# Let the Players Go!

## Substituting Excessive Handholding with Autonomous Experiences

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**Abstract.** This paper explores how games can facilitate greater autonomous experiences. The project describes possibilities of how a certain kind of simulation can be a viable substitute for the often overwhelming and explicit communications of information that characterize many instances of handholding in video games. We hypothesize that consistently supporting the players' expectations regarding their interactions with the world can result in decisions informed by players' knowledge and experiences from the real world and consequently can lead to feelings of autonomy over their own actions. To test these hypotheses a vertical slice of a video game was developed with mechanics that were chosen to support the players' natural intuition and what they want to do, rather than restrict them to what they can do. An experiment was conducted where 12 participants tested the first version of the game, then answered questions and filled a survey based on the Player Experience Inventory (PXI). Based on the feedback, an improved second version of the game was made. The results of the two versions were then compared. Overall findings show how leveraging implicitly communicated information, consistent simulation and logical mechanics enhance the players perceived autonomy and can teach players complex systems without resorting to handholding strategies. The methods used can be turned into practical steps that game developers can take into consideration if developers want to facilitate more autonomous experience for their players.

**Keywords:** games · Self Determination Theory · autonomy · simulation · handholding · user interface · information transfer · experimental validation · satisfaction · agency · volitional engagement · choice · opportunity · gameflow · affordance · diegetic puzzles

## 1   Introduction

As time progresses, game systems are getting increasingly more complex. From the first arcade games to the modern AAA blockbusters shooters, developers are always finding new and exciting ways to give players satisfying experiences. Technology evolves and thus developers can easier implement more functionalities into their games, often to the satisfaction of the players. However, with more functionalities follows a risk of overwhelming the players to the point of less satisfaction. If games fail to train players

on the available functionalities, players will end up frustrated and might quit playing entirely. Out of this need for informing players emerged a tendency to overexplain. How, why, and what players must or can do are often explicitly communicated to the point where they don't have to think for themselves. This experience of a game overexplaining something which the player could have figured out themselves, had the game supported it, is often referred to as the game holding the players' hands, or simply: handholding. In this paper the term means exactly that. It is a well-known term but has not been precisely defined before.

Handholding consequently reduces the players' feeling of ownership over their actions and being self-governing. This feeling is known as autonomy and is considered a basic human need as well as a highly satisfying feeling [7].

## 2    Background: Previous Research

### 2.1   Autonomy in Games

Games are artefacts which evolve when dedicated developers find new ways to create satisfying experiences for their players. One of these can be supporting their perceived autonomy. Psychological studies found that the feeling of having control and agency over one's own choices is a basic human need. Not only is it rewarding in and of itself, but it also increases one's overall life satisfaction [8]. This need for autonomy together with need for relatedness and competence was included in the Self-Determination meta theory (SDT) [1].

Rigby and Ryan have expanded upon the term in relation to games: they define which criteria are required for autonomous experiences to happen in a game:

"At its heart, autonomy means that one's actions are aligned with one's inner self and values. […] Even if you have only a single pathway open to you, you still feel autonomous if it is the one you want to travel down." [7], [p 40].

In practice, increased autonomous feelings in players happens when two criteria are present: meaningful choices and volitional engagement [7], [p 49]. Providing these consists of presenting opportunities that match the personal desires, intentions, and values of players. Each choice needs to be something players internally want to do and aligns with their values for it to be truly volitional. Having more volitional choices motivates them to come back. It can have positive implications to have more meaningful choices. However, even if a game only presents the player with a single path, that path can make the player feel autonomous if their engagement with it is volitional [7].

At Ubisoft, an instrument (Ubisoft Perceived Experience Questionnaire) was developed to assess both players' motivations as well as games' affordances based on the basic psychological needs described by SDT [1]. In order to provide an overview of how autonomy is operationalized in games, here are the items contained in the UPEQ survey [12]:

- I was free to decide how I wanted to play.
- I could approach the game in my own way.
- The game allowed me to play the way I wanted to.
- I had important decisions to make when playing.

- The choices I made while playing influenced what happened.
- My actions had an impact on the game.

## 2.2 Informed Choices and Handholding

Before players will engage with meaningful choices presented by a game, they need to be informed about them. How this is achieved is also important for the autonomous experience. How handholding negatively affects volitional choices is explained in the next section. This section accounts for the positives of handholding: how it can lead to less frustrations because the player is well-informed. It accounts for some goals game developers might have when developing their games, and how handholding can help achieve these. It is important to note both positive and negative effects of handholding so that the alternative suggested in Sect. 2.5 is to achieve the positives and avoid the negatives of it.

It is difficult to find good definitions of handholding on paper, however it is discussed many places on the web. One example is a reddit thread where players discuss what handholding in games mean to them. This discussion shows the importance and significance it has to players, but also the unsureness of what the definition should be [15].

**Handholding and GameFlow.**  GameFlow is a model that can be used to evaluate the player's satisfaction in a game [9, p 65]. It can be a tool for developers to design their game around, or just account for what affects the satisfaction of a game. Here we use it to see how handholding affects it positively, so we know what the hypothesis must achieve. According to GameFlow a satisfying game incorporates the following steps [10]:

1. A task that can be completed.
2. The ability to concentrate on the task.
3. Concentration is possible because the task has clear goals.
4. Concentration is possible because the task provides immediate feedback.
5. The ability to exercise a sense of control over actions.
6. A deep but effortless involvement that removes awareness of worries and frustrations of everyday life.
7. Concern for self disappears but sense of self emerges stronger afterward.
8. Sense of duration of time is altered.

Primarily, steps 3, 4, 5 and 6 can be achieved by overexplaining information. Steps 3 and 4 requires information that is given to the player about what they must do and how their actions affect it. An example of communicating these could be a quest-log which consists of a list of tasks that needs to be completed to get a reward. Another is waypoints, which are UI elements that point to the players' next goal in the game space.

Step 5 implies the need for players to know the game's button-mapping[1].

