

Why are Immersive Sims so Immersive?

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ABSTRACT

Immersive Simulations are games built on maximizing immersion for players through non-linearity, emergence, and player freedom. This work delves deeper into two games that belong to the genre of Immersive Sims, *Thief: The Dark Project* [1] and *Dishonored* [2], to look for tools and mechanisms that lead to high levels of immersion.

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I INTRODUCTION

Immersive Simulations reveal their core essence through the name we have given them; they are intensely immersive experiences that use every tool at their disposal to sell players a fictional world, while offering deep systems that create emergent gameplay and constitute a simulation. In *Thief: The Dark Project* [1] (shortened to *Thief* in this work), players experience the fantasy of being an expert thief. This includes what one would expect: spending drawn out periods of time waiting for a patrol to pass and remaining hyper-vigilant to sounds made by both player or Non-Player-Characters (NPCs). As well as trying to navigate a level that the player does not have any knowledge of. These are elements a real thief would have to deal with, and the game uses such elements to strengthen the fantasy. It also offers many tools for the player to experiment with and craft their own story in highly nonlinear levels. The plot is immutable but the stories told through the game are malleable and plentiful. The deep nature of its system offers freedom in the play experience. Equally so, in *Dishonored* [2] players experience what being a supernatural assassin feels like. Every aspect of the game reinforces this notion and works towards creating such a fantasy, giving flavour to both the world and the act of assassination, of deciding whether to take someone's life. And again players are given many tools to deal with highly nonlinear levels the way they want to. *System Shock* [3] sold the simulation of being aboard a ship controlled by a complex AI. The same can be said for many immersive sims.

In essence, Immersive Sims are a balancing act between two forces. The first force is that of the simulation, of the rules that it must follow. A *Thief* would be limited by their speed, by their strength. Fighting would be tough and moving around a noisy endeavour. These are not inherently limits of the game, but limits of the subject of the game. The second force is that of player freedom, emergence and non linearity, of letting players play the way they want to play. Often, these are complex systems that interact with each other to create a large possibility space for play. Immersive sims thus give players a lot of freedom within a set of rules. If the rules are too strict or the tools too few, the game experience becomes tedious or too constrained.

In recent years, there has been a rise in systemic games [4] (games relying on many interwoven systems). Unsurprisingly, Immersive sims are highly systemic games and it is no surprise that the rise of systemic games has correlated with an increase in immersion. For example, blockbuster games like *Red Dead Redemption 2* [5] or *Legend of Zelda* [6] are both highly systemic and highly immersive. One does not need to go far to find instances of emergence in *Red Dead Redemption 2*. This recent rise of highly systemic games lauded for their immersion and attention to detail has prompted Raph Colantonio [7] to declare that Immersive Sims are dead. Not because they are unpopular, but because their core pillars of emergence, player choice and deep systems has spread to many genres.

History and the Immersive Sim Genre

Let's dive into some history books to look at the origin of Immersive sims and why perhaps Colantonio's thoughts are warranted. Immersive sims started out as a spin off from retro FPSs (e.g *Doom* [8]) and RPGs (e.g *Ultima* [9] and the widespread popularity of *Dungeons and Dragons* [10]). Mixing a bit of both genres, they were trying to create deeper simulations, deeper games. They were not, however, called immersive sims on their release. The genre was solidified later on [11], grouping games such as *System Shock*, *Thief* and *Deus Ex* [12] together. The Immersive sim genre is a nebulous one, and there is a lot of debate on which games are part of the genre or not. I believe this doesn't matter as genres are often a question of taste and gatekeeping inevitably devolves into semantics. Whether a game belongs to a genre is, all things considered, unimportant and up to interpretation. Games are deeply subjective. What

matters is the overarching ideals of the genre and its foundational principles. We can then classify games as immersive sims based off their loose similarity to the principles. Often those ideals are set about by earlier games and then followed upon by subsequent games. In this instance, games like *System Shock* and *Thief* wanted to create a deeper game experience, and found themselves sharing a lot of elements: systemic gameplay, emergence, player choice, desire to transmit the narrative through every possible element available etc... And thus, a new genre was born and games followed in their wake. Slowly, other genres began grabbing certain elements, namely combinatorial systems and emergence, into their own games. Pillars of the immersive sims have been shared so widely that the question of whether a game is an immersive sim is almost a constant talking point when new RPGs are released. For example the debate about whether *Starfield* [13] is an Immersive Sim, and also theories [14] on Meta Immersive Sims, the successor of Immersive Sims. I believe that what defines an Immersive Sim is whether it feels like an immersive sim. I understand such a definition is unsatisfactory, and yet it is the best heuristic I have found to classify them in an art form that is deeply subjective.

Nevertheless, we can look at games that broadly adopt these ideals and are widely accepted to be Immersive Sims and study the elements used to make these games so immersive. There is a lot to learn from Immersive Sims and their high degree of immersion. These elements could theoretically be implemented into other genres, and this has already happened as we have mentioned and will continuously mention throughout this work. What better way to study the immersion of games than with a genre that was created in its name? We will look at *Thief* and *Dishonored*; the former a foundational game of the genre and the latter game having been accepted into the Pantheon of Immersive Sims without much fanfare.

II THIEF: THE DARK PROJECT

Thief: The Dark Project is a foundational game for Immersive Sims, and its development studio Looking Glass is regarded as a legendary entity that has contributed massively to several tropes in modern games. In *Thief* you embody Garrett, a member of a secret thieving guild, from a first-person viewpoint. Throughout the game you are tasked with infiltrating various areas to steal objects. To do so you are given tools - a bow and various arrow types as well as a lethal and non-lethal melee weapons. *Thief* unfolds slowly and is punctuated by many tense moments as you patiently wait in darkness while guards patrol by you, ignorant of your presence, until you can move towards your objective.

It is also a game of enveloping atmosphere, the soundscape playing an active role in your understanding of not only your environment, but also your current situation. Players should always be aware of the sounds they make, but also of the sounds they hear. In *Thief*, you are attuned with Garrett's senses. What Garrett hears or sees, you also hear and see. This is also true of NPCs in the game, who hear what Garrett hears, and so sound does not only play an aesthetic role but becomes a mechanic. Mechanics are often defined as actions a player can do, and usually sound would be categorized as a system, but we will frame *Thief's* use of sound as a mechanic. *Thief's* sound design remains somewhat one-of-a-kind. So much so that critics highlight *Thief's* use of sound when they write retrospective articles [15]. As far as reducing barriers between a game and its player, *Thief's* players and its NPCs hear sounds the same way. In this chapter we will discuss *Thief's* use of sound and frame it through a broader class of mechanics - diegetic mechanics.

