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BTH

Bachelor's thesis in media technology, Department of Technology and Aesthetics, Spring semester 2024

The Uphold of Flow in Games

- and how game designers can communicate their rules efficiently



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Abstract

The aim of this paper was to find what informative tools exist in which information about game mechanics can be visually communicated to the player. Moreso, a simplistic puzzle game consisting of five levels was created to test the different tools in how productive they are for game testers to understand and be immersed by. The test was conducted to see which tool would make the game testers experience a state of Flow. Observers were asked to comment on how the game testers reacted during the puzzle solving in the levels to give an outsider perspective on the development. The results showed that two tools were considerably more immersive than the others, and were also found to improve the quality on more levels than one. In conclusion, the tools can be used together for a better user experience, and the chosen tools for a game should be adapted accordingly to the type of game and the target audience.

Key words: Flow, informative tools, game test, game design, visual design, game development, puzzle, problem solving

Introduction

Many people have tried a game at least once in their lives, whether it be a board game or a video game. One thing that all these games have in common are the mechanics that build the game. The ones conducting this research paper are no strangers to games of all different genres, and therefore know the way around certain game mechanics, and the introductions to them. When these introductions are conveyed to the player without their understanding being respected, the game experience suffers. A game is supposed to be fun and a form of stress relief; having an introduction to new game mechanics that are incredibly hard to understand will give the player the opposite feeling.

Some introductions to game mechanics come across as discrete while others might be referred to as hand-holding by players. Mechanics can be both player actions, but also abstract rules of the game that the characters in the game are not aware of. Examples of actions are running, jumping, pushing, pulling, i.e. different verbs. Meanwhile, examples of the abstract rules are turns in a turn-based style game, time limits, randomly generated numbers, and experience points (Kramarzewski & De Nucci, 2023).

Game mechanics are the core of what a game truly is. They are the interactions and relationships that remain when all of the aesthetics, technology, and story are stripped away.

- Jesse Schell (chapter 10, 2015)

In *The Art of Game Design* (2015), Jesse Schell states, as seen in the quote above, game mechanics are a fundamental part of the game's core. A game designer could make a game with an interesting story that could potentially captivate a player for hours, yet if the mechanics are not thoroughly planned, the experience could be doomed. No game designer would like the player to stop playing the game because of an unsatisfactory experience, therefore the game's mechanics should be considered a high priority in the planning and development phases of the game.

Background

When conveying information in video games, there is communication between the game designer and the player. The game designer essentially explains to the player how to manoeuvre or face the task at hand. The more comprehensible the information is conveyed, the less room for misunderstandings will occur. The communicational bridge between game designer and player is not always a steadily built one, but it is the core of this research to find a way on how to build them.

For a player to be interested in the game, it is not only the game mechanics that should be appealing, the gameplay needs to be appealing in every aspect as well. In *Practical Game Design* (2023), Kramarzewski and De Nucci mention that the gameplay goes hand in hand with other aspects of the game and can all be described as part of the experience. While game mechanics are a fundamental component of the gameplay, it is also important to consider other components, such as dynamics and Flow. These should be used together with game mechanics in order to create a desirable gameplay experience.

As a game designer it can be challenging to invent innovative game mechanics, especially since there are many games already released with creative mechanics. A game designer does not necessarily have to create new mechanics however; they will more often than not use previously invented mechanics in their own games. Kramarzewski and De Nucci describe game mechanics as “[...] ingredients ready to be mixed into all sorts of recipes, and you are the chef!” (chapter 5). As a game designer, one should not be afraid to test different mechanics and find which one suits best for the intended game environment.

While it can be thrilling to invent something that has not been used in a game before, the game designer should ask themselves if it really is necessary to bring something new to the table when there exists perfectly acceptable mechanics that many players already are familiar with.

One of the most famous game mechanics is the jumping mechanic, which was first introduced in *Donkey Kong (1981)* (Wikipedia, 2024). Despite this not being a newly invented game mechanic, it is still used in games from all sorts of genres, which proves that it is not necessary for new mechanics to be invented in order to have a playable game. A game needs to be more than just playable however, as a playable game without an interesting story or otherwise captivating mechanic will simply just be a sandbox. It is important for the game designer to be able to balance the use of mechanics in their game for it to be an enjoyable experience (Kramarzewski & De Nucci, 2023).