The effortless involvement mentioned in step 6, could encourage developers to accommodate less experienced players. Effortless involvement can simply be attained if the game does not allow the player to think for themselves but does it for them. The players need not put in effort if the game constantly hold their hands.

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[1] A scheme which overviews which buttons to press to act out the specific functionalities. For example, press space to jump.

**Handholding in Casual Games.**    The free-to-play market has grown to staggering proportions [11]. Many free-to-play games have a business model that focus on in-game transactions which usually give advantages to the player. To increase the chances of purchases, playtime and retention have become the focus. Games need to be more user friendly and easy to learn to avoid players getting frustrated and stop playing. Additionally, casual games, have a broad audience. Therefore, their user experiences must also accommodate less experienced players. From these emerged new ways to cater to players which bled into other types of games other than causal ones.

### 2.3   The Negative Effects of Handholding

In Glued to games Ryan and Deci maintain that bad games overexplain what players must do, and how it limits volitional engagement:

> "*[Bad games] have characters that literally command the player to "Keep moving!" But a well-designed video game never <u>drags</u> or <u>prods</u> the player along in these ways. Instead, they use well-crafted <u>stories</u> and compelling <u>rationales</u> to awaken in the player an <u>internal desire</u> to walk the path ahead. We call this experience in games volitional engagement.*" [1]

  Drags, prods and command are all verbs that could describe handholding. A game with less volitionally engaging choices is one that overexplain how, why, and what the player must do. Handholding consequently happens at the expense of meaningful choices and volitional engagement, and thus it reduces the player's sense of autonomy. Instead, games can tap into rational thinking and support the player's internal desires which in turn will increase their perceived autonomy.

### 2.4   Benefits of Agency

Image of the city [5] is a book that explores how people identify objects and structures in cities by taking in their visual information and turning it into cognitive maps. It explains that the visual qualities of the city images can help people navigate, but also that easy to identify structures that inspire little imagination can make navigation easier but be boring as a result. The images a person might observe has a significant impact on the satisfaction linked to the city. Cities that are maze-like and hard to navigate can be very satisfying to experience, because the cognitive act of mapping and deducting new information from the visuals is satisfying:

> "*We stare into the jungle and see only the sunlight on the green leaves, but warning noise tells us that an animal is hidden there. The observer then learns to single out clues and reweighting previous signals. […] Finally, by repeated experience the entire pattern of perception is changed, and the observer need no longer consciously search for giveaways […] Quite suddenly the animal appears among the leaves, clear as day.*" [5].

In games this same deduction happens when players must look at different cues, contrasting visuals, compositions, and landmarks to figure out how to navigate, what to do and how to do it.

**Informing via Visuals.** Image of The City explain that an environmental image can be analyzed into three components:

" *[…] identity, structure and meaning*" [5].

Identity is the visual aspects of the object. How does it stand out? What are the qualities that an observer identifies? Simply put: what are its distinctive visual qualities?

Structure is how it relates to the surroundings. Where is it usually seen; how does it affect being grouped together with something else?

Meaning is something the observer gives the object. Objects can be familiar which means the meaning has been defined long time ago. For example: doors. We do not have to spend much time identifying a door and its meaning because we know it, but also because it has a very distinctive visual identity. If an object is unfamiliar the quality and distinctiveness of its identity will affect how long it takes for an observer to apply meaning. Similarly, if it has meaning already but the visual identity of the object instance is far from the familiar identity of it, it can also take a long time to identify it. The meaning of an interactable object in a game can be leveraged to inform the players of its functionality. This is called affordance and is defined as what opportunities an observer perceives when looking at the visual qualities of an object.

Or we might even exercise clearer identities of objects the player can interact with, to let the player explore its meaning and function by themselves:

" *If it is our purpose to build cities for the enjoyment […] we may even concentrate on physical clarity of the image and allow meaning to develop without our direct guidance.*" [5].

Thusly, players can be informed of the games functionalities through visuals which identities are easy to identify, as well as either ensuring meaning through a predefined familiarity with the said identity or let the player develop meaning themselves.

## 2.5 How Simulation Can Hypothetically Achieve Autonomous Experiences and Substitute Handholding

Based on the insights derived from literature on autonomy and handholding, this section will describe the kind of consistent simulation that can hypothetically be used to avoid handholding while still informing the player enough to avoid frustration.

Our hypothesis is this:

*Simulations that can consistently support players' expected outcomes during their interactions with a game will result in players being informed by their inherent knowledge and experiences from the real world. Information gained by players in this manner can lead to an increased sense of autonomy over their own actions.*

Instead of communicating every aspect of the games system with explicit information, which restricts autonomy, utilizing consistent simulations will leverage players own ability to think and act on their own accord. Players already possess some of the required information, the game must only support and incentivize them to use it.

For example, players know that a rock should follow a parabolic trajectory if thrown. If the game does not support this, either the parabolic trajectory is wrong or the rock just falls flat, then players will not feel supported and will be less incentivized to think for themselves from that point on. This upholding of illusion is referred to as suspension-of-disbelief, and players perception of it can be an indicator of how well the game scaffolds this illusion.

Some information is harder to communicate implicitly. Meta information like which buttons to press to act out functionalities, player health, and score each should be explicitly communicated without restricting autonomy. This is because this information exists in the context of playing a game. They belong to long established game conventions and do not necessarily come from within the in-game universe. In other words, they are not diegetic[2] but they do not interfere with the players' suspension-of-disbelief. Without explicit communication, players might feel frustrated because they do not know how to use controls to play the game. Additionally, the feedback from their interactions which affect the health or score for example might not be present, thus removing the meaning behind their choices. Informing the player enough to avoid frustration while still avoiding overexplaining therefore becomes a matter of balance. A balance that is hard to perfect.

## 3   Background: Games that Foster Autonomous Experiences

In these following subsections we will analyze three critically acclaimed games. The first two serve as examples of what implication the absence or presence of handholding have on autonomous experiences. The last one is a newer example that successfully achieves the consistent simulation defined so far, hence it possesses many elements that support player autonomy and comparing it to our hypothesis serves as an example of how applying it can be successful.

