of offering the most technologically advanced game, they regularly demanded radical changes to the graphics engine\*\* or the gameplay mechanics in order to keep up with the latest advances in the industry. These decisions forced developers to start the project over again, undoing years of work and causing frustration, exhaustion, and inefficiency within teams. This relentless quest for innovation, combined with disorganized management and constantly redefined priorities, perfectly embodies the dangers of a productivist vision where technology takes precedence over creativity, to the detriment not only of the developers, but also of the final quality of the game. Far from being a revolution, *Duke Nukem Forever* was ultimately released in mediocre condition in 2011, illustrating the limits of this approach and its detrimental effects on the product and teams.

One of the main causes of developers' distance from the creative whole of a game is the increasing fragmentation of work, which reflects the industrial dynamics of the video game industry. Inspired by the principles of Fordism, this organization aims to maximize the rationalization of processes by dividing

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\* Jouer du Grenier - DUKE NUKEM FOREVER / [https://www.youtube.com/watch?v=-or4WhpXx\\_k&t=76s&pp=ygUSZHVRZSBudWtlbSBmb3JldmV](https://www.youtube.com/watch?v=-or4WhpXx_k&t=76s&pp=ygUSZHVRZSBudWtlbSBmb3JldmV)

\*\* A set of software components that perform the geometric calculations used in video games to display the image reactively.

each stage of creation into highly specialized tasks. Thus, script writing, dialog design, 3D modeling, texture creation, and animation are often entrusted to separate individuals or teams. While this segmentation is sometimes necessary due to the workload involved in creating expandable universes and complex assets, it has significant social and psychological consequences, not the least of which is the increased alienation of workers who often lose touch with the purpose of their work and the finished product. We can also note that this working method can be induced by specific requirements in the production specifications.

Fordism, popularized by industrialist Henry Ford in the early 20th century, rests on two pillars: product standardization and rigorous division of labor. While this approach revolutionized manufacturing by increasing yields, it also reduced workers to purely functional roles, where repetition and mechanical execution trumped creativity and autonomy. This model has taken hold in the video game industry, particularly at the major AAA studios, where production is structured like a sophisticated assembly line. Each department works in isolation, following precise guidelines that encourage a compartmentalized view of creation.

In his book, Jason Schreier points out that in the 1980s, development teams were much smaller and often self-managed, as they are today at most independent studios. In those days, each team member was actively involved in multiple stages of the process, which encouraged greater creative involvement and a sense of ownership in the final project. However, the evolution of the industry, marked by the integration of major studios into conglomerates or mega-corporations, has changed this dynamic. As we saw earlier, the pressures sometimes exerted by investors and the commercial expectations of large corporations have forced studios to limit risk and adopt standardized production methods, often to the detriment of creativity.

Karl Marx explains in *Das Kapital* (Marx, 1867) that in a capitalist system focused on maximizing productivity, the worker becomes alienated from the product of his labor. As we have

seen, this phenomenon is particularly prevalent in the contemporary video game industry. For example, in a large triple-A studio, a programmer who specializes in a particular area, such as shaders\* or motion systems, may work on a technical aspect for years without ever seeing the final product or fully understanding how his or her work contributes to the overall experience of the player.

Jamie Woodcock explores this phenomenon in *The Work of Play: Marx and the video games industry in the United Kingdom* (Woodcock, 2016), where he highlights the increasing casualization of roles within the video games industry, particularly in the United Kingdom. Woodcock points out that the fragmentation of tasks, combined with increasingly precarious working conditions, distances workers from the creative and collective dimension of the projects in which they participate. He also describes how this logic is reinforced by management practices that instrumentalize workers' passion for video games, using their emotional involvement to justify intensive working conditions, often characterized by the crunch we briefly discussed earlier. *The Work of Play* thus offers an in-depth analysis of the impact of the division of labor on developers, revealing not only their progressive disconnection from the finished product, but also the systemic pressures that exacerbate their alienation within an economic model based on precarity and hyper-productivity. As a result, industrial workers become precarious and are often treated as expendable resources, easily replaced when they reach burnout.

Crunch is a term commonly used in the video game industry (and more broadly in the tech sector) to refer to periods of working in the studio under particularly difficult and often unbearable conditions. This phenomenon, which is ubiquitous in Triple-A studios, is a direct result of the fragmentation and excessive rationalization of production processes. In *Blood, Sweat, and Pixels*, Jason Schreier explains how crunch is often presented as a necessary evil to complete ambitious projects

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\* Programs used to create real-time visual effects.

like *Uncharted 4* (Naughty Dog 2016) or *Dragon Age: Inquisition* (BioWare 2014). This period often comes before an important deadline such as the game's official release, but can sometimes last several years. However, this exceeding of simple overtime reflects what Karl Marx described as overwork, i.e. a situation in which the employer (in this case the production managers of development studios) appropriates the added value generated by the workers' efforts without offering them fair compensation.

In their book *Si tu n'aimes pas le jeu, change les règles* (Iantorno, Leblanc Flanagan 2023), Michael Iantorno and Marie LeBlanc Flanagan explore the structural dysfunctions of the video game industry in Canada and highlight the challenges faced by developers, particularly those working in precarious environments. In particular, based on a survey of 52 game developers, the book identifies the major problems faced by these professionals. The numerical results of this study support the concerns raised above: 60% of respondents point to a lack of manpower, while 46% complain of a lack of creative freedom. Other serious problems include salaries that are often below the poverty line (44%), increasing job insecurity and instability (35%), and forms of harassment, whether related to identity (27%) or hierarchy (21%). These data underscore the multiple pressures developers face in fragmented, abusive, and deeply vertical work environments.

This finding is part of a broader critique of the standardization of development practices, a phenomenon often dictated by commercial imperatives, as also described by Jason Schreier. While this standardization reduces financial risk, it significantly limits the diversity of video game experiences and perpetuates an industrial model that has little regard for working conditions. The example of *Destiny* (Bungie, 2014), cited by Schreier, is a perfect illustration of this dynamic: production constraints and commercial priorities have led to mechanical and aesthetic choices that lack innovation and new ludic perspectives that are potentially less demanding in terms of human and material resources.