But *Thief* has other ways to reduce barriers. The minimal UI and the maps players use to navigate the game reduce the presence of out-of-world elements. There are no objective markers on the map or in the game - players are left to contemplate the world and its contents to figure out where they must go. In some way, maps are also a sort of diegetic mechanics and we will explain our reasoning later in the section. However, we begin this chapter with a discussion of *Thief's* sound design and how it brings players closer to the game.

Sound Design and Diegesis

Diegetic Mechanics

We can follow [16] in expressing what Diegetic mechanics are.

Diegetic is a term that is used more often in film when the audience and the characters experience an element of the film the same way. A good example is when a film's music originates from world elements rather than added onto the movie later on. Similarly in games we often describe UI as diegetic or non-diegetic. Games like *Dead Space* [17] have almost entirely diegetic UI - health is an in-world gauge on the back of the player character, guns have ammo counters next to the trigger, among other things. These elements often ground the player in the world, increasing immersion and presence (both go hand-in-hand and are often a side of the same coin).

A *Mechanic* is described by its name - it is one of the actions players can do and are often represented by verbs (i.e A player can shoot - that is a shooting mechanic).

And so diegetic mechanics are actions that are experienced the same way by our players and our game characters, and more specifically between our players and their playable character - though in *Thief's* case it is critical that all characters experience sound the same way. Then, if we focus on the act of seeing

and hearing in a first person game where the main character is able to hear, both these are diegetic. We hear what they hear, we see what they see. This is perhaps a reason why so many immersive sims are first person, seeing is natural and there is no abstraction required to imagine yourself in the character's world.

Let them all hear

In *Thief* this idea of diegetic hearing is taken to another level - all NPCs hear sounds you hear, and can build an understanding of them and what creates them. We only need to read [18] and see that the NPCs of *Thief* uses complex sensory detection and processes all sounds created by the player or by other characters. Players must then become more aware of their surroundings and the sounds they create. And in *Thief*, player footsteps are more or less noisy depending on the floor material (i.e metal is extremely loud and carpet is silent). So often in games it feels like sounds are heard differently by us and by characters in the world. While it may be unimportant in games where there is no sneaking or stealth, many games with such elements fail to get this crucial aspect right. Perhaps modern stealthing games aim for higher player engagement, and listening carefully to the sounds around them slows gameplay down. Regardless, NPCs hearing and reacting to sound appropriately increases presence and immersion, precisely because if we were them we would react to this auditory stimuli. And this connects with another aspect of the *Thief* - if NPCs react to sound the same way we do, they need to be quite complex. Thankfully designers only have to fake certain aspects of human hearing which is enough to create a real feeling of presence. Any Immersive Sims enthusiast will quote good and believable AI in a list of important features of the genre. That does not mean engineering AI using complex models, but creating AI that reacts to small things. We dive deeper into the AI of *Thief* later on.

Thief uses sound in other ways too, namely in communicating to the player their relationship to the world. Not only in the sound of their footsteps describing the material they are walking on, but NPCs will react by saying certain phrases of alarm if they hear the player. Hearing is a requirement to play, playing without it would amount to playing without a gun in an FPS. There is no FPS without shooting. There is no thieving and sneaking without sound. In that light categorizing *Thief*'s sound design as a diegetic mechanic is warranted.

Diegetic elements are crucial to Immersive Sims and immersion as a whole and I believe developers should augment their mechanics using those elements as they require less abstraction work from the player. Every time a player needs to look through a menu, some immersion is lost. Every time a player looks at User Interface that is not in world, some immersion is also lost. Reducing these obstacles will inevitably lead to more immersion. This is not to say to forego UI, but instead to implement it creatively throughout the game, while keeping an eye for accessibility. No one should be left out in the name of immersion.

Minimal UI and Realistic Maps

As discussed previously, Diegetism is a term that is often employed with respect to UI. And while *Thief* is built on this idea that players perform basic mechanics such as seeing and hearing the same way characters in the world do, the user interface is no exception to this. Nothing illustrates this point more than the maps of *Thief*. They are another element that feel like they belong in the world. In fact, they are some of the strongest maps that have ever been made for video games. They are simple and they are imperfect. And the game is much more immersive as a result of that imperfection. This is a stark contrast to most maps in modern games, they come in all shapes or form, but usually they require heavy usage of UI. *Thief* barely uses any UI, maps are simply maps. They are imperfect drawings of the

level in stark contrast to the full knowledge maps of most games. The lack of perfect knowledge is an incredible source of immersion, because in life we do not possess all the knowledge. And while it's understandable to want to simplify the player's life while playing our games, it's not always warranted and can even be damaging. Designers could probably ask themselves certain questions when designing maps. Does it make sense for our characters to have perfect knowledge of the map? Does the player need to know the map to be able to play? Often designers employ other techniques to gate knowledge of the map through fog of war systems, or the well known synchronization points of Assassin's Creed's [21]. In the case of *Thief*, the game is much more exciting because we must wrestle with the maps and make decisions based off that imperfect knowledge. We can quickly look at one of *Thief's* maps (Figure 1).