### 3.1   Elden Ring

Elden ring is a game developed by FromSoftware. It received great critical acclaim. In short, the game is an open-world 3$^{rd}$-person action-roleplaying game where you explore and make your way towards a massive golden-tree. The playable space is very big and dense with branching paths and choices.

It separates itself from other open-world games with how little it holds the hands of the players. From Software games are held as some of the most difficult games, but also very rewarding, which can be tied to that players must figure out how, why, and what they should do. It supports and helps the player mainly with implicit communication. For example, it uses perspective, composition, landmarks, shapes, color, and the like

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[2] Diegetic. Something which exists in the in-game universe.

**Fig. 1.** Elden Ring. Possible paths implicitly communicated in the environment.

to help the player navigate. The big glowing tree is used as a landmark to orient them as well as an indication of where the player must go to complete the game. The castle creates a composition which implies what stands between you and your goal. The layout uses levels of rock formations and verticality to further point the player in the right or optional directions (see Fig. 1).

One aspect which was chosen to be not communicated is the progression of optional quests in the game. Many open-world games like Elden Ring utilize a quest-log system. In Elden Ring the players must find out what to do with no indication of their progression. Because there is no way to view the players' progression many sites and YouTube videos have been made to explain step by step how each quest should be completed. This creates an incentive for investing time away from the game, minimizing immersion. This information is also explicit and non-diegetic which breaks suspension-of-disbelief.

If the game had given players the tools to obtain an overview of their progression without explicitly explaining the next goal, it would have reduced the incentive to get information outside of the game while still encouraging volitional engagement.
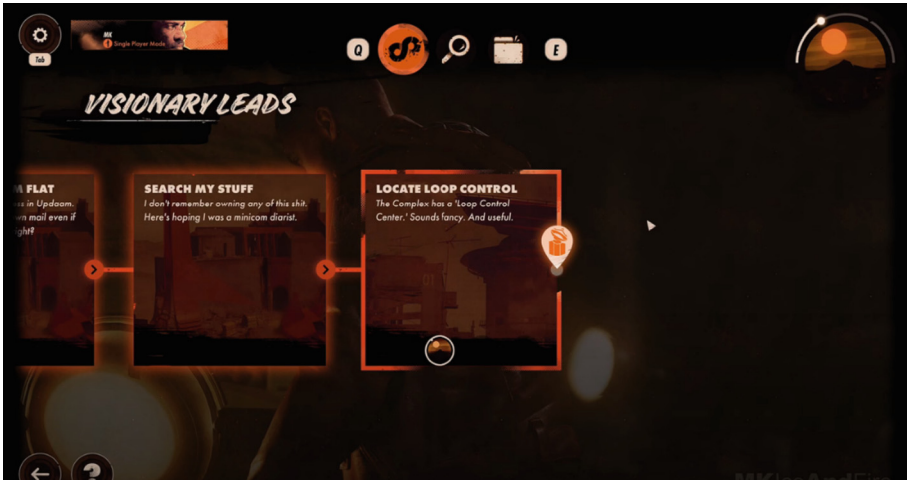
### 3.2 Deathloop

Deathloop is a game designed by Arkane Studios. It was published in September 2021.

The game takes place on an island where the player progress by finding clues on how to kill certain NPC's. These clues are collected and can be viewed in the UI menu. Here the player can get an overview of how the clues connect to each other, however, players do not have to connect them themselves. The game presents the answer and tells players where to go next instead of letting them figure it out themselves (Fig. 2).

The clue overview has many similarities to a conventional quest-log, which is a list of tasks to complete to advance the game [4].

Ultimately because the game gives the player the answers, they are not incentivized to think for themselves thus restricting their volitional engagement.

Deathloop received good reviews [6] however, has also been noted as a lost potential by some players. One reviewer reports:

**Fig. 2.** Deathloop UI clue-overview resembles a quest-log.

" *Instead of giving players the satisfaction of figuring it out for themselves, and crafting their own ending, Deathloop simply supplies players a screen (UI) with all the answers, where you are given specific tasks to figure out the next step of the puzzle.*" [3].

Deathloop has many great mechanics which leans into its detective narrative; however it fails to capitalize on these to let the player deduct new information from the clues themselves. The player's experience of their own autonomy could have been more realized.

If the game would let players figure out the answers, one clue obtained might for example show the image of the next objective without a specific location. It might describe a building with a visual metaphor resembling a mirror, and the average player would be able to find it given that the building does indeed reminds of a mirror. Here prior knowledge of the physical world has an impact on players successfully finding the correct building. In the unlikely event of a player not knowing what a mirror is, they would be lost. This is why it can be beneficial to present several different opportunities to gain information and advance. More meaningful choices mean higher chances of volitional engagement.

### 3.3 Design Guidelines

This section concludes the analysis and lists the guidelines that inspired our game's design, which will be accounted for in the next section.

Elden Ring primarily inspired the navigation and pathfinding. It demonstrates how minimizing handholding and instead guiding the players with visual landmarks, cues and inherent knowledge, the players are incentivized to think for themselves and progress through logical thinking. Also, the idea of letting the player figure things out themselves and not being afraid of letting players fail to experience a bigger sense of accomplishment when completed was inspired by this game.

Deathloop inspired the game to make use of a detective narrative and a set of mechanics that support this narrative. The idea was that the narrative presentation serves as a guide for the players motive and actions.

A second hypothesis formed:

*If players know they play the role of detective, this information will incentivize them to perform detective related actions they know from the physical world or other media. They will have the required information to start roleplaying by searching for clues, deducting answers from them, and solving puzzles. Because they know what a detective is they already have a set of information they can actively or passively apply to how, why, and what they can or want to do.*

## 4 The Game

The game was developed in Unreal Engine 5. This engine has photorealistic qualities as well as thorough physics simulation, which serves as a bonus for supporting players' suspension-of-disbelief. A video of a playthrough is linked in Appendix 3.