In this research, the objective is to research and discover what strengthens and what weakens the introduction to certain game mechanics. To complement the findings, a simplistic game was created that makes use of the different methods of visually conveying the functionality of the game's mechanics. The game is playable on the computer, along with a keyboard and mouse. The games being researched are within the limited scope of being top-down view RPGs with 2D graphics. The selected games of evaluation are: *Misao* (2011), *Corpse Party* (2008), *Pokémon Diamond/Pearl* (2007), *Omori* (2020), *Mad Father* (2012), and *The Witch's House* (2012). These games contain pixel art for the environment and characters, and often contain a series of puzzles and problem solving in order to progress. The created game uses 2D artstyle and puzzle mechanics, and different kinds of methods to introduce how the puzzle mechanics will work for each level in the game. Each level in the game consists of a different room where the goal is for the player to solve the puzzle and get out, which is possible by interacting with certain objects that exist in the room. Other games outside of the chosen scope will be mentioned further into the paper for examples, clarifications, and comparisons.

As stated above, the methods discovered are separated into different levels in the game, this was in order to conduct interviews with game testers and have them evaluate how well the game mechanics were introduced to them in every level. The information is conveyed through the visual aspects of the game, meaning that the game is purely using everything that the player can *see* on their screen without relying on complementary audio sources that could otherwise allow the game to communicate with the player.

Purpose

The goal is to investigate the possible dos and don'ts within introductions to game mechanics. Additionally, its purpose is how to maintain the player's state of Flow whilst interacting with the introduction in question. It is aimed towards striving game designers, veterans, and for anyone interested in the concept of communication between the ones making the games and the ones playing it. While the current hypothesis is that there will not be any "correct" or "incorrect" way of making such introductions, this paper is meant to unravel the patterns and most practical ways that encourage players to immerse themselves in the game and the experience that arises from it.

The questions to be researched are as follows:

- ❖ What different ways exist today in which information about game mechanics is communicated to the player within the chosen scope of game genre?
- ❖ How can the information be visually presented so as to not disturb the game's Flow?

It is not often a game designer decides to equip the lens of a player. Schell (2015) points out the importance of understanding the target audience and their wants; imagining oneself in the position of a certain target group will help with the development of a desirable experience. The game designer must ask themselves what the target audience likes in general, what is unappealing for them, what they expect to see, what the game designer themselves would like to see if they were a part of the target group, and what the target group would like or dislike about the game designer's game in particular. As Schell states: "A good game designer should always be thinking of the player, and should be an advocate for the player." (chapter 8). While concluding the answer to the second research question, it is therefore important to consider the fact that different target groups will experience the game differently, simply because no one group will have the same interests as another.

The intention behind this research paper is to enhance the understanding of game designers and to further promote the value of the player's experience. Stepping away from the game designer's seat once in a while will lend a valuable insight of how the mechanics intertwine with the experience altogether. To reiterate from the previous example of how the components could be compared to ingredients, sometimes the chef needs to taste their own dish in order to know how to improve their craft, instead of consistently recreating it over and over again. Adding new ingredients might enhance the dish, or in this case - the game - to further add to the experience for the player.

Study design - a game

To reach a result in this research, a game was created consisting of five levels designed with the help of the methods. These levels are designed as digital escape rooms for one player. The test player's task is to solve the puzzle presented and then escape. The levels are all separated from one another in terms of their designs. They are given the choice to select any level in any order. Once the test player has finished the game (either fully or if they interrupted it) they are to be interviewed about their experience. The game was created for PC use using Unity. The game has not been designed from a visually aesthetic perspective as its purpose is to explore functions and the ways they are explained to the player, hence high quality assets are not to be expected.

Methods and terminology

The six categories of game mechanics

Schell (2015, chapter 10) describes how game mechanics can be separated into six main categories and how each one of these can provide the game designer useful insights on the game design. While all of these categories can be useful in some way for different kinds of games, the last category, **chance**, has been omitted, because it is not relevant to the kind of game that is being made.