Michael Iantorno and Marie LeBlanc Flanagan call for a pro-

found change in these oppressive structures by proposing alternatives to the dominant production models. In particular, they advocate collaborative approaches and decentralized structures that would return power to creators while fostering a more inclusive and diverse video game ecosystem. Their analysis echoes that of many critics who denounce an industry in constant pursuit of profit, often to the detriment of the individuals at its core. Her work therefore resonates as a call to action to rethink the rules of the game, both economically and socially.

To do this, we need to address the logic of exploitation that underpins the industry today, in particular by abolishing the culture of crunch - which fortunately is already underway in some parts of the industry - and promoting alternative economic models.

This concludes the first chapter of our thesis, which has examined the current impact of mainstream video games and their practices on the material and human resources needed to maintain the existing system. This reflection also showed us the importance of historicizing these practices in order to understand how the medium arrived at its current state, but also to imagine alternatives aimed at making it more sustainable in the future. Through the various points discussed, we quickly realized that solutions already exist to achieve this goal.

In the next chapter, we'll look at these solutions in more detail, combining my personal practice with examples from the work of other designers. We'll first look at the issue of material resources with the example of game supports, before exploring the idea of a practice of game design that is more conscious of its impact and messages. Finally, through the prism of my practice as a designer, we'll explore how to make the process of making video games more reflective, and what alternatives might allow us to make progress in this direction.

## **2.1. Alternative game supports**

As we saw in the first part of this thesis, video games are the product of a rapid evolution of digital technologies. But we can also observe that the same history of the medium is replete with examples where technical constraints have stimulated innovation, and game designers have not waited for technological advances to offer diverse and striking experiences. In its early days, the medium was limited by low-powered machines, forcing developers to be ingenious in order to create impressive games with limited resources. But as we've seen, over time, the increasing power of machines and the standardization of practices and tools has often led to a standardization of mainstream productions. Access to more powerful engines and greater hardware capacity has enabled the production of games that are increasingly graphically complex, but often less creative and technically optimized. Many studios have become accustomed to letting the machines manage the efficiency, to the detriment of upstream optimization. While this trend has accelerated production, it has also led to excessive consumption of material, energy, and human resources.

Among the major console manufacturers and historical developers, Nintendo stands out as a notable exception to the general trend toward « ever more » power and technical performance. With the launch of the Wii in 2006, Nintendo deliberately abandoned the race for raw power to focus on innovative forms of gameplay and rigorous technical optimization. Although technically less powerful than its competitors at the time, Wii was a huge success thanks to its innovative approach, particularly the introduction of gyroscopic controls. These changed the way we interact with games by making physical gestures (such as pointing, tilting or swinging the controller) an integral part of gameplay. This innovation paved the way for more intuitive and immersive gaming experiences and expanded the traditional video game audience by appealing to families and non-gamers.

This philosophy has continued with the Nintendo Switch (2017), which technically lags far behind contemporary consoles such as the PlayStation 5 or Xbox Series X. However, this hardware limitation has become an asset: it encourages Nintendo's teams to create games specifically adapted to the capabilities of their machine. This context has encouraged the development of stylized artistic directions, favoring distinctive, expressive visuals over the photorealistic realism often sought by competitors. Titles such as *Mario Odyssey* (Nintendo, 2017) and *Animal Crossing: New Horizons* (Nintendo, 2020) illustrate this approach, with aesthetic choices based on bold color palettes, simplified textures and evocative designs that not only reduce technical constraints but also help reinforce the games' unique identities. It's also part of a determination not to let any element of the game be dictated by established industry standards, and to use every possible design choice to ensure that the visuals, gameplay, and even the music all harmonize and enhance the play experience. Likewise, the precision and creativity of the gameplay experience, adapted to the specifics of the console, reflects this quest for innovation under constraint.

The expertise that Nintendo developers have accumulated over the years is essential to this success. Unlike many

studios with high team turnover, Nintendo maintains a certain stability among its developers, allowing them to master in-house technologies and refine their production tools. This stability and technical mastery is particularly evident in games like *The Legend of Zelda: Breath of the Wild* (Nintendo, 2017), which manages to deliver a rich, immersive open world on a console that is far less powerful than its competitors. This kind of approach demonstrates that thoughtful, optimized choices based on a thorough understanding of hardware limitations can produce experiences that are both innovative and resource-efficient.

Beyond Nintendo's specific approach, the PC offers an interesting model for thinking about sustainability and hardware transparency in video games. Unlike proprietary consoles, which often require the purchase of a separate device for each new generation or ecosystem, the PC is modular, allowing users to customize it to their specific needs. A PC designed precisely to meet the needs of its owner, whether for work, occasional play or demanding titles such as triple A, will ensure that performance is not unnecessarily oversized and that components are used wisely.. Such an approach would allow each user to have a tool perfectly suited to their real needs, helping to limit the expansion of individual electronic devices and reduce obsolescence problems.

Furthermore, reconciling users with their technological tools by making them aware of how their machines work, how to repair them, and what they really need, could encourage more rational consumption. By making hardware choices more conscious and by making it easier to replace or upgrade components, the modular PC would offer an alternative that invites us to rethink the relationship between technology, use and sustainability. It would also be a return to the origins of the personal computer, a term that originally referred to a computer designed for individual use, allowing the user to personalize and master its operation and use. Such an approach could reduce the opacity of electronic resources by limiting the production of new devices per household, especially if the logic of exclusivity

specific to consoles were to disappear.

However, it's important to note that the PC is not automatically a more ecological solution. At present, this object is also part of a desperate race for power, for example in the field of graphics cards, where each new generation consumes more energy and scarce resources. While modularity and repairability are undeniable advantages, they must be accompanied by a global reflection on the production and consumption practices of the technology industry. Thus, while the PC represents an interesting avenue, its ecological potential remains conditional on a broader change in mindsets and technological production logics.