In the game the players enter a little village on a small Faroe island. They play as a detective who has received a job about a missing woman named Alma. They then must explore it while collecting clues, deducting new information from them, interacting with the environment, and solving small puzzles and navigating the level to receive one of three possible endings. The only explicit meta information they get is the control-scheme and the context of being a detective, which is presented in a locked-off section at the start of the map. The players must learn the controls by selecting a key, opening a door with it, and pushing a box to gain access to the small open world that is the island.

The control scheme can be seen any time the game is paused. There is a HUD element which indicates when the players can interact with something they are looking at. The objects that can be interacted with have distinct identities and affordances that communicate to the player that they can be interacted with. Some objects have meaning, and some only rely on identity to allow meaning to develop without direct guidance [5]. Keys and tools can be picked up and placed in an inventory which is displayed in the in-game characters hands. Keys are picked up in the left hand and tools in the right hand (see Fig. 3).

The axe can be used on weak-looking objects like fragile doors, boards, and windows. Smaller to medium sized objects can also be held in front of the players and then be thrown

**Fig. 3.** In-game overview of the items the player has picked up.

(see Fig. 4), and players movement actions involve walking, jumping, and climbing up on objects.

The interactions with objects are physics simulated to act as we expect from the real world.



**Fig. 4.** Screenshot from the game. The player is holding a rock.

**The Detective Presentation.** The players are also introduced to a diegetic tablet which the player character will place in front of the screen view when the keyboard button TAB is pressed (see Fig. 5). This acts as a classic detective board but as an in-universe app where the detective can overview all the collected clues. It supports players while directing them implicitly with the information contained in the clue. The clues do not tell players exactly what to do, but highlights important points that can be coupled together with other clues. For example, one clue informs players that Alma might be located at lighthouse, a second one that she is unnaturally dangerous and strong while a third one informs of a book that has information about dealing with evil demons. Players might then deduce that the book is important to deal with Alma at the lighthouse.

The detective narrative also helps guide players while also giving meaning behind their choices. Each choice and functionality are not isolated but are supported with dynamics that mean progression can be advanced in several ways: one player might find a key to a door and enters a house this way. Another player might find a rock, throws it
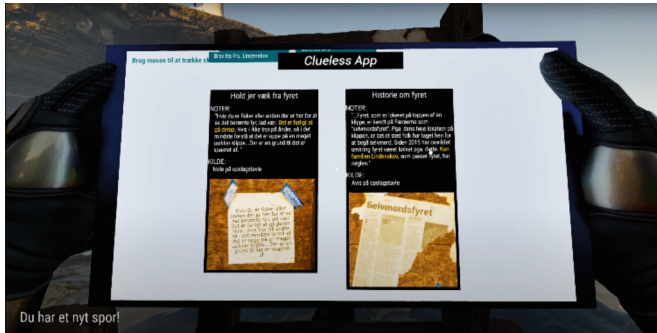
**Fig. 5.** The in-game tablet that overviews the collected clues, which give indirect information.

at a window and climbs inside the house this way. The clues are not necessary to finish the game, however a single key is needed to open a door to finish the game. The clues give information needed to acquire certain items that can change the ending. In the end, players are met with these choices and it is up to them to decide how they want to deal with Alma in the lighthouse. There are clues that each gives the player the necessary information to have an idea of what each option might result in. If players are unhappy with the choice they made, they can simply play it again and try out a different one.

**Environment and Level Design.** The environment and level consist of five distinctive houses: a dock house at the start area, two residential houses, one shed and one old prayer house. There is also a lighthouse on a cliff which must be accessed via a locked door, a beach, a main road, and off-road and the dock where players start.

The lighthouse and the cliff are landmarks that acts as navigational guides. It is also at the lighthouse where players finish the game.

The water and the cliffs act as a natural barrier to enclose the playable space (Fig. 6).



**Fig. 6.** The lighthouse on the cliff.

## 5   The Experiment

We stipulated two hypotheses:

*H1: Thorough and consistent simulations can lead to an increased sense of autonomy.*

*H2: Framing players expectations within the role of a detective and supporting these with detective-like functionalities will encourage players to act autonomously.*

In order to test the hypotheses, we conducted tests over five iterations of the game, after which a questionnaire was administered. Each new version of the game was improved using the findings from the previous test, until a version had been achieved that was to our satisfaction and gave good insight into how the autonomous experiences had improved. Each test of a version involved between two and 8 participants, roughly split evenly between genders and with age ranging from 21 to 29. The first and last test had the most participants of 6 and 8. In total 12 different participants tested the game.

The protocol of each test included probes designed to evaluate the autonomous experiences of the participants.

Firstly, participants were introduced to the game. The only information they were given was that they were detectives solving a mystery.

When they finished it, they were asked questions relating to their experience of the video game about their actions and thoughts. The questionnaire can be found in the appendix.

In the first and last version, they were given a questionnaire based on the Player Experience Inventory, PXI, which is a model used to evaluate the players emotional responses to games. The questionnaire focused on PXI questions relating to autonomy, immersion ease of control, goals and rules, progress feedback audiovisual appeal, meaning, curiosity, and narrative [13, 14]. These can be seen in Appendix 1 and 2.

## 6   Results

The most relevant findings are:

Overall better autonomous responses from the participants in the improved version (see Figs. 7 and 8). Participants felt freer to think for themselves in the final version. Some of the participants that had experienced high feelings of autonomy, said it was because they felt free to figure things out themselves in their own pace. It was when the players expectations were fully supported with functionality, that they reported very high levels of satisfaction.

Misinterpretations of object affordances and not knowing which buttons to press resulted in worse autonomous experiences because participants tried to interact with non-functional objects. This was also backed when the later versions had tutorials that explained how to control the game on the keyboard, which increased autonomy. Functionalities that did not act as expected or the lack of functionality where players expected it significantly reduced the players incentive to find new clues.

Interpretations of implicit information in clues had to be supported. In some instances, the participants interpreted them differently than we had imagined, resulting in incidents of feeling restricted or frustrated. If their interpretations of clues aligned with their actual meaning, they reported intense feelings of reward. This was improved by making important information in clues clearer. A balance between implicit and explicit.