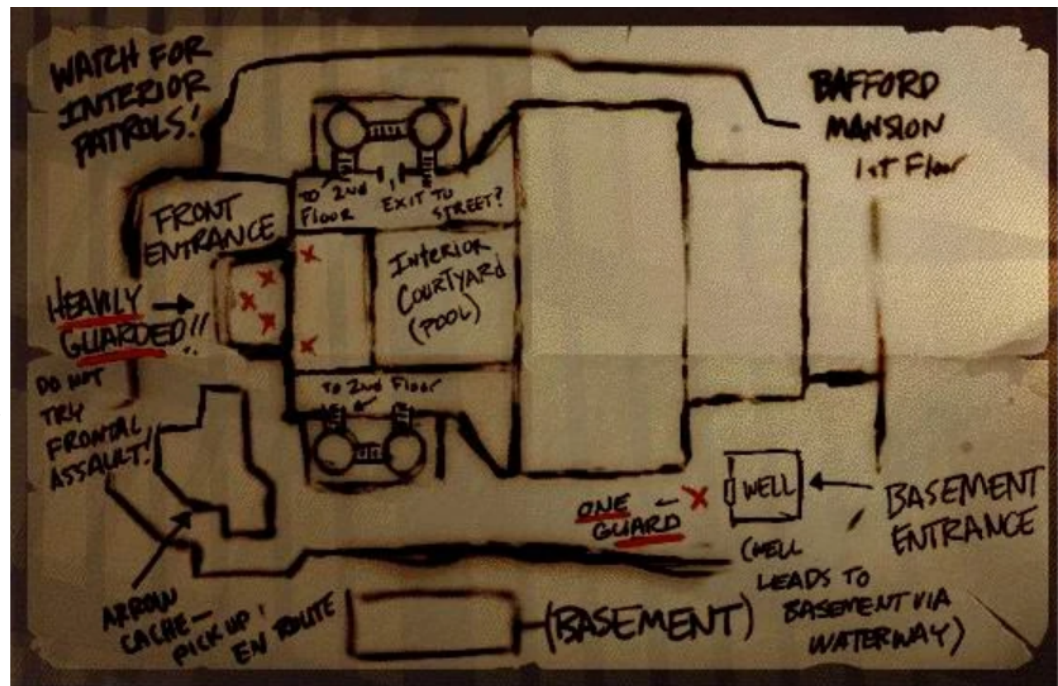


Figure 1. Map given to the player in the "Lord Bafford's Manor" level. Uses a hand drawn style and gives imperfect information, and sometimes outright doesn't give any knowledge of an area except its boundaries.

This map is for one of the early levels of *Thief*, "Lord Bafford's Manor". The art style is that of a hastily jotted down scouting map by someone who doesn't necessarily know everything there is to know about the mansion and its surroundings. It gives the player information on entry points, heavily pushing the player towards avoiding frontal assault. This will give the player some thought early on in the game about their strength. Some will obviously attempt the frontal entry, and no doubt succeed. It also gives some information on supply caches, internal layout of the level (without much detail of interior patrols) and where to get higher up in the mansion. The latter being one of the main objectives since players can reach the conclusion early on that what they must steal is in the higher levels. We can also note how the east wing of the mansion is completely unknown, as if the scout had not been able to reach this area. This not only adds a lot of uncertainty and danger to this location, but it's highly realistic: most scouting reports are incomplete. And there is no doubt players will want to explore this area to satisfy their curiosity but more importantly to gather more loot to satisfy the mission requirements. Players must steal a minimum amount of valuables to be able to finish the level, and that threshold increases based

on difficulty. This is quite an ingenious way of managing difficulty, instead of increasing enemy health or damage output, it's forcing you to go deeper into unknown territory, take more risks and better manage your starting resources. This goes hand in hand with the provided maps. The more you need to steal, the more risks into the unknown you must take. Designers at Looking Glass knew that and often left maps with empty and uncertain areas.

Equally so, the UI in *Thief* is extremely minimal, as seen in figure 2; basically only showing your current weapon, your health and a light visibility indicator. In general reducing the amount of out of world screen-space UI can only increase player presence. Special care must be taken to keep player frustration in check in the name of minimal UI.



Figure 2. An ingame screenshot of *Thief* showing the in-game UI. Most of the screen is left free of UI presence.

Modern Examples

We can discuss another example of a diegetic elements and UI in a modern game, *Gloomwood* [19], and comment on what it creates in player immersion.

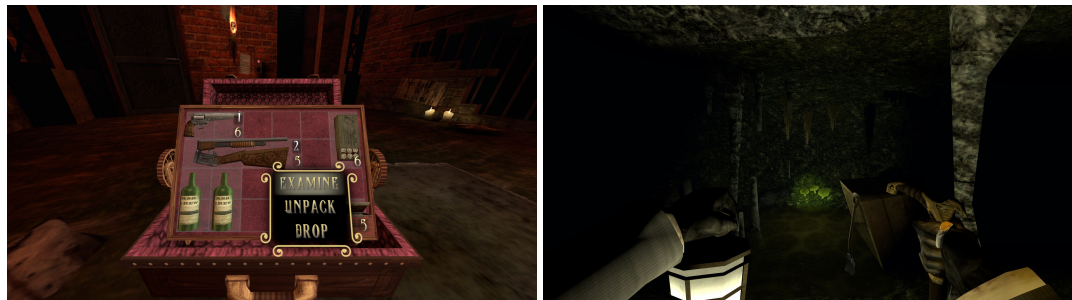


Figure 3. The inventory in the game *Gloomwood*. **Figure 4.** The ring in the game *Gloomwood*. The inventory occupies the space and cannot be opened when there is no space. The ring acts as both a cosmetic item and a player visibility indicator. This replaces any in game UI.

Gloomwood is a retro stealth horror game that employs many of the Immersive Sims's core design

pillars. What is does particular well is its dedication to diegetism and reducing barriers between players and core features that are normally UI panels and elements. We can focus on its inventory system in figure 3 as well as how it transmits visibility information to the player in figure 4.

The inventory system accomplishes several outcomes with respect to players. Firstly, it removes a menu that a player would have to sift through. When players interact with the inventory, it is through its physical presence in the world. Players can then drag out items into the surrounding areas of the inventory. This simple idea of dragging out items, instead of a button in the menu that when used drops items, is non trivial. This reduces a barrier between the world and the player. The interaction is not only direct because players remain in world during the interaction (they don't travel to a menu panel), but the movement itself is diegetic: players drag out items, as if physically taking them out of their inventory. Secondly, the inventory is a physical object: a briefcase. In most games, inventories are not physical objects, they are non existent and abstract concepts, only limited by a fictional and forced upon number like *inventory space* or *carry weight*. In *Gloomwood*, you can see how much content is in your inventory. An added feature of this physicality is that at the beginning of the game it is possible to entirely forego picking up the Inventory, and thus play the entire game without one; not many games allow that!

Another interesting feature is how it transmits the current light visibility of the player. Again, a standard way of communicating this is through a UI indicator, most often in the middle bottom part of the screen. Dozens of stealth games have resorted to using such a method. *Gloomwood* decides to take an in-game cosmetic item that the player character possesses, the ring, with actual functionality, a light indicator. It's not only an arbitrary decision; doing so is logical. Jewels shine and glisten when lit, so the idea that the ring does so too is grounded in physical law that players are familiar with.