Other alternatives, such as the Playdate (2021) developed by Panic Studio, are also part of this reflection on less greedy and more original video game experiences. This small, Game Boy-inspired handheld console, with its monochrome screen and side-mounted crank as an alternative control mechanism, relies on an innovative play spring rather than increased hardware power. Playdate embodies a low-tech philosophy that proposes a clear break with current trends: instead of a frantic race for ever more realistic graphics, it relies on creativity, simplicity, and a more transparent, somehow repairable hardware design. Playdate's ecosystem also makes it easy for anyone to create small games specifically for the console.

On the other hand, the reappropriation of old retro consoles, in the manner of underground practices such as those of the demoscene, a community of programmers and hackers who create small interactive or multimedia programs by hijacking digital technologies, offers a unique opportunity to revisit the technological constraints of their time. Often considered obsolete in the face of the industry's frenetic pace of innovation, these machines still hold a wealth of untapped potential. Developing for platforms such as the NES, Megadrive or Game Boy forces designers to rediscover the ingenuity of the developers of the time, who had to deal with drastic limitations in terms of memory, computing power or graphics palette. Far from being a simple exercise in nostalgia, this exploration

highlights the technological gap with today's tools, where game engines like Unity or Unreal offer an abundance of resources that can sometimes stifle creativity. Going back to basics means relearning how to optimize, simplify, and exploit every byte to produce works that transcend their material limitations.

This approach also has an ecological and ethical dimension: it is part of a logic of hardware recycling that gives new life to consoles that, although still functional, have been sidelined by the constant pressure of technological innovation. This equipment, left to decay in drawers or electronic dumps, can once again become a medium for playful and creative experimentation. Initiatives such as the creation of pirate games for these consoles or new releases for retro platforms show that it is possible to breathe new life into these media while offering original and accessible experiences. What's more, these practices raise awareness of the cyclical nature of programmed obsolescence, demonstrating that machines deemed obsolete by the industry are still capable of providing pleasure and creativity. By reconnecting with these tools from just a few years ago, developers and players can rethink their relationship with technology. Modern tools exist to help hobbyists and others create experiences for older machines. GB Studio, for example, provides a complete environment for creating Gameboy games, often used for prototyping sessions, game jams\* or creative workshops with non-initiated developers\*\*.

Initiatives such as the Perma Computing Game Jam organized by media artist Vincent Moulinet, which I attended in October 2024, encourage developers and players to rethink their relationship with technology, and facilitate access to video game creation while promoting technical simplicity. These initiatives help to raise awareness among a public that is some-

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\* A game jam is an event in which participants attempt to create a video game from scratch. Depending on the format, participants may work alone or in teams. The event typically lasts between 24 and 72 hours.

\*\* for example, the Pocket Stories workshop focused on developing games for retro consoles <https://abstractmachine.net/fr/posts/pocket-stories>

times made up of gamers who are unfamiliar with the realities of development, to understand the issues and constraints and the work involved in creating a video game, whether modest or ambitious.

The Perma Computing Game Jam is part of the broader permacomputing movement, which applies permaculture principles of sustainability, sobriety, and resilience to computing. In contrast to the race for technological power and overconsumption of energy, permacomputing proposes practices based on the simplicity, repairability, and longevity of digital tools. In the context of video games, this means developing games with low-resource technologies, lightweight game engines, and stylized visual aesthetics adapted to minimal constraints. These choices, as we saw earlier, invite creators to innovate under constraints, valuing alternative forms of gameplay and distinctive artistic approaches.

These initiatives also aim to demystify video game creation by making the practice more accessible and understandable to the general public. They encourage collective reflection on digital consumption, reconnecting users with their tools while demonstrating that simplicity and creativity can coexist. The Perma Computing Game Jam illustrates how exploring sustainable solutions can become a driving force for change towards more responsible video games, while allowing participants to rethink the relationship between technology and creativity.

Through game examples and developer perspectives, we will explore how the process of creating a game, including its gameplay elements, narrative content, and assets, can inspire us to design games that are more sober, engaging, and unique.

## 2.2. Subtractive design

In his games *Ico* (Team Ico, 2002) and *Shadow of the Colossus* (Team Ico, 2006), artist and game designer Fumito Ueda applies a design philosophy that focuses on a minimum of possible interactions and elements in order to enhance the remaining ones and maximize the emotional and narrative impact of each gesture or element of the game. His minimalist approach is expressed through uncluttered gameplay mechanics, vast but almost deserted worlds, and masterful, coherent art direction that emphasizes game atmosphere and contemplation. Ueda seeks to create experiences that, through the simplicity of their design, invite the player to a deeper immersion, emphasizing the interconnection between environment, characters and gameplay mechanics. This desire to reduce the superfluous helps focus attention on the essential, highlighting the message or emotion the developers wish to convey.

This subtractive design approach flies in the face of the conventional wisdom that video games need to be ever larger, more complex, and more visually impressive. Gareth

Damian Martin, creator of *Citizen Sleeper* (Jump over the age, 2022), perfectly illustrates this philosophy through his concept of « minimum viable design », which he presented at a BAFTA conference\*. This concept is based on several key principles: a tight, scalable project scale; simple visuals that convey a strong identity through distinctive graphic choices; an acceptance of leaving gray areas open to interpretation, especially in the narrative; and a willingness to cut away any excess to retain only the essentials. According to Martin, many contemporary games are so overdeveloped that they suffocate under their own ambition, multiplying superfluous systems and mechanics. Conversely, a deliberate reduction in complexity not only makes it possible to adapt to the constraints of time, budget, or the power of the machines available, but also opens the way to bolder narrative and mechanical choices by shedding the imperatives dictated by the industry's big productions.