Their sense of progression was improved in later versions. We figure it is due to clearer goals deducted from clearer clues.

Some reported being satisfied with how they had to explore and connect the clues to gain new information, which backs up the importance of letting players develop meaning themselves from object identity.

The participants of the first versions were not informed that they played as a detective, where the participants in the later versions did. We observed that players that had this information played differently. They more often interacted with actual interactable objects because they knew what to look for. They also commented that this was indeed the case.

All responses from the questionnaire can be found in the appendix.

3. Goals and Rules

6 Responses

| ID ↑ | Name | I grasped the overall goal of the game | The goals of the game were clear to me | I understood the objectives of the game |
|---|---|---|---|---|
| 1 | anonymous | 4 Agree | 5 Strongly agree | 5 Strongly agree |
| 2 | anonymous | 3 Neither agree nor disagree | 2 Disagree | 3 Neither agree nor disagree |
| 3 | anonymous | 5 Strongly agree | 4 Agree | 4 Agree |
| 4 | anonymous | 5 Strongly agree | 4 Agree | 3 Neither agree nor disagree |
| 5 | anonymous | 5 Strongly agree | 4 Agree | 5 Strongly agree |
| 6 | anonymous | 5 Strongly agree | 4 Agree | 4 Agree |

**Fig. 7.** Autonomy responses on first version

10. Autonomy

8 Responses

| ID ↑ | Name | Responses | | |
|---|---|---|---|---|
| | | I felt free to play the game in my own way | I felt like I had choices regarding how I wanted to play this game | I felt a sense of freedom about how I wanted to play this game |
| 1 | anonymous | 5 Strongly agree | 5 Strongly agree | 4 Agree |
| 2 | anonymous | 5 Strongly agree | 5 Strongly agree | 4 Agree |
| 3 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |
| 4 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |
| 5 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |
| 6 | anonymous | 4 Agree | 3 Neither agree nor disagree | 4 Agree |
| 7 | anonymous | 5 Strongly agree | 4 Agree | 4 Agree |
| 8 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |

**Fig. 8.** Autonomy responses on final version

## 6.1 Discussion

This section serves first and foremost as a discussion of the findings, and a list of ways these findings constitutes to which developers can utilize when developing a game that focus on the players' autonomy.

**Logical Functionalities.** It is not technologically feasible to simulate the real world one to one easily. We can however filter the functionalities we implement into games, with the criteria that they must satisfy to the players expectations when it comes to their interactions. If their suspension-of-disbelief is negatively affected, it might be a sign these expectations have not been accommodated. Affordances tell the player what they can do with an object, and misinterpretations of them, such as not being able to pick up a knife in a game where you must defend yourself, can have significant negative long-lasting effects on the players' motivation to think for themselves.

Consistency incentivizes creative thinking. The player will look for opportunities based on their experience from interacting with the game's system. For example, if they can throw a rock to destroy a window, they might think about throwing a rock at another object that has a visual identity that resembles a weak structure. In the opposite way, if they cannot destroy the window, they might be less incentivized to explore other tactics and interactions, this ending up being lost and frustrated.

However, there is also a satisfaction to be had in letting players apply meaning themselves to their interactions and explore the functionalities and new information this way.

**Implicit Information and the Advantages of More Choices.**  Primarily informing the player implicitly is usually a sure way to make the player not feel handheld. However, it requires a setup where the player will obtain this information one way or another. Because implicit information can be overlooked or simply misinterpreted, it can be an advantage to have several ways to find one point of information, so one way or another the player will very likely find it.

**Tools Instead of Explicit Guides.**  Because humans have deductive abilities, supporting their deduction with tools is a great way to incentivize them to think for themselves. Instead of giving explicit guiding on why, how, and what to do, games can supply players, for example, with a diegetic map where they can pin important points of interests themselves, instead of the game automatically doing it. Diegetic elements instead of UI can be a great way to inform the player of explicit information while it still upholding the players' suspension-of-disbelief. For example, a physical map instead of a UI map.

**Navigation.**  It is evident from the experiments and the analysis of Elden Ring, that navigation can be thoroughly enjoyable without a mini-map, quest-log, or waypoints: Contrast, color, shape language, affordance, visual identity, landmarks, and structures can all help with the cognitive mapping of the environment to the players' navigation satisfaction.

## 7  Conclusion

On the notion that autonomous experiences are crucial for players to feel in control and satisfied with their choices in games, this paper has accounted for the broad criteria for them to be facilitated in games. It has also notably explored the concept of handholding in games and its impact on players' autonomous experiences. Handholding refers to the tendency of games to overexplain and guide players excessively, reducing their sense of ownership and self-governance. The term handholding is not well defined in the domain of games and this paper hopes to validate its importance. We have discussed the positive effects of handholding, such as reducing frustration and providing clear guidance to players. It can be beneficial for certain goals. However, excessive handholding can limit players' volitional engagement and meaningful choices, ultimately diminishing their autonomy.

Analyzing critically acclaimed games, we observed the implications of handholding on players' autonomous experiences. Games like Elden Ring by FromSoftware demonstrated the success of implicit communication and minimal handholding. These games rely on environmental cues, landmarks, and visual elements to guide players, allowing them to figure out how to progress and make meaningful choices independently.

To substitute handholding and its negative effects while still providing enough information to avoid frustration, we offered a hypothetical approach of simulation. This proposed that by simulating players' expected outcomes based on their inherent knowledge and real-world experiences, games can inform players implicitly and support their autonomy simultaneously.

A game was developed to test the hypotheses laid out at the end of Sects. 2 and 3. The game was tested and iterated upon, resulting in a version which satisfied the autonomous experiences of the participants. They were each conversed with and answered a questionnaire. Findings from these tests included that the players' autonomous and immersive experiences were heavily affected by the simulation qualities of aspects like affordances, visual cues, contrasting elements, logical interactions and functionalities, and environmental navigation. If the players' expectations of alle these systems were met, the autonomous experience were better. The importance of balancing explicit communication of meta information, such as button-mapping and feedback, with implicit communication of in-game functionalities became essential to strike the right balance.