Red Dead Redemption 2 also makes extensive use of in-world UI, such as its widespread use of realistic maps that look like they would in real life, as seen in figures 5 and 6.



Figure 5. A newspaper in *Red Dead Redemption 2*

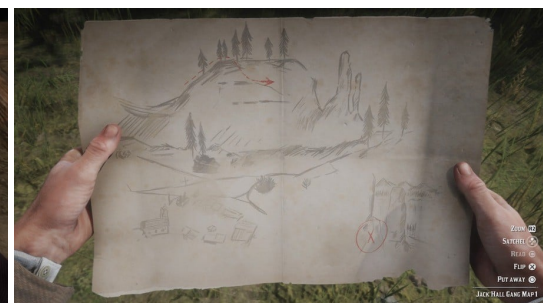


Figure 6. A treasure map in *Red Dead Redemption 2*

Players can read the news through actual newspapers held by Arthur Morgan, the player character. This could've easily been implemented through panels by the UI designers, but they decided for a diegetic approach. The same applies for maps and other 2D elements. This reduces the time spent out of world and increases the physicality of the game. Designers should really ask themselves what parts of the game interface could function in world, and how the UI can we tweaked to reinforce core mechanics and presence. Doing so will inevitably increase immersion.

AI behaviour: the more the merrier?

Another important part of Immersive Sim design is the AI. AI in *Thief* is not necessarily overly complex as seen in [18]. There is a slightly high tech sensory system that NPCs use to detect things around them (the player being the main one), but that system feeds into simple behaviour systems. Patrols, idling, and searching for player. The complexity arises not from the behaviour themselves, but from the reaction to player actions. Because *Thief* is highly emergent and non linear, designers need to make AI that looks like it's reacting to anything devilish players can think up. A box hitting their heads, they should react. A bottle hitting a wall, they should react. A light going out, they should react. NPCs need to be built in a way that makes them look more complex than they are. This is exactly why the sensory system in *Thief* is complex. It's that system that will determine whether an AI should enter one of its simple states (like searching for a player). In fact, the search state is one you will see constantly, but it will trigger because of various player actions. Figure 7 summarizes this: a complex sensory system feeds into the simple state machine so that it can decide when it should be alerted.

I have learnt from that in my own stealth immersive sim, making sure NPCs react to a whole host of stimuli, even though their behaviour is not necessarily complex and hand crafted for each stimuli. It would be a lot of effort to make a specialised state for each player action. Developers would need to write new script lines for each, make the required animation (if they are required) and no one wants overly complex state machines. Simplicity is incredibly important in developing for immersive sims, specifically because of the emergent gameplay. The more complex the AI, the higher the burden. That being said, immersive sims must also make use of extensive scripted events. Simple state machines with a wide breadth of stimuli detection must coexist with hand scripted triggers by designers. For example, in my own game I had to script NPC reactions to seeing a certain door open, or to losing a key they had for a particular door. Designing AI thus becomes balancing simple states with hand crafted states for specific behaviour. Too much of the former and your AI is boring, too much of the latter and your AI is intractable or impossible to understand. Many modern games could learn from these ideals; often it feels like AI does not react to a wide array of player stimuli. A feeling of complex AI can be introduced relatively cheaply.

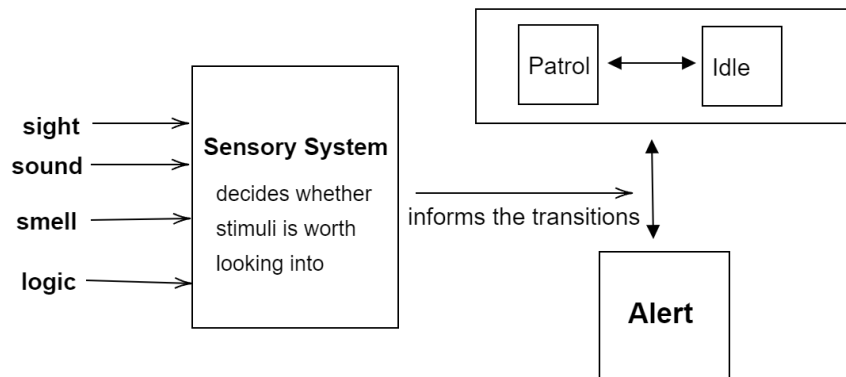


Figure 7. A graph explaining the AI systems of Thief. Simple state machines will have their transitions decided by a sensory system that responds to a whole host of stimuli.

III DISHONORED

In *Dishonored* players find themselves in a fictional Victorian universe, playing as a disgraced bodyguard, Corvo Attano, accused of murdering the empress. Corvo narrowly escapes with their life and is recruited by The Loyalists, a group of sympathisers to the late Empress who wish to reclaim power for the rightful ruler, the Empress's daughter. At the beginning of the game, Corvo is gifted supernatural powers by a morally grey God - The Outsider. The first of those powers is "Blink", a short ranged teleportation power. Other powers can be unlocked as the game progresses, but none are ever required. The game can in fact be played with no powers. The game unfolds in missions where the player must eliminate targets that stand in the way of this political quest. The player is confronted with choices at every turn, choices on how to approach a mission - how will they infiltrate the Building where their target is situated. Choices on morality - eliminating a target does not necessarily mean murdering them, other actions may neutralize their political position.

Dishonored modernizes the Immersive Simulator by combining realistic, dynamic and engrossing environments, a strong narrative and systems driven mechanics. These three facets of design - Environments/Levels, Narrative and Gameplay, work together to create a truly complete Immersive Sim. A game some critics even enshrine as a classic of the genre. They also laud the immersion of the game - *Dishonored* creates a breathing world that reacts to your every actions. How is this achieved? Playing the game, we are sucked into it, but in truth the game has a strong design philosophy that bears similarities to *Thief* and other precursors. We may look to the seminal GDC talk [25] where the co-creative directors Raph Colantonio and Harvey Smith delve deeper into their design principles.

We can note three key principles on which we will later expand: the pull based narrative, the General Purpose Systems and the play path matrix. Each correspond to a specific facet of design - Narrative, Gameplay and Level Design. And each work towards increasing the player immersion. Each contribute towards removing barriers between players and the game. And it does so in a total way, touching most aspects of the game.