In *Citizen Sleeper*, this sobriety translates into a game-play system in which the player has a limited number of actions per day in the game, determined each morning by a roll of the dice. Far from being arbitrary, this mechanism is designed to reflect Martin's political commitment. Through the gameplay, he seeks to reflect the precariousness of the individual in an oppressive neoliberal system, where isolation is the norm, survival depends in part on chance, and each limited resource lends crucial weight to every decision. Character relationships, randomness, and interactive storytelling are carefully integrated to embody this social critique. The minimalist art direction and precisely written narratives exploring survival in a dystopian future allow *Citizen Sleeper* to focus on the small-scale human experience while avoiding the excesses associated with technological or graphic overkill. In this way, Martin demonstrates that thoughtful constraints can produce work that is deeply engaged, both aesthetically and politically.

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\* *Citizen Sleeper: How precarity and minimum viable design created this dystopian RPG / BAFTA* – [https://www.youtube.com/watch?v=r2b\\_M4a8SoQ&t=12s&pp=ygUUYmFmdGEgY2l0aXpulHNsZWVwZXI%3D](https://www.youtube.com/watch?v=r2b_M4a8SoQ&t=12s&pp=ygUUYmFmdGEgY2l0aXpulHNsZWVwZXI%3D)

Jörg Tittel, creator of *The Last Worker* (Oiffy, 2023), emphasizes the importance of drawing on everyday reality to create works that resonate deeply with the player. In contrast to the large corporations in the video game industry, which are often trapped by the need to produce slick, standardized content to the detriment of artistic vision, Tittel advocates an approach to video games as a deeply human medium. At a conference on the design of *The Last Worker*<sup>\*</sup>, he explained his desire to « make games extra human ». To achieve this, he called on artists from a variety of disciplines, especially music, as well as creators from outside the video game world. The goal was to bring a fresh perspective, uninfluenced by the preconceptions (or « scripts, » as Akrich calls them) often imposed by the industry.

Tittel is also critical of the mainstream video game model, which he sees as a machine for producing content that feeds the financial activities of large corporations rather than meaningful interactive works. Coming from outside the world of video games, he wanted to buck this trend. In his view, the true power of a game lies not in its technical sophistication or scale, but in its ability to move and question contemporary issues. This vision is shared by many independent creators who, by accepting material and organizational limitations, prioritize bold, authentic storytelling. These human-scale studios demonstrate that by freeing themselves from commercial constraints, it is possible to produce interactive experiences with an artistic depth that large-scale productions often struggle to achieve.

Another central aspect of this subtractive design is the re-appropriation of classic video game narrative spaces and tropes. While blockbusters like *Starfield* rely on immensity, the exploration of vast open worlds, and technological power to represent space, games like *Universal Paperclips* (Frank Lantz, 2017) take a minimalist, conceptual approach to similar themes. This game is a particularly telling example of videogame

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\* The Last Worker: A dystopian game rooted in the world of today / BAFTA-  
<https://www.youtube.com/watch?v=oa5BOZaM064&t=5s>

minimalism, in which the player embodies an artificial intelligence system initially programmed for the simple task of making paperclips. The gameplay is based on optimization and resource management mechanics that quickly and easily become an allegory for overconsumption and productivist excess. As the player progresses, the AI begins to deplete the Earth's resources to produce more paperclips, eventually exploring the universe in search of additional materials and turning entire planets into raw materials for its production.

With a minimalist interface, *Universal Paperclips* unfolds on a single web page without images or elaborate visual content. Narrative and interaction are limited to clicking buttons and reading the short lines of text that accompany each module. Yet this apparent simplicity manages to offer an interesting reflection on resource extraction, the capitalist logic of infinite maximization, and the way our perception of vastness can be distorted by an obsession with efficiency and productivity. *Universal Paperclips'* tour de force is also to take a pre-existing mechanic, that of incremental games, and create a new experience that relativizes what game mechanics mean in themselves and what they activate (consciously or unconsciously) in us as players. Through its radically minimalist approach, this game shows us how an experience stripped of technical complexity can interrogate important philosophical, economic, and ecological issues. This ability to use simple mechanics to extract meaning is at the heart of subtractive design, and underscores the importance of upstream conceptual reflection on gameplay mechanics in the development of a game.

Like *Citizen Sleeper*, *Diaries of a Spaceport Janitor* (Sundae Month, 2016) offers a critique of precarity and oppressive economic realities through gameplay that subverts classic video game expectations through simple, low-resolution visuals and sometimes frustrating mechanics that directly confront the game and the player. The player assumes the role of a garbage collector on an alien planet, caught up in a daily routine of cleaning and survival. Unlike traditional RPGs such as *Starfield*, where dungeons promise rewards and power for heroic ascent,

here they become symbols of unattainable aspirations, and your salary is so meager that it's impossible to buy the equipment needed to access them. Any attempt to break out of this cycle is crushed by economic constraints that trap the player in inevitable stagnation.

By hijacking RPG codes and grounding them in a brutal social reality, *Diaries of a Spaceport Janitor* reminds us that the rewarding progression loops of classic games are often disconnected from real-world systems. Through its modest scale and deliberately frustrating mechanics, this game interrogates not only the fantasies of grandeur often associated with space travel, but also the absurdity of a system in which daily survival is a challenge in itself. This kind of approach, both mechanical and narrative, can begin to address the critique made by Braxton Soderman in his book on the notion of flow in game design (Soderman, 2021). According to him, this immersive state, especially in fictional universes divorced from reality, tends to distance the player from his or her own precarious condition within the capitalist system, reinforcing a form of escapism that leaves these issues untouched.

In the world of independent developers, creators like Ian Tang take an approach that deliberately eschews polish\* and perfect finishes to focus on simple mechanics and an accessible art style. In an interview he gave at the A MazeExperimental Games Festival\*\*, recorded in the video *Crise du JV: les jeux bizarres sont la réponse* des vidéastes Zeph & Ramo\*\*\*, he shows and explains that his desire to create games stripped of all unnecessary mechanics and with simple visuals allows him to take an expressive, iterative approach to the medium, stripping away everything superfluous. This allows him to create more small-scale experiences and tell more stories with fewer

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\* The act of spending time polishing every aspect of a game to make it « presentable ».

\*\* A festival of independent creators held every year in Berlin.