Space

The first category is **space**, which Schell states that every game possesses. Whether it is a digital game or a board game, the gameplay is confined to a "magic circle" and shows the player what actually exists in the game. When looking at the simple, abstract construction of a game's space, they generally have bounded areas, some number of dimensions, and can be either discrete or continuous.

The game created is confined to the boundaries of the rooms inside of the game. While what the player sees is entirely two dimensional, one could argue that the environment in itself is three dimensional since the playable character is able to walk around freely and interact with certain objects. This also makes the game's space continuous, since different areas in the room will hold different interactable objects, therefore the actual position of the player matters. To compare this with a discrete space, Schell mentions how the squares in tic-tac-toe are discrete. It does not matter where in the square the cross or circle is placed, because it will all mean the same thing according to the rules of the game.

Objects, attributes, and states

The second category is about **objects, attributes, and states**. A game space is generally inhabited by different kinds of objects; props and characters are two examples of this. The objects often hold certain attributes that describe information regarding the object in question. An example of an attribute that a character (playable or not) could have is health. The attributes will also have different states, for example, the health attribute could have a "maximum health" state, and a "current health" state. The first one would be described as a static state, which means it will rarely or never change throughout the game, while the second state is dynamic and therefore will constantly change during the gameplay. Schell expresses that objects are nouns of game mechanics, and the attributes and their states are the adjectives.

In the game, the playable character is considered the object. During the Interact level, the character has a normal, happy attribute, which in this case is portrayed as the health bar. If interacting with the wrong object, the happy attribute's state goes from happy to sad, indicating that damage has been done.

Actions

The third kind of game mechanic are the **actions**. They can be described as the verbs of game mechanics. The actions can be categorised as operative actions and resultant actions. Operative actions are things like player movement, the basic actions a player can take. The resultant actions however can be described as the things that will leave an impact or be meaningful to the progress of the game.

In the case of the game being created in relation to this paper, the character will be able to walk around (operative) in order for them to find the correct objects to interact with (resultant) which will eventually trigger the door to open and let the player progress.

Rules

The fourth, and according to Schell, the most fundamental mechanic, are **rules**. The rules define the space, for example not being able to walk through a wall. They also define what actions are allowed and what consequences certain actions will have on the gameplay's progress. Additionally, they also define the goals that the players strive to achieve. A goal should be concrete, achievable, and rewarding. Concrete means the players should clearly understand what the goal of the game is, the goal should also be achievable so the player will not give up because they find the challenge of achieving said goal too difficult, and they should feel rewarded for reaching the goal. If the challenge of achieving the goal is in itself perfectly balanced, then it could be rewarding enough for the player.

The game has one clear goal for the players to achieve: unlock the room so they can move onto the next level of their choice. While it will be challenging during development to evaluate the exact

difficulty of the various puzzles that the levels contain in order to progress, the hope is that the challenge of progressing will be rewarding for the game testers.

Skill

The fifth category is **skill**. Certain skills are required for a player in order for them to understand what is happening in a game. If the skill level of the player is matched to the difficulty of the game, the player will most likely feel challenged and continue playing until they get the reward of accomplishing the current challenge. Skills come in a variety of categories, the first one being *physical skills*. Physical skills include how to use a game controller and certain video game machines, such as *Dance Dance Revolution* (Wikipedia, 2024). The second skill is *mental skills*, and include aspects such as the user's ability to memorise, observe, and solve puzzles. Making decisions is also a mental skill since some games will progress differently if a certain choice is made. The last skill is *social skills*, which often is thought about as the ability to make friends and be an influence on others. In games, the social skill can instead be viewed as guessing what an opponent is thinking about, fooling an opponent, and coordinating with teammates. In multiplayer games with opposing teams, having voice chat, for example, will allow teammates to effectively communicate with each other, and also potentially taunt opposing players if global voice chat between all teams is enabled, causing their mood to be affected and therefore giving them a disadvantage during gameplay.