The pull based narrative reduces friction in giving narrative information to the player. The General Purpose Systems increases the believability of the world and its systems so that players do not need to excessively suspend disbelief. And finally the play path matrix reduces the funneling of players along one path which in turn strengthens the idea that they are physically present in this virtual space. All in all, a word we can use to describe *Dishonored* is intimate and in fact most Immersive Sims strive to create that feeling in players, a closeness to the game and its world. As discussed earlier, *Thief* was masterful in creating that feeling of physical embodiment and physicality. Let us delve deeper into each principle, drawing examples from the various missions of *Dishonored*.

Pull Based Narrative

Most games offer exposition and narrative elements through direct conversations with NPCs (Non playable Characters) and *Dishonored* is no exception. Many scripted interactions exist throughout the game and the plot wouldn't be as solid without them (as we've seen in the AI of *Thief*). What is quite exceptional in *Dishonored* is its use of environmental storytelling, which the co-directors Raph Colantonio and Harvey Smith name the pull based narrative. The pull based narrative is a technique of transmitting narrative content to the player without NPCs directly talking to the player. Instead, information about the world and its characters is shown through conversations the player hears while sneaking around the levels which might lead to random encounters. Or through notes and books left around on desks and tables (usually in

believable places - a servant might leave a note at the main entrance of their master's manor). It is also done through the visual look of environments - an area hit by the plague will look as such. All these tools act as natural ways of pulling the player into the world, closer to the narrative, without directly addressing them through dialogue. We present figure 8 where a simple diagram illustrates the principle.

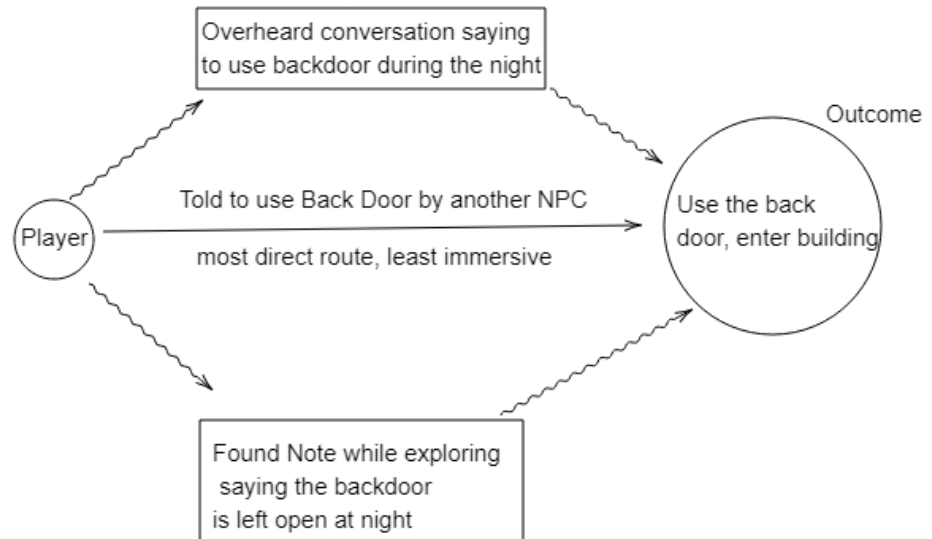


Figure 8. A flowchart explaining the Pull based Narrative. The player goes through indirect paths to get information or lore. The least indirect paths are the most organic. The direct paths are scripted and avoided except for Major story beats.

Dishonored is littered with such pull based narrative instances, each strengthening the idea that the player is a visitor in this space where NPCs live and breathe. In almost every mission, overhearing conversations between guards, servants or other factions can give critical information or some more narrative lore that adds depth to the world. We can stratify these pull based narrative elements into various classes. These will be specific to *Dishonored* but they apply more generally to any game using Environment storytelling,

1. **Pull based narratives requiring a direct response:** these pull based elements are those that happen around you in the world and require a reaction from you within a set amount of time. One example of that in *Dishonored* is when you see a shakedown - thieves try to rob an innocent bystander in a side street. If you do not act and keep out of sight, these mobsters will succeed and that person will end up hurt or dead. If you do act, you may save that person and receive a reward of some kind. One instance of a reward is receiving the key to an art dealer's house which not only holds valuables but also additional information to neutralize your assassination target without murdering them. A seemingly unrelated action unlocks a new path. The beautiful aspect of direct response pull based narratives is that they force a moral choice on the player, bringing them deeper into the game. Acting or not acting says something about you as a player and lets you express yourself. It also says something about the character you are playing and strengthens the idea that the world exists without your presence.
2. **Pull based narratives offering actionable information:** these are overheard conversations or notes left around the world that give you useful information. For example in *Lady Boyle's Last*

Party you may sneak upstairs past the guards and read in Lady Boyle's diary (the woman you need to assassinate) that she is feeling extremely promiscuous this evening and will "bed any man who asks me". The game is targeted at adult audiences but even then most people will assume this is simply a narrative beat to add an edge to the character. This is in fact not the case. An astute player can go talk to the target (the mission happens during a masked ball organised by Lady Boyle) and she will make overtures and finally invite you up to her room. Far away from the many guards present around the party, this gives you a window of opportunity to assassinate her, or knock her out if you decide to go for the non lethal option (more on that later). None of these actions are directly encouraged by the game and this is one of many ways to accomplish the mission. There is no objective marker or text telling you to try and charm the target once you read that note. Everything is extremely organic - the player decides to act on some information they gather. The designers could've decided to make her promiscuity common knowledge and added an objective saying "Go woo Lady Boyle", but they preferred using a pull based narrative. We can agree that doing so is much more immersive and gratifying than having everything heavily telegraphed. The idea that all Knowledge is Power dramatically increases immersion. There are hundreds of such instances in *Dishonored*, the game is built on pull based narratives offering actionable information.