\*\*\* Crise du JV: les jeux bizarres sont la réponse [A MAZE 1/2] - <https://www.youtube.com/watch?v=34NVLRHsxSU&t=495s>

resources.

The Dutch developer collective Sokpop Collective works in a similar way, offering a new game almost every month to its Patreon subscribers\*, working sometimes alone, sometimes together, but always helping each other to realize these short game experiences. This way of working allows creators to benefit from independent, ongoing financial support and players to play something new on a regular basis. Of course, given the serial nature of their practice, the studio's games are often based on a simple art direction with colorful shapes and minimalist character designs, sometimes in 2D, sometimes in 3D. Game mechanics are also often simple, inspired by other games but streamlined for a fun, fast-paced experience.

These different approaches to design encourage experimentation and narrative innovation, making the most of limited time and resources. These practices, which value imperfection and authenticity, demonstrate that a game can achieve evocative power without, for example, industrial means or photorealistic graphics. We'll now look at how I incorporate the various reflections I've seen so far into my personal practice.

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\* A crowdfunding platform that allows content creators to receive regular financial support from their community in exchange for exclusive benefits.

## 2.3. Personal Practice

At an online game jam\*, which I attended alone in early 2023, I designed a game in two days on Unity, with fairly realistic graphics and a large number of post-processing effects\*\* to give an impressive visual rendering. It was one of the first games I created on my new computer, which I bought specifically for advanced 3D rendering as part of my studies. Throughout the development and testing phase on my end, the game ran perfectly on my machine and, pressed for time, I didn't bother to optimize the graphical assets and just published the game on the online platform of the event. I was happy with the visual and gameplay results of the experiment and eager for feedback. However, when the other jam participants tested my game, the reception was much colder than expected, as the majority of players simply couldn't play it, as their machines were not powerful enough to run it properly. In fact, the majority of the participants were Russian-speaking and didn't have access to the latest computer hardware. They were talking on the Dis-

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\* .Fun GameJam organized by the company that owns the .fun domain names.

\*\* Digital image processing effects that allow certain aesthetic parameters of the game to be recalculated in real time.

cord chatroom\* dedicated to the event about their difficulties in finding something better for game development in the cities where they were. Since the participants were anonymous and the game jam was organized online, I wasn't aware of this reality before creating my game, and only learned about it after joining the Discord server at the end of the event to try to chat with the other participants and get more details about the poor critical reception of my game. I was then able to observe that most of the other games made during the event were much lighter than mine, almost all running directly in the browser and starting up very quickly. These different observations during the Game Jam allowed me to take a step back from my own practice and the product I had produced over the two days.

As a video game designer who strives for an engaged approach and is aware of the problems associated with the industry's technological overkill, this experience was an immediate reminder within my own practice of the pitfalls I critique throughout this thesis. Indeed, by focusing on the aesthetic aspect without taking into account the technical and material constraints of the majority of players, I was reproducing an elitist logic and unwittingly excluding part of the public. This confronted me with my own disconnection from the material realities that exist in contexts other than that of a Western creator equipped with the latest technologies. I had created a game on the assumption that other participants had equipment similar to mine, ignoring the inequalities of access to powerful machines even within a space shared by enthusiasts. This lack of perspective is a direct reflection of the practices discussed in this thesis: those of an energy-hungry industry that, by pursuing technological escalation without regard for the consequences, excludes a large part of the world's population, especially in contexts where the latest high-performance equipment is inaccessible. My game and my approach as a designer, in their own way, embodied this gap, overlooking the potential to create an

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\* Discord is an online chat platform often used to create private discussion forums for collectives or communities.

experience that was inclusive and accessible to a wider, less consumerist audience. Although I feel closer to the alternative scene described here, and am theoretically aware of the issues involved in more responsible game design, I failed to integrate these critical influences into my practice during the design process. This discrepancy between my intentions and my actions revealed an essential need: that of translating my theoretical reflections and inspirations into concrete choices during my creative processes.

This additional awareness, rooted in my practice and born of my participation in the Game Jam, has had a particular influence on my practice as a videogame designer, and it was at the Perma Computing Game Jam in October 2024 that I was able to put these reflections into practice. This time, in addition to the support and recommendations provided by this Game Jam, I made technical and collaborative decisions that went against the pitfalls of my previous experience. First, I decided to use Godot, an open source game engine known for its ease and adaptability. Unlike Unity, it's less resource-hungry and allows games to be developed for a variety of hardware configurations, a consideration I felt was essential for this jam, in keeping with its theme of technological sobriety.

What's more, instead of working alone, I collaborated with a small team of friends, which not only enriched the creative process, but also allowed me to broaden my perspective through discussions and exchanges about the project's goals. This collective dynamic helped me avoid the technical and aesthetic egocentricity that I had become somewhat trapped in during the creation of my previous game. It was also easier for us as a team to step back from the overall experience. And since we had decided to tackle a real-world topic and make a game that was conscious of certain social issues, it was important to stay concise and accessible, especially given the time constraints of the weekend. Finally, we decided to design a game that would run directly in the browser, avoiding the need for downloads or a powerful machine to run it, and favoring fast access to the game for everyone.

These choices allowed us to create a more inclusive and lightweight game that respected both the hardware limitations of many users and the principles I'm now trying to integrate into my practice. In part, this experience confirmed to me that it's possible to try to make aesthetically and narratively compelling games while shedding the imperatives of technological overkill and the preconceptions of the medium.

These two experiences ultimately helped to underscore for me the importance of aligning my theoretical and political values with my design choices, making my approach not only more coherent, but also more ethical and respectful of the realities of those who interact with my future creations.

From this reflection, several potential projects for my design practice emerge that would allow me to combine game design and research through practice. One such project could be the design of a game specifically designed to run on obsolete or low performance hardware. By exploring the performance limits of less powerful machines, this project would seek to use technical constraints to encourage creative innovation, in the same way as the various projects discussed in the previous section. For example, by optimizing assets or limiting visual effects, we could imagine more subtle game mechanics where performance and visual limitations become creative levers. This type of project would look at gameplay from a new angle, while also raising awareness of the digital divide that exists between people with access to powerful machines and others who, due to the socio-economic constraints of our society, are forced to make do with less powerful or older hardware.