In conclusion, while handholding can provide benefits in terms of less frustration, it heavily hinders the autonomous experience of the players. By leveraging implicit information in the form of composition, visual identities, meaning, form language, color, affordance, and simulating expected outcomes, games can empower players to think for themselves and take ownership of their actions, in turn resulting in more satisfying experiences and motivations to play the game again. Future research and game development should continue to explore ways to enhance autonomy in games and create less trivialized and more satisfying player experiences.

# Appendix 1. PXI Based Questionnaire Results from Testing First Version of the Game

1. I regularly play games on PC or console (Playstation, Nintendo, Xbox and so on...)

6 Responses

| ID ↑ | Name | Responses |
| --- | --- | --- |
| 1 | anonymous | 1 Strongly disagree |
| 2 | anonymous | 1 Strongly disagree |
| 3 | anonymous | 5 Strongly agree |
| 4 | anonymous | 2 Disagree |
| 5 | anonymous | 2 Disagree |
| 6 | anonymous | 2 Disagree |

2. Ease of control

6 Responses

| ID ↑ | Name | It was easy to know how to perform actions in the game | The actions to control the game were clear to me | I thought the game was easy to control |
| --- | --- | --- | --- | --- |
| 1 | anonymous | 2 Disagree | 4 Agree | 4 Agree |
| 2 | anonymous | 5 Strongly agree | 4 Agree | 4 Agree |
| 3 | anonymous | 4 Agree | 4 Agree | 5 Strongly agree |
| 4 | anonymous | 4 Agree | 3 Neither agree nor disagree | 4 Agree |
| 5 | anonymous | 4 Agree | 3 Neither agree nor disagree | 3 Neither agree nor disagree |
| 6 | anonymous | 4 Agree | 5 Strongly agree | 5 Strongly agree |

6 Responses

| ID ↑ | Name | Responses | | |
|---|---|---|---|---|
| | | I grasped the overall goal of the game | The goals of the game were clear to me | I understood the objectives of the game |
| 1 | anonymous | 4 Agree | 5 Strongly agree | 5 Strongly agree |
| 2 | anonymous | 3 Neither agree nor disagree | 2 Disagree | 3 Neither agree nor disagree |
| 3 | anonymous | 5 Strongly agree | 4 Agree | 4 Agree |
| 4 | anonymous | 5 Strongly agree | 4 Agree | 3 Neither agree nor disagree |
| 5 | anonymous | 5 Strongly agree | 4 Agree | 5 Strongly agree |
| 6 | anonymous | 5 Strongly agree | 4 Agree | 4 Agree |

## 4. Progress Feedback

6 Responses

| ID ↑ | Name | Responses | | |
|---|---|---|---|---|
| | | The game informed me of my progress in the game | I could easily assess how I was performing in the game | The game gave clear feedback on my progress towards the goals |
| 1 | anonymous | 3 Neither agree nor disagree | 5 Strongly agree | 4 Agree |
| 2 | anonymous | 3 Neither agree nor disagree | 5 Strongly agree | 4 Agree |
| 3 | anonymous | 3 Neither agree nor disagree | 3 Neither agree nor disagree | 3 Neither agree nor disagree |
| 4 | anonymous | 3 Neither agree nor disagree | 3 Neither agree nor disagree | 2 Disagree |
| 5 | anonymous | 4 Agree | 4 Agree | 4 Agree |
| 6 | anonymous | 3 Neither agree nor disagree | 4 Agree | 3 Neither agree nor disagree |

## 5. Audiovisual Appeal

2 Responses

| ID ↑ | Name | Responses | | |
|---|---|---|---|---|
| | | I enjoyed the way the game was styled | I liked the look and feel of the game | I appreciated the aesthetics of the game |
| 1 | anonymous | 5 Strongly agree | 4 Agree | 5 Strongly agree |
| 2 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |

## 6. Meaning

6 Responses

| ID ↑ | Name | Responses | | |
|---|---|---|---|---|
| | | Playing the game was meaningful to me | The game felt relevant to me | Playing this game was valuable to me |
| 1 | anonymous | 5 Strongly agree | 4 Agree | 5 Strongly agree |
| 2 | anonymous | 4 Agree | 5 Strongly agree | 5 Strongly agree |
| 3 | anonymous | 3 Neither agree nor disagree | 4 Agree | 4 Agree |
| 4 | anonymous | 4 Agree | 5 Strongly agree | 4 Agree |
| 5 | anonymous | 3 Neither agree nor disagree | 4 Agree | 3 Neither agree nor disagree |
| 6 | anonymous | 5 Strongly agree | 4 Agree | 5 Strongly agree |

## 7. Curiosity

6 Responses

| ID ↑ | Name | Responses | | |
|------|------|-----------|---|---|
| | | I wanted to explore how the game evolved | I wanted to find out how the game progressed | I felt eager to discover how the game continued |
| 1 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |
| 2 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |
| 3 | anonymous | 4 Agree | 5 Strongly agree | 4 Agree |
| 4 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |
| 5 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |
| 6 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |

## 8. Immersion

6 Responses

| ID ↑ | Name | Responses | | |
|------|------|-----------|---|---|
| | | I was no longer aware of my surroundings while I was playing | I was immersed(fordybet) in the game | I was fully focused on the game |
| 1 | anonymous | 3 Neither agree nor disagree | 4 Agree | 3 Neither agree nor disagree |
| 2 | anonymous | 4 Agree | 4 Agree | 4 Agree |
| 3 | anonymous | 4 Agree | 4 Agree | 4 Agree |
| 4 | anonymous | 4 Agree | 5 Strongly agree | 4 Agree |
| 5 | anonymous | 4 Agree | 4 Agree | 4 Agree |
| 6 | anonymous | 4 Agree | 4 Agree | 4 Agree |

## 9. If there was something that retracked from your immersion, can you explain what it is?

1 Responses

| ID ↑ | Name | Responses |
|------|------|-----------|
| 1 | anonymous | other sound and noises |