- 3. Pull based narratives offering lore-oriented information:** *Dishonored* is a beautifully crafted world, a spin on the Victorian era set in London. Factions are complex entities, morality is woven into everyone and everything. Rarely do we have all together evil or good characters. Our opinions of them, the factions and the world are informed by lore oriented pull based narratives. The elements appear in the same format as actionable pull based narratives - through notes and conversations you hear while stalking the shadows unseen. One commonly used instance of this is bringing lore information on the assassination target to the player. First off, if you want players turning in their sleep over important game decisions, you must have complex characters. In life people often act compulsively and non-optimally, they make mistakes. If it is the same for game characters, we begin to believe the world a bit more. These lore-oriented pull based narratives do exactly that - they add complexity to the world, they turn every aspect of morality from black or white into a grey blob players must navigate using their own moral compass. They actively decide whether targets, guards, weepers (people who have the plague and have descended into fits of madness) deserve to die for it. This is something that is ingrained deep into the design philosophy. Let us look at a strong example - the mission where you must assassinate Daud, the trained assassin who murdered the empress (she incidentally was your lover). You arrive in the mission telling yourself that Daud must die for what he has done. And yet, when you are in the same room as him, listening to him, preparing to pounce. You don't see the monster that was pictured. He's simply a man that was paid to murder a woman. He didn't hold anything against her, money simply talks. You can find a diary on his bed, a couple of meters above him. It is full of his doubts and regrets, his sadness at having murdered the empress. He says he wants to leave the city and never come back. While this does not give you actionable information, it turns everything upside down. Does this man deserve a second chance? Many players agree as the assassin is often spared. Not all lore-oriented pull based narratives have this level of importance. Some simply serve to make the world seem lived in, full of unimportant details - a conversation between two guards discussing their superiors, for example. An immersive world is also one where normality reigns most of the time. Before we move on we may note on one ingenious lore-oriented pull based narrative : The Heart. At the start of the game The Outsider gives you a heart which when used while looking at another NPC will give you more

information on them. For example, pointing that heart at a random guard may trigger it to say that this guard murdered his wife a fortnight ago or that he lost his entire family because of the plague. This adds depth to virtually every character in the game. This is how you create immersion.

Pull based narrative elements are a strong tool to increase player immersion and even player involvement. The game is a conversation between the player and the world. Designers should try and make the player feel like the world breathes around them and they are interacting with something that has been there in their absence. Game elements don't always have to look like they're perfectly scripted and/or perfectly telegraphed to players. Players are smart and can understand the context through subtle hints. However, the pull based narrative is not the only tool used to create immersion.

General Purpose Systems

Dishonored is not only a game of complex morality and narrative structure. The systems that make the game - the sneaking, the enemy AI, the different mechanics players can use - interact in complex ways. Complexity increases player freedom and sense of presence in the game - it feels real. Co-Directors Smith and Colantonio call this design principle the General Purpose Systems, but that is simply an in-house name for something known as systemic Design. systemic Design has simple foundations - games are made of Systems. A combat system, a sneaking system, etc... In his talk [26], Mike Sellers defines a system as being made of parts. Attributes provide a state to those parts and behaviour create interaction between those parts. Those parts don't need to be complicated, and as we'll see in *Dishonored*, they are not. However, these parts interact and create layered and deep behaviours. So systemic design is the idea that parts of a game can be simple but create complex behaviour when interacting with other parts. As such, a game is made of systems which themselves are made of parts. Parts interact together to create complex behaviour and systems as a whole interact amongst themselves to add another layer of complexity. The possibility space, that is the breadth of actions a player can make and resulting outcomes, becomes enormous. Figure 9 summarizes this idea. We can detail the implementation of systemic Design in *Dishonored* and discuss how such systems increase immersion and realism.

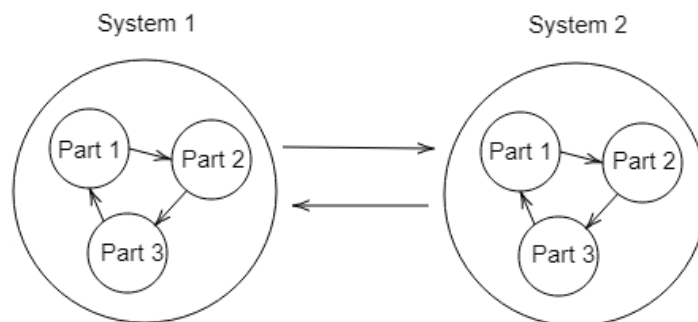


Figure 9. Simple visualization of the Systemic Design philosophy. Each system is comprised of parts that interact amongst each other. Systems also interact with each other. These interactions create complex outcomes.

Input/Output System

First of all, let us look at the foundations of the General Purpose System. In their talk, Smith and Colantonio define the General Purpose System as game mechanics that "listen to each other". In this instance, the parts are the mechanics and behaviour emerges from their interactions (listening to each other). In order to do so they created the Input/Output system. Entities in the game can output a certain status, and other entities around can receive these outputs as inputs to trigger some behaviour. As such game mechanics propagate throughout entities that listen to them and trigger some behaviour. Let's look at three entities in *Dishonored* and the outputs they emit,

- **Arrow:** they emit a piercing status on target entities.
- **Fire Arrow:** they emit a piercing status and a fire status on target entities.
- **Candle:** they emit a fire status on target entities.

Now we can think of some entities and their inputs,

- **Guard:** receive piercing status and take damage. Receive fire status and catch fire, when on fire run around.
- **Gas Barrel:** receive fire status and explode. Explosion emits explosion status on target entities in range.
- **Oil Puddle:** receive fire status and catch fire.

Simply put, entities receive piercing, fire or explosion statuses and may also output one, two or all of those statuses to other entities. Simple, right? If we imagine these three parts form a system and we layer this system with enemy AI (targets on fire try to run away), we find ourselves in a reasonably complex game (10). For example, one can imagine a player shoots a fire arrow on a guard who then catches fire but while trying to run away walks into an oil puddle where a gas barrel is standing, triggering an explosion near the player, hurting them. One can construct a large amount of scenarios merging these simple entities to create complex behaviour. If these parts didn't communicate, we wouldn't be able to create complex behaviour. Games that use systemic design allow for communication between parts and hence outcomes like the one described earlier are possible but more importantly they resolve situations unplanned by the designers. Designers don't need to code every single possible chain of events. All they do is create systems that talk to each other and the player does the rest.