While the game uses a regular computer keyboard for movements and interactions, the physical skill is not the primary focus for the game. Instead, the game will make use of the mental skills of the player, allowing them to figure out how to progress with the puzzle solving. The overall experience with each level having a different approach to introducing the current game mechanics also allows the player to use the mental skill of thinking how the information will be helpful in the current level.

How these apply to the game

While the game mechanics from these five categories are not a method of introducing game mechanics in regards to how a gameplay mechanic works, they are still considered core mechanics of how a game should be built from the ground up. Therefore, the relevant categories have been applied to the game and are consistent throughout the gameplay. For example, the playable character will only be able to move within the blue space in the game, but it will be able to move freely within said space. One of the things that have been changed during gameplay however, is the introduction for how the player approaches the challenge they are faced with, and thus lets the player discover new ways of thinking and pushing forward.

Informative tools

Gazaway (chapter 18, 2021) presents different types of tools on how to convey information to the player. There are a total of six tools, but the tool of tell will be omitted as this research concerns visual aspects. These are listed as most effective to least effective and are as follows:

- ❖ **Interact** entails showing the player what to do, if they perform the correct action they are rewarded, and if not they are corrected.
- ❖ **Show** is the next tool and often involves the usage of video and audio. An NPC can be utilised to perform an act that the player later is encouraged to do.
- ❖ **Tell** calls for using audio cues to instruct the player (the omitted tool).

- ❖ **Write** entails written directions which are unfortunately less likely to be absorbed by players. It is however useful when there are no means to use **interact** or **show**. It is albeit encouraged to include **write** alongside of above mentioned tools in order for the player to have means of having a reminder of the rules.
- ❖ **Hint** makes use of iconography in order to aid players in understanding what is expected of them. This tool is in certain game mechanics the preferred one as it lets the player figure out what to do. It is important to make use of hints sparingly.
- ❖ **Guess** is considered to be the most frustrating tool as it gives the player no chance or advice on how to progress or solve the problem at hand. It punishes mistakes and discourages curiosity. In conclusion, guessing should not be needed.

Even if **interact** is placed at the top of this list, it is evidently preferred to make use of the tool which best suits the circumstance. A quest consisting of riddles requires the **write** tool, as a quest of making use of a map requires the **hint** tool. The main takeaway from a list such as this is not to see what is considered best and design only with it in mind, but to also make sense of when to apply which tool.

Flow

In Jenova Chen's thesis *Flow in Games* (n.d.), Flow is described as a diagram of balance between challenge and abilities. Additionally, it is also a balance between anxiety and boredom. If unbalance occurs, i.e. the challenge is too great, it produces anxiety, and if too small it produces boredom. Fortunately, the threshold is not very sharp and the tolerance humans possess is quite high within the principle of Flow. In the midst of this diagram, between anxiety and boredom, Flow occurs. Flow is also what transpires when the player is consumed by the game and loses the track of time and their surroundings.

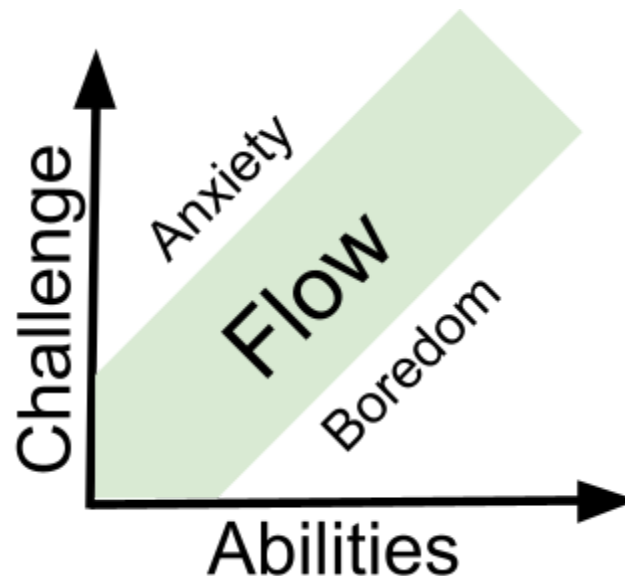


Figure 1. Flow diagram.