## 10. Autonomy

6 Responses

| ID ↑ | Name | I felt free to play the game in my own way | I felt like I had choices regarding how I wanted to play this game | I felt a sense of freedom about how I wanted to play this game |
|---|---|---|---|---|
| 1 | anonymous | 4 Agree | 3 Neither agree nor disagree | 4 Agree |
| 2 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |
| 3 | anonymous | 5 Strongly agree | 4 Agree | 4 Agree |
| 4 | anonymous | 4 Agree | 4 Agree | 4 Agree |
| 5 | anonymous | 5 Strongly agree | 4 Agree | 4 Agree |
| 6 | anonymous | 3 Neither agree nor disagree | 3 Neither agree nor disagree | 3 Neither agree nor disagree |

## 11. Autonomy ekstra

2 Responses

| ID ↑ | Name | I felt constrained by the mechanics in the game | I felt the game did not let me do things I would have liked to, to solve problems my own way |
|---|---|---|---|
| 1 | anonymous | 2 Disagree | 3 Neither agree nor disagree |
| 2 | anonymous | 2 Disagree | 3 Neither agree nor disagree |

## 12. Narrative

2 Responses

| ID ↑ | Name | I would be able to retell the story to someone | I felt immersed in the story | I wanted to see how the story progressed | I felt the story was believable |
|---|---|---|---|---|---|
| 1 | anonymous | 5 Strongly agree | 4 Agree | 4 Agree | 4 Agree |
| 2 | anonymous | 4 Agree | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |

# Appendix 2. PXI Questionnaire Results from Testing Final Version of the Game

1. I regularly play games on PC or console (Playstation, Nintendo, Xbox and so on...)

8 Responses

| ID ↑ | Name | Responses |
|------|------|-----------|
| 1 | anonymous | 3 Neither disagree nor agree |
| 2 | anonymous | 1 Strongly disagree |
| 3 | anonymous | 2 Disagree |
| 4 | anonymous | 5 Strongly agree |
| 5 | anonymous | 1 Strongly disagree |
| 6 | anonymous | 1 Strongly disagree |
| 7 | anonymous | 5 Strongly agree |
| 8 | anonymous | 1 Strongly disagree |

2. Ease of control

8 Responses

| ID ↑ | Name | It was easy to know how to perform actions in the game | The actions to control the game were clear to me | I thought the game was easy to control |
|------|------|------|------|------|
| 1 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |
| 2 | anonymous | 4 Agree | 5 Strongly agree | 5 Strongly agree |
| 3 | anonymous | 4 Agree | 5 Strongly agree | 4 Agree |
| 4 | anonymous | 4 Agree | 4 Agree | 4 Agree |
| 5 | anonymous | 4 Agree | 3 Neither agree nor disagree | 3 Neither agree nor disagree |
| 6 | anonymous | 4 Agree | 4 Agree | 4 Agree |
| 7 | anonymous | 4 Agree | 5 Strongly agree | 5 Strongly agree |
| 8 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |

## 3. Goals and Rules

8 Responses

| ID ↑ | Name | Responses | | |
|---|---|---|---|---|
| | | I grasped the overall goal of the game | The goals of the game were clear to me | I understood the objectives of the game |
| 1 | anonymous | 4 Agree | 4 Agree | 4 Agree |
| 2 | anonymous | 4 Agree | 4 Agree | 4 Agree |
| 3 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |
| 4 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |
| 5 | anonymous | 4 Agree | 2 Disagree | 3 Neither agree nor disagree |
| 6 | anonymous | 4 Agree | 4 Agree | 4 Agree |
| 7 | anonymous | 4 Agree | 5 Strongly agree | 4 Agree |
| 8 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |

### 4. Progress Feedback

8 Responses

| ID ↑ | Name | The game informed me of my progress in the game | I could easily assess how I was performing in the game | The game gave clear feedback on my progress towards the goals |
|---|---|---|---|---|
| 1 | anonymous | 4 Agree | 4 Agree | 4 Agree |
| 2 | anonymous | 3 Neither agree nor disagree | 4 Agree | 3 Neither agree nor disagree |
| 3 | anonymous | 4 Agree | 3 Neither agree nor disagree | 4 Agree |
| 4 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |
| 5 | anonymous | 2 Disagree | 2 Disagree | 3 Neither agree nor disagree |
| 6 | anonymous | 2 Disagree | 3 Neither agree nor disagree | 3 Neither agree nor disagree |
| 7 | anonymous | 4 Agree | 3 Neither agree nor disagree | 3 Neither agree nor disagree |
| 8 | anonymous | 4 Agree | 5 Strongly agree | 4 Agree |

### 5. Audiovisual Appeal

8 Responses

| ID ↑ | Name | I enjoyed the way the game was styled | I liked the look and feel of the game | I appreciated the aesthetics of the game |
|---|---|---|---|---|
| 1 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |
| 2 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |
| 3 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |
| 4 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |
| 5 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |
| 6 | anonymous | 5 Strongly agree | 4 Agree | 5 Strongly agree |
| 7 | anonymous | 4 Agree | 4 Agree | 4 Agree |
| 8 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |

## 6. Meaning

8 Responses

| ID ↑ | Name | Responses | | |
|---|---|---|---|---|
| | | Playing the game was meaningful to me | The game felt relevant to me | Playing this game was valuable to me |
| 1 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |
| 2 | anonymous | 5 Strongly agree | 4 Agree | 5 Strongly agree |
| 3 | anonymous | 4 Agree | 3 Neither agree nor disagree | 4 Agree |
| 4 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |
| 5 | anonymous | 4 Agree | 3 Neither agree nor disagree | 4 Agree |
| 6 | anonymous | 4 Agree | 4 Agree | 4 Agree |
| 7 | anonymous | 5 Strongly agree | 4 Agree | 4 Agree |
| 8 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |