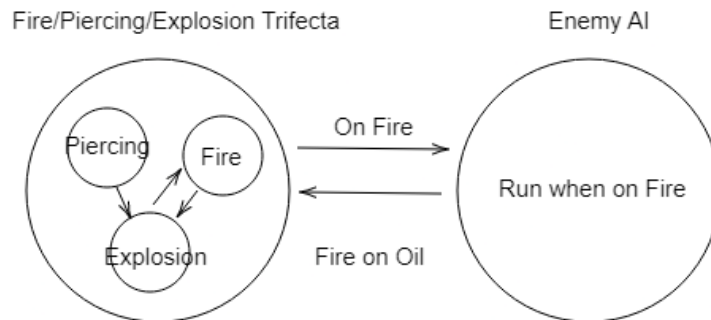


Figure 10. Simple graphical view of the Fire/Piercing/Explosion mechanics with enemy AI and resulting behaviour.

Immersion from Realism

We've concluded that the Input/Output System creates complex situations, but why is that important to the player? Why are they care? How is that relevant to immersion? Because complex situations are analogous to realistic situations. Let us imagine a normal succession of player thoughts in *Dishonored*. They have just murdered a guard who was being too nosy and want to dispose of a corpse in order to remain undetected. What could they do besides finding a convenient place to hide the body? They're in luck - they possess an ability which spawns a swarm of rats. However, they pause wondering whether the rats will devour the corpse - it would make sense but after all so many games do not bother to deal with such edge cases. They bite the bullet and spawn the rats who indeed gnaw at the corpse until only bones remain. Incredible, the player thinks, rats do respond to the world - almost as if they were real famished rats. Such interactions between the player and the game happen all the time in Systemic Games which brings them closer to the game. The immersion triggered by an exchange like this is not that expensive for the designers, but the upside for the player is priceless. The parts involved here are straightforward: rats are attracted by anything they can eat and a body is something a rat can eat. Add many parts together and you have a believable world that offers players freedom to act. The game doesn't restrict their imagination but encourages it. The world has depth. Designers should try and create such systems in their games. Interaction between systems is almost always appreciated by players, and this is perhaps vindicated by today's blockbuster games presenting a high degree of systemic gameplay. A perfect example of that is *Legend of Zelda: Tears of the Kingdom* which was widely lauded for its playfulness and the fun made possible by its systems. Players can think up stratagems and create crazy situations, or even better they can come across things that they had not planned marvel at the game's depth.

Play Path Matrix

We've covered how indirect narrative tools and systemic design both positively impact immersion. Those design techniques work in favour of a third broader one, the play path matrix. At its core, the play path matrix can be defined as the idea that players have multiple tools or approaches to reach their objective - assassinating their targets. And as we've said multiple times, a large possibility space amounts to increased realism and immersion. The pull based narrative indirectly transmits some of these approaches (making Lady Boyle take you to her room) to the player without having NPCs directly talking to them. Doing so wouldn't be organic. On the other hand, the General Purpose Systems offers many ways for the player to interact with the game and go about their business. For example, we know rats are attracted to flesh and so a player could spawn several swarms inside the party which would create chaos. In this chaos the player could assassinate Lady Boyle or hope that a guard inadvertently shoots her while trying to get rid of the rats. These outcomes are entirely possible and surely have happened, creating a memorable moment for several players who perhaps still think of it to this day. There is a third aspect that we haven't discussed as of yet and is a critical part of the play path matrix - highly non-linear level design. If a designer wants to promote different tools and approaches, this not only must be reflected in gameplay and narrative but also in the level players traverse. Players must be able to enter from a backdoor, from the roof, from a window or a waterway - this is what we mean by non-linear. The world must make sense and invite possibilities. A large part of the immersion comes from the idea that spaces are realistically laid out. Some windows are open to let air in, buildings are connected to the sewer system. The roof might not be as strongly guarded as other parts of a buildings. All these make sense and one would expect similar situations in real life. Before further discussing the play path matrix, let us delve into a useful tool to analyze level design, Molecular Diagrams.

Molecular Design

Designer Azar presents [24] a technique called Molecular Diagrams to describe game levels. The idea is to use a graph made of edges and nodes to represent a game level. That is, nodes are the game spaces / rooms and edges define the connections between these game spaces. Figure 11 shows a simple molecular diagram describing relationship between three nodes inside a level. Note that some edges are thicker than others - that thickness represents the cost of traversal. The thicker the line, the less expensive it is (in game time or in resource cost or any other metric a game uses) to go from one node to another. We can also give directions to the edges if traversal is one way only which happens often in games. You may drop down a ledge that you cannot go up again which can create interesting situations (falling inside a dangerous pit). We can show an example of a directed molecular graph (Figure 12). Molecular Design can thus be used to represent any level and relationship between game spaces. They are a powerful tool to reveal dynamics of a level.

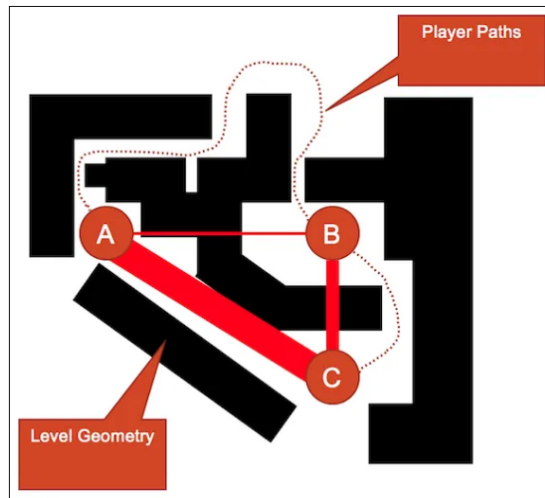


Figure 11. Molecular diagram [24] without directions. Nodes represent game spaces. Edges represent traversals from node to node.

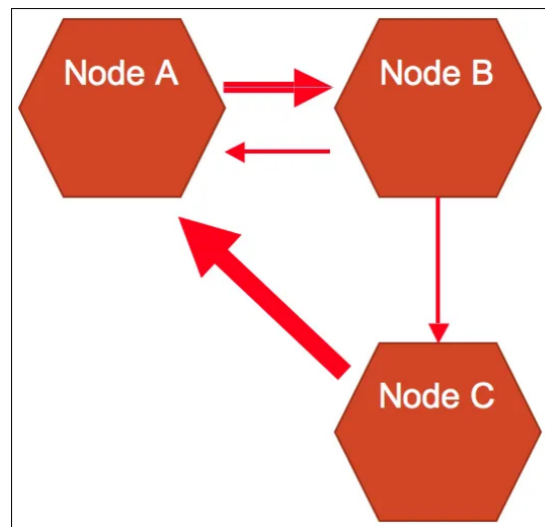


Figure 12. Directed Molecular diagram [24]. The direction of the arrow determines which way a player can move from node to node (game space to game space)

Molecular Design in Dishonored

A molecular graph of a *Dishonored* mission would have many nodes and edges, which is how level designers intended to create their levels. We remind ourselves that the play path matrix's purpose is to offer many approaches for the player. A large part of the immersion comes from whether these mission graphs are large and plenty of edges and nodes. Let us look again at the mission "Lady Boyle's Last Party" and construct a reduced molecular diagram (Figure 13) of the level (doing a full one would be too large as countless options exist).