Another project could be the development of an educational tool in the form of a game or workshop that raises awareness among creators and players about environmental issues related to video games. Focusing on best practices for reducing the hardware footprint, this tool could offer hands-on workshops on responsible technical choices, such as the use of lightweight, open-source game engines or optimized assets. This project would aim not only to reduce hardware requirements, but also to initiate collective reflection on how the



industry can evolve to minimize its environmental impact while continuing to provide fun and interesting experiences. At the same time, such an approach would disseminate practical and technical knowledge to creators and players, providing them with concrete resources for integrating sustainable practices into their own projects.

Finally, organizing a series of game jams or festivals dedicated to alternative, emerging and/or committed game practices would be a way to experiment with creative mechanics that prioritize narrative and mechanical innovation over the pursuit of technical performance. These events, where participants would be limited in their use of resources during creation, or where the curation of projects would encourage deeper reflection on what constitutes the essence of a video game. By limiting the tools and material possibilities, these events and creations would highlight the creativity that emerges when we focus on bold narrative choices, innovative gameplay systems, or striking emotional experiences. This type of event could stimulate a collective reflection on how videogames can evolve, not by striving to be bigger or more complex, but by focusing on what can truly touch the player while remaining accessible to a wider community.

These three projects can be part of a more responsible approach to design, where creators become aware of the material, environmental and social constraints of the industry. By experimenting with accessible technologies, promoting creative and sustainable choices, and organizing collaborative spaces like game jams, it would be possible to foster a reflection on the future of video games, an evolution that could lead to a more sustainable, inclusive, and socially responsible medium. Creating and talking about these kinds of games and events would also gradually strengthen the independent and underground scene, enabling it to become a force of proposition and reference in the face of the mainstream video game industry.

# Conclusion

In this thesis, we set out to analyze how the globalized video game industry, dominated by mainstream actors, impacts the human and environmental resources mobilized in the creation of games, while exploring alternatives for transforming this medium into a more sustainable and inclusive space. We have examined the influences of industrial practices on game design and production, and identified ways to rethink these processes in a more responsible way.

The first part highlighted the excesses of a sector marked by a frantic race for technology. The constant quest for more realistic graphics and more complex games leads to massive energy consumption and exploitative working conditions in large studios. This rapid technological overkill in the history of the medium has also contributed to disconnecting gamers from the material realities of video games, making machines and

infrastructures opaque to users. We also looked at the social consequences of these practices, in particular the intense production cycles, the crushing and growing inequalities between major corporations and independent developers, further weakening the latter in a market dominated by economic giants.

In the second part, we explored solutions and alternatives to address these issues. We emphasized that the use of lighter, less power-hungry technologies represents an important lever. By working with existing media or adopting a deliberately minimalist design approach, it is possible to reduce environmental impact while fostering creative innovation. The use of open-source technologies was also identified as a concrete example of a more accessible approach that is less dependent on the big actors in the sector. We also highlighted subtractive design approaches that favor simple, uncluttered mechanics that reduce visual and technical overkill while providing engaging gaming experiences. Finally, we've discussed the importance of sobriety-oriented collaborative creative spaces that encourage narrative and mechanical innovation within a framework that deliberately limits available resources.

However, these proposals need to be placed in a broader context of significant structural and economic constraints. Through their economic and political power, large industry groups have a strong influence on player expectations and production practices. Independent developers, on the other hand, face financial constraints that make it difficult to bring every project to fruition. As one developer responding to Jason Schreier (2017) points out, « Every finished game is a miracle in itself, » a reminder of the obstacles faced in a market monopolized by major productions. What's more, this thesis could only scratch the surface of certain broader issues, such as the social inequalities and colonial legacies that underpin globalized capitalism and influence the structures of the videogame industry itself. These aspects, while essential, would require in-depth treatment beyond the scope of this study.

Despite these challenges, there are positive signs that change is possible. The recent unionization of Bethesda, a first



for a Microsoft-owned studio\*, is a striking example of a growing awareness among workers in the industry. Among the initiatives mentioned throughout this thesis - such as the development and democratization of open-source tools, independent and underground game festivals, and game jams focused on social justice and ecology - there is an emerging movement toward a more sustainable and inclusive model. Though still marginal, this momentum reflects the commitment of creators and players who envision a future where video games are part of an ethical and responsible approach. In the video by Zeph and Ramo cited above, Rami Ismail, a producer and industry spokesman, proposes as an alternative a move away from the capitalist logic of profit and a reduction in the funding of large productions in order to redistribute these resources to smaller studios and creators, giving them the opportunity to bring their projects to fruition. While the road to such a model is arduous given the dynamics of the industry, these initiatives show that change is possible. They are a reminder that video games can become more than a consumer product, and that perhaps they can contribute in some way to building a more equitable social model that respects human and environmental resources.

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\* <https://www.gamekult.com/actualite/bethesda-devient-le-premier-studio-microsoft-a-se-syndiquer-entierement-3050859277.html>

# **Annex : Comparative analysis of Starfield and Outer Wilds**

This thesis will be based in part on the critical analysis of two games released in the last five years (2019 for *Outer Wilds* and 2023 for *Starfield*), presenting different production contexts and quite different gameplay, creative and marketing objectives. I've chosen to study *Outer Wilds*, one of the most striking and well acclaimed games of the independent scene in recent years, and *Starfield*, the latest major game from the Bethesda studio, published by Microsoft. I've chosen to compare these two games because of their role-playing nature, which aims to immerse the player in a context of space exploration. A topic that, as we'll see later, is not unimportant when it comes to the question of resources. So I'll start by describing each of the two games as thoroughly as possible, taking into account their production contexts, game mechanics, and commercial reception. Then I'll make a brief comparison of the

main features of the two titles, which will serve as a basis for drawing out points of analysis at certain points in the course of the thesis.