## 7. Curiosity

8 Responses

| ID ↑ | Name | Responses | | |
|---|---|---|---|---|
| | | I wanted to explore how the game evolved | I wanted to find out how the game progressed | I felt eager to discover how the game continued |
| 1 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |
| 2 | anonymous | 4 Agree | 5 Strongly agree | 5 Strongly agree |
| 3 | anonymous | 5 Strongly agree | 4 Agree | 5 Strongly agree |
| 4 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |
| 5 | anonymous | 5 Strongly agree | 4 Agree | 5 Strongly agree |
| 6 | anonymous | 5 Strongly agree | 4 Agree | 5 Strongly agree |
| 7 | anonymous | 4 Agree | 4 Agree | 4 Agree |
| 8 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |

## 8. Immersion

8 Responses

| ID ↑ | Name | Responses | | |
| --- | --- | --- | --- | --- |
| | | I was no longer aware of my surroundings while I was playing | I was immersed(fordybet) in the game | I was fully focused on the game |
| 1 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |
| 2 | anonymous | 3 Neither agree nor disagree | 4 Agree | 4 Agree |
| 3 | anonymous | 4 Agree | 5 Strongly agree | 5 Strongly agree |
| 4 | anonymous | 4 Agree | 4 Agree | 4 Agree |
| 5 | anonymous | 4 Agree | 5 Strongly agree | 5 Strongly agree |
| 6 | anonymous | 4 Agree | 5 Strongly agree | 4 Agree |
| 7 | anonymous | 3 Neither agree nor disagree | 4 Agree | 4 Agree |
| 8 | anonymous | 4 Agree | 4 Agree | 4 Agree |

## 9. If there was something that retracked from your immersion, can you explain what it is?

4 Responses

| ID ↑ | Name | Responses |
| --- | --- | --- |
| 1 | anonymous | sound |
| 2 | anonymous | I was surrounded by friends, and we had great fun talking |
| 3 | anonymous | If I was unable to accomplish something I wanted to do (like hit something with the axe, walk into the water etc) it could effect my focus on the game. |
| 4 | anonymous | lav FPS |

## 10. Autonomy

8 Responses

| ID ↑ | Name | Responses | | |
|---|---|---|---|---|
| | | I felt free to play the game in my own way | I felt like I had choices regarding how I wanted to play this game | I felt a sense of freedom about how I wanted to play this game |
| 1 | anonymous | 5 Strongly agree | 5 Strongly agree | 4 Agree |
| 2 | anonymous | 5 Strongly agree | 5 Strongly agree | 4 Agree |
| 3 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |
| 4 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |
| 5 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |
| 6 | anonymous | 4 Agree | 3 Neither agree nor disagree | 4 Agree |
| 7 | anonymous | 5 Strongly agree | 4 Agree | 4 Agree |
| 8 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |

## 11. Autonomy ekstra

8 Responses

| | | the game | solve problems my own way | interacted with them | too much | direct the ending | leads just by looking at them |
|---|---|---|---|---|---|---|---|
| 1 | anonymous | 2 Disagree | 3 Neither agree nor disagree | 5 Strongly agree | 5 Strongly agree | 4 Agree | 5 Strongly agree |
| 2 | anonymous | 2 Disagree | 2 Disagree | 5 Strongly agree | 4 Agree | 4 Agree | 4 Agree |
| 3 | anonymous | 1 Strongly disagree | 1 Strongly disagree | 5 Strongly agree | 5 Strongly agree | 4 Agree | 4 Agree |
| 4 | anonymous | 1 Strongly disagree | 1 Strongly disagree | 5 Strongly agree | 5 Strongly agree | 4 Agree | 5 Strongly agree |
| 5 | anonymous | 3 Neither agree nor disagree | 1 Strongly disagree | 5 Strongly agree | 5 Strongly agree | 2 Disagree | 3 Neither agree nor disagree |
| 6 | anonymous | 4 Agree | 4 Agree | 3 Neither agree nor disagree | 4 Agree | 4 Agree | 4 Agree |
| 7 | anonymous | 2 Disagree | 2 Disagree | 4 Agree | 5 Strongly agree | 3 Neither agree nor disagree | 5 Strongly agree |
| 8 | anonymous | 2 Disagree | 2 Disagree | 5 Strongly agree | 5 Strongly agree | 4 Agree | 4 Agree |

12. Anything you would like to add to your answers about autonomy?

**3** Responses

| ID ↑ | Name | Responses |
|---|---|---|
| 1 | anonymous | limitation of physical movement |
| 2 | anonymous | Had some difficulties differentiating between my bag, my clues, and what i had in my left and right hand. Sometimes you should left click sometimes you should press E. While it was easy to figure out, it wasn't intuitive |
| 3 | anonymous | Det var fedt, at man kunne tage tingene i sin egen rækkefølge og selv gå rundt og udforske |

13. Narrative

**8** Responses

| ID ↑ | Name | I would be able to retell the story to someone | I felt immersed in the story | I wanted to see how the story progressed | I felt the story was believable |
|---|---|---|---|---|---|
| 1 | anonymous | 4 Agree | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |
| 2 | anonymous | 4 Agree | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |
| 3 | anonymous | 5 Strongly agree | 5 Strongly agree | 4 Agree | 5 Strongly agree |
| 4 | anonymous | 5 Strongly agree | 4 Agree | 5 Strongly agree | 5 Strongly agree |
| 5 | anonymous | 4 Agree | 4 Agree | 4 Agree | 4 Agree |
| 6 | anonymous | 4 Agree | 4 Agree | 4 Agree | 4 Agree |
| 7 | anonymous | 3 Neither agree nor disagree | 3 Neither agree nor disagree | 3 Neither agree nor disagree | 4 Agree |
| 8 | anonymous | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree | 5 Strongly agree |

14. Want to add something else?

2 Responses

| ID ↑ | Name | Responses |
|---|---|---|
| 1 | anonymous | I loved that I could jump and sprint <3 |
| 2 | anonymous | Great to play around in the game while collecting the clues. If you are a bit unfocused you can always just go and explore the game. Even if you just want to throw a rock at someones window. :-) |

## YouTube Video of a Playthrough of the Game Experiment

https://www.youtube.com/watch?v=o_eBtfHb90Q.

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