Flow is a fundamental part of the gaming experience. As the above methods were applied to the research, the maintenance of how Flow is treated was also analysed. Furthermore, in the game, the levels were all designed with keeping Flow in mind. After playtesting was completed, game testers evaluated

their Flow experience in a way that will measure their anxiety and boredom compared to the challenge and their abilities.

Mihaly Csikszentmihalyi, in *Flow: The Psychology of Optimal Experience* (2008, p. 6), furthermore writes about the diagram mentioned previously. The diagram, which is to say, the ratio between challenge and skill had earlier been speculated to be a diagonal experience. In other words, if the ratio is even, the enjoyment is secured. Due to empirical research performed later on, it was discovered people lacked enjoyment if the levels they were used to did not match either skill or challenge. Hence, the modified model predicts Flow when the challenge and skill are at an even, as well as the user's own level (calculated by mean). Additionally, the occurrence of anxiety is not common in everyday life and if the experience is compared to boredom, it is considered as far more negative.

Flow is an essential component to this research. While creating a game where the ratio is being upheld as well as showing respect to every player's individual level is not a task to be considered easy, it does not make it a trivial one. What matters most in this situation is to convey information so as not to disturb the experienced or discourage the less experienced player. All in all, the player's level should be respected but not be what this work is reliant on as the game is designed. In conclusion, the ratio in addition to the level shall all be balanced, but the level in this manner could be slightly disregarded.

Diegetic design

The term "diegesis" comes from Greek and means "narration" (Wikipedia, 2024). A diegetic design means that something exists in the game universe and can be perceived by the characters in the game itself. In certain games, a diegetic design could mean a heads-up display (HUD) that is a part of the playable character's equipment, for example a helmet. It could also be the instrument panel in a car in a first person view game where the player is driving a vehicle. A non-diegetic design however, would be a health bar over a character's head or an inventory on the side of the HUD.

There are ways to tell the player about important information without the use of non-diegetic design tools. Instead of the health bar, the game designer could have the character limp or bleed to indicate that damage has been done (TV Tropes, n.d.).

While the goal during development of the game was to create an experience that aims to engage the player, Galloway's (2006, pp. 12-14) findings about non-diegetic game components are beneficial to some extent. Since all games have some sort of setup (a main menu, for example), a game cannot be completely diegetic, but certain aspects of the game certainly can. An icon above a character's head or a text box telling the player what another character said will not be considered diegetic, but a painting on the wall depicting what needs to be done will. Statues of monkeys exist in the Show level and can be perceived by both the player and the game character, just like a painting on the wall. Instead of using a health bar, the playable character starts frowning when making the wrong choice in the Interact level. This lets the player know that the choice they made was wrong while still making use of a somewhat diegetic design. Because of the chosen game genre, the developed game will never be perceived as diegetic, but the game can still make use of the components available for making diegetic games as they can prove to be a more creative way of informing the player rather than just using text and icons.

What stands out in design

Depending on the design choices made, some things seem to stand out more than others for the viewer. Ware (2010) writes about certain design elements that will immediately capture the attention of the

viewer. Apart from flashing a bright light in the viewer's face, the game designer can make use of colours, shapes, movements, and angles on otherwise similar objects in a defined space to make some of them stand out. It is also described that when only a single object among all of them possesses either of these attributes, the "pop-out effect" will be the strongest.

When it comes to solving puzzles, the above mentioned attributes can be effectively used to find the right puzzle piece in order to progress and solve the puzzle. An example of this is used in the created game, with the first part of the Guess level showing three circles, but one of them is red instead of blue. Since the red circle is alone in the current state of the level, it stands out and therefore the player can probably figure out that this circle is the first one they should interact with. One of the circles during the hint level is desaturated in colour compared to the other circles, the player can therefore come to the conclusion that something is special about this one. The Interact level uses chests that occasionally show their fangs, but since they are not always showing them and there are also multiple chests with fangs in the finished version, the "pop-out effect" that Ware mentioned is not as prominent as it would have been if only one chest owned this attribute.

Game evaluation

The chosen game genre to be researched is top-down RPG:s with a 2D art style. A few evaluated segments are as follows:

Misao

Misao (2011) is a Japanese survival horror