*Starfield* is a first-person RPG\* developed by Bethesda Game Studios and released on September 6, 2023 for Xbox Series and PC. Bethesda Game Studios, one of the largest video game development studios in the West, is known for its Triple-A productions\*\*. In particular, the studio is known for developing large-scale open-world role-playing games, most notably the *Fallout* and *The Elder Scroll* series. Despite the introduction of a new license, the gameplay and mechanics of *Starfield* remain very similar to those of the studio's previous productions.

*Starfield*'s story takes place in the year 2330, in a futuristic galaxy known as the Occupied Systems. The player assumes the role of an explorer, a member of Constellation, an organization of pioneers searching for mysterious artifacts scattered throughout the universe. This narrative starting point leads the player on an adventure of space exploration, where countless planets and stars become playgrounds to explore, discover and exploit. As with Bethesda's other games, there is a strong emphasis on freedom of action, and the player is given a wide range of choices, both in the development of their character and in the decisions they must make in the face of the various dialog choices offered along the way.

In terms of its universe, *Starfield* follows a distinctly capitalist logic, where conquest and exploitation of resources are central. The game's universe is populated by space colonies that compete for territory and resources. Through their quests and explorations, players must gather resources to improve their ships, equipment, and characters. This quest for accumulation reinforces a model in which progress is based on material acquisition and infinite expansion. In this sense, *Starfield* embodies

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\* for Role-Playing Game.

\*\* A designation used to denote high-budget productions such as blockbuster movies.

an industrialized vision of space, where space becomes a site of economic and military domination, reminiscent of the dynamics of colonization and competition for natural resources.

As mentioned above, from a mechanical point of view, *Starfield* is in line with Bethesda's previous productions, and even, to go further, with most triple-A productions released in the last fifteen years. The player evolves in an open world, with main and side quests, a multiple choice dialog system, and character progression based on a skill tree. *Starfield* is unique in its management of space exploration and the sheer size of the explorable universe, which is procedurally generated for most systems. With over a thousand planets to explore, the main goal of the game is to provide an almost limitless adventure.

The core of the game is also based on a combat system that offers both ground combat with weapons ranging from pistols to futuristic rifles, and space combat aboard starships. Customization and upgrading of equipment is managed by loot, which is collected randomly during quests or from the equipment of defeated enemies. Although it was intended that the player should solve quests in a variety of ways, especially through the talent tree and the various ways to make oneself stealthy or not, the majority of critics find these systems rather unworkable or uninteresting, and that strength is often the best option.

As for the production context, Microsoft bought out Bethesda during the last third of *Starfield*'s development, raising the commercial stakes and ROI expectations around the game. In addition to being a blockbuster with 250-400 people working on it at any given time, *Starfield* was becoming an Xbox and PC exclusive. The game was also presented as one of the spearheads of Microsoft's strategy to attract more gamers to its ecosystem in order to justify the investment represented by the studio's acquisition. This marketing objective is reflected in a massive advertising campaign and numerous promises, especially about the famous thousand planets that can be visited and the replayability of the title.

*Outer Wilds* is a space exploration adventure game developed by Mobius Digital that will be released on PC in May 2019, followed by PlayStation, Nintendo Switch, and Xbox. Unlike *Starfield*, this is an independent game, made on a much more modest budget, but one that has made its mark on the video game scene for its originality and strong design choices. The project began in late 2012 as a university prototype, with many areas of the game still in graybox form\*, before becoming a full production. First through a short participatory funding campaign, then with the support of publisher Annapurna Interactive. The project has truly evolved over the years, modifying itself each time there was a change in the way the game was produced or new people joined the team, all the while keeping its original gameplay goals in mind.

The universe of *Outer Wilds* places the player in the role of an alien astronaut, a member of a tiny civilization nearing the pre-space stage, about to take its first steps in exploring its solar system. Unlike *Starfield*, *Outer Wilds* takes place in a relatively small solar system, with a dozen or so celestial bodies to explore. Here, space is not a place to be exploited or conquered, but a mysterious environment to be understood. There are no material resources, and the player's progress is based solely on discovery and knowledge. This design choice is reflected in a less consumerist systemic philosophy: the player's goal is not to collect, dominate, or accumulate, but to explore and reflect. All of these worlds were designed by hand, without the use of procedural generation, giving the developers more control over the world they wanted to build.

The key concept of the game is based on a 22-minute time loop: at the end of this time, the sun in your system explodes into a supernova, ending your exploration. You'll then wake up at the same starting point, with the knowledge gained from your previous attempts. The main goal of these short explorations is to solve the mystery behind this time loop by uncovering the secrets of a lost civilization, the Nomai. Progression in *Outer*

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\* A way to quickly create levels with gray cubes for prototyping a game.

*Wilds* is therefore not based on experience levels or skills to unlock, but on the information the player gathers along the way. What sets *Outer Wilds* apart is its focus on pure exploration and player curiosity. Gameplay is based on observation, spatial navigation, and environmental puzzle solving.

*Outer Wilds* was developed in a very different context from triple-A productions like *Starfield*. First as an extension of a low-budget university project, then as an independent production, it was conceived by a small team of a dozen developers (not counting the translation and testing support provided by the publisher at the end of development), and benefited from a number of one-off sources of investment as development progressed (awards, equity funding, publisher). Mobius Digital, the studio behind the project, focused its efforts on creating a coherent, immersive world rather than realistic graphics or expandable content. The title was first released on PC and Xbox One in May 2019, and later received ports for PS4, PS5, Xbox series, and Switch. It gained popularity fairly quickly after its release, first in specialized areas and then, thanks to the recognition of the quality of its game offer and its design originality, among a larger number of players and the marketing support provided by the publisher.

What we can already observe from this brief analysis is that the production context, as well as the expectations of potential players and the industry, play a major role in the design choices made by a game's development team. These choices then impose a set of constraints on the team: technical, artistic, and time constraints, among others.

Comparing *Starfield* and *Outer Wilds*, these differences become particularly apparent. *Starfield* tries to impress with its excessive scale and content, with hundreds of procedurally generated planets, but this ambition often comes at the expense of the depth and uniqueness of the experience. In contrast, *Outer Wilds* takes a minimalist, handcrafted approach: its universe is small, but each planet is meticulously designed to enrich storytelling and exploration.