There are several things to note. First of all, all of these edges are two-way, meaning the game encourages seamless traversal across the level. This allows the player to feel like the space is their ally and

not their enemy. There is a level of freedom created from being unrestricted in moving around. The only restrictions are difficulty wise. That is some edges are thicker (easier to go through). However, whether going through expensive or cheap edges, the outcome is the same - designers promote accomplishing the objective over how you accomplish it. It is up to the player to decide how they want to approach it. In this instance, a player simply needs to get on the balcony and they can walk right in the second floor. They don't even need to go through the foyer and enter the party. From there they can search for information upstairs to find their target and enter the party through the main door once they're ready. At its core, non linear level design is thus about creating as many edges and nodes as possible, offering the player various approaches. This is clear in this molecular diagram.

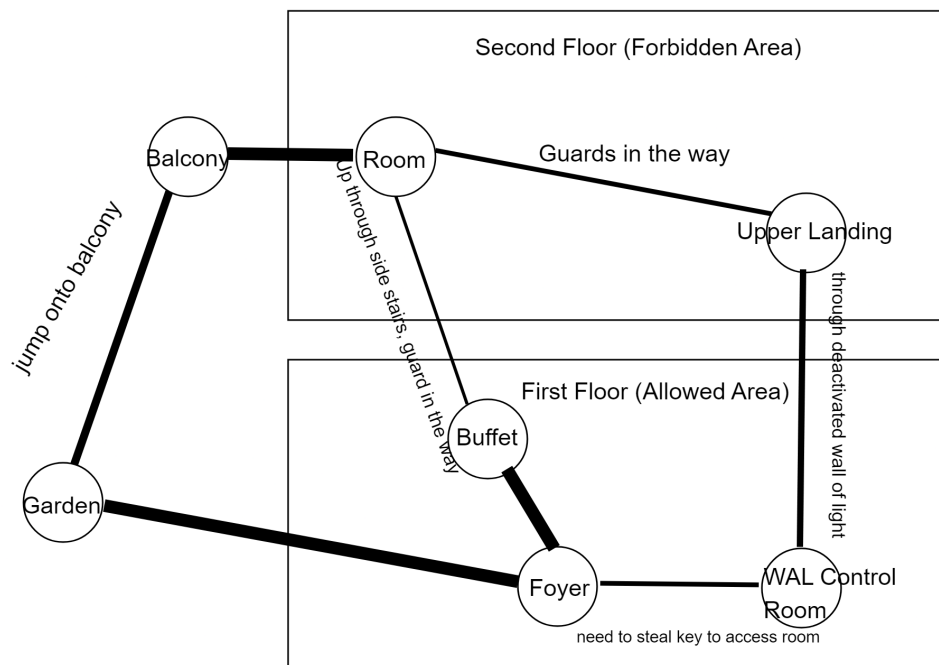


Figure 13. Simple Molecular Diagram of "Lady Boyle's Last Party" to reach the second floor. Players can go through the balcony, shut down the Wall of Light (electric fence that kills the player if they walk through it) and use the stairs, or use the back stairs that are guarded by one guard.

Immersion emerges from the idea that the space is complex and interconnected. Without specialized level design, the General Purpose System would not be able to express itself as much and the pull-based narrative would be less useful. Designers should try and make their spaces as interconnected as possible, even if they can only do so on the tiniest of scales.

We've seen how the play path matrix is about creating a large possibility space. This is done through level design and systemic design, internally dubbed the General Purpose System. These various possibilities are also uncovered through environmental storytelling techniques, which we call the pull based narrative.

All these elements contribute to creating a powerful feeling of immersion in Dishonored. And all of

those ideas can be used, and have been used in modern games. Levels can be designed with non linearity in mind to strengthen the idea that the world is a real place that wasn't designed to funnel players. Systems can be crafted with interactions in mind to allow for a larger space of outcomes when players play. And stories can be told through the world, and respond organically to player actions. The latter is now almost required in most modern RPGs; *Red Dead Redemption* has countless examples of indirect storytelling. All these elements will undoubtedly increase the immersion in any game they are applied to; there is no doubt about that.

IV CONCLUSION

In this article, we have looked into Immersive Sims and why they are some of the most immersive games ever made. We have used two Immersive Sims in the name of *Thief: The Dark Project* and *Dishonored* to analyze the tools used to create this immersion. In *Thief*, a mix of diegetic elements, minimal UI and reactive AI all work towards reducing the suspension of disbelief required by players. And in *Dishonored*, a breathing world reacting to player actions, non linear levels and highly emergent systems all increase player immersion. But in truth, both these games use all of these tools to create an engrossing and immersive game. We've only focused on specific tools for each.

Games from any genre can learn from these elements to make more immersive games - it's not only reserved to the stealth genre that both games in this piece are a part of. We can see the fingerprint of immersive sims in most modern games. They are becoming so ubiquitous that some say the Immersive Sim genre is dead; but in truth the design principles of the genre can be found everywhere, even in genres one did not expect. Immersive Sims live on through the principles they have created: player freedom, environmental storytelling, non linearity, diegetic mechanics and emergence. Studios no longer set out to make Immersive Sims, not because they are dead, but because they can make any other game and borrow from the Immersive Sim design philosophy when they see fit.

In fact, those advancing the Immersive Sim genre to its next chapter are not triple-A developers, but smaller indie teams. These small entities are pushing the foundation of the genre in every possible way, in search of a new Immersive Sim; something that pushes the idea of immersion, of player freedom, to the next level. We do not know whether this is futile but perhaps we will find traces of this new age of Immersive Sims in future genres in ten or twenty year's time. Only time will tell. However, one thing is certain: Immersive Sim fans can look forward to many more games that contain traces of the genre.

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