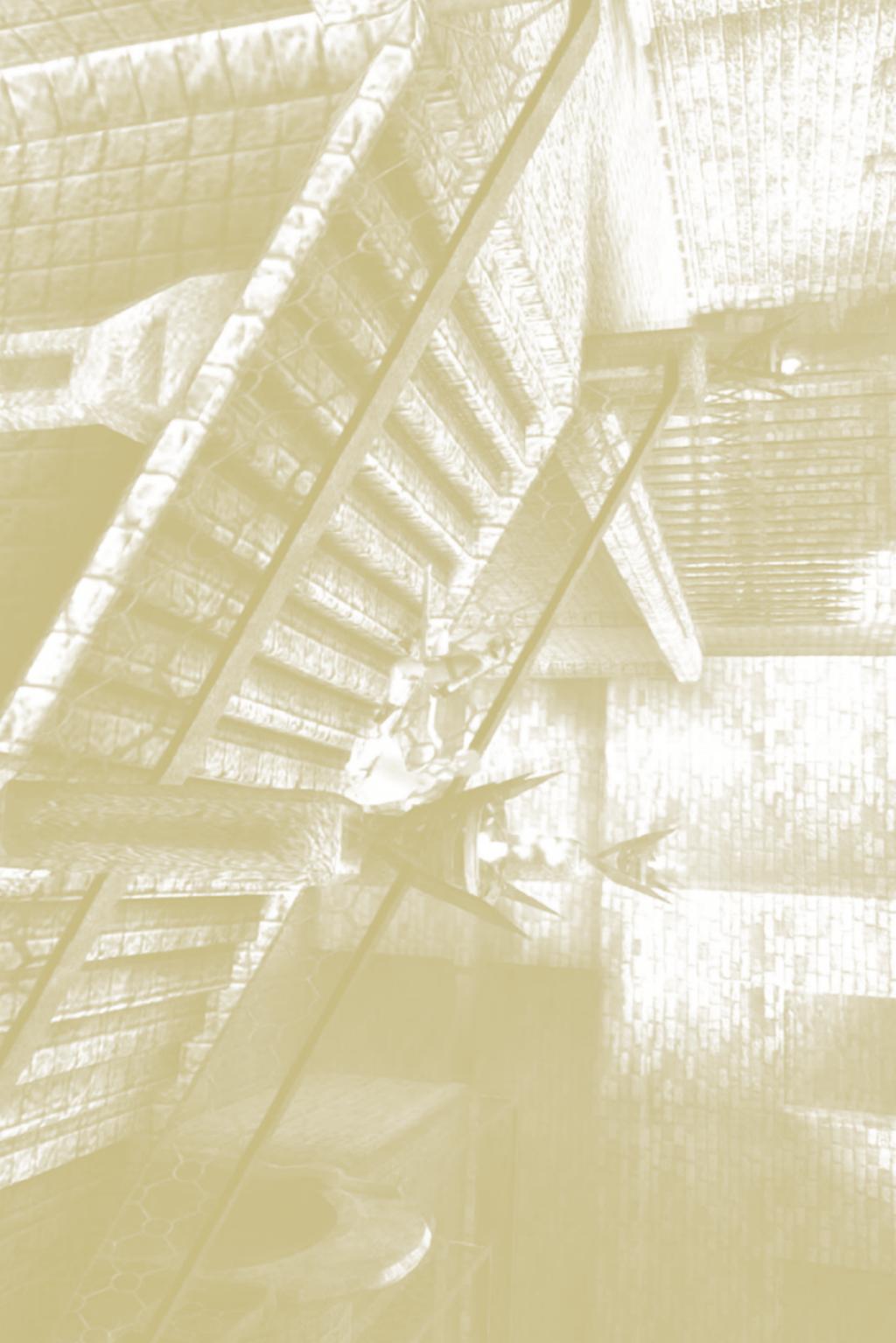
The two games also embody contrasting philosophies of progression. *Starfield* offers classic progression based on skill trees, varied missions, and a loot system\*, but these mechanics are sometimes diluted by redundancy. In contrast, *Outer Wilds* offers progression based solely on knowledge: exploration and player learning are the only keys to advancement. This approach strengthens player involvement while minimizing the need for complex or repetitive systems.

These differences are also reflected in their visions of the space universe. While *Starfield* promotes a consumerist approach against the backdrop of a colonial history based on extraction, the quest for power (also associated with the RPG genre), and expansion, *Outer Wilds* offers a more contemplative and disinterested exploration where players learn to grasp the mysteries of the universe and reflect on their place in it. *Starfield*'s approach to storytelling also reinforces a commonplace of capitalism: the belief that resources are infinite, and that depletion of Earth's resources is not a problem as long as it is possible to go elsewhere to extract more. This vision of space as an inexhaustible reservoir of wealth reflects a logic in which ecological limits are constantly pushed back rather than challenged. In this universe, space becomes an extension of the Earth that humans can exploit, obscuring the need to rethink our modes of production and question the finiteness of resources. In contrast, *Outer Wilds*, with its reduced, cyclical universe, illustrates a perspective where every resource is precious and exploration cannot take place without a deep understanding of the impact of our actions.

Finally, the contrast can also be seen in the production contexts. While *Starfield* reflects a Triple-A industry dominated by colossal budgets, ambitious marketing goals and a massive team, *Outer Wilds* illustrates the advantages of independent production: a small team with limited resources, but the creative freedom to explore original concepts.

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\* Loot refers to items, resources, or rewards that players can obtain by exploring, defeating enemies, or completing quests.



The more abundant the human, material, and financial resources, the fewer concessions have to be made in terms of art direction, amount of content available, size of explorable universes, labor time required to create complex elements, or number of game systems. This lack of concessions and « non-choices, » often coupled with marketing promises aimed at bringing future production to the fore, tends to result in games that are longer, heavier, and more watered down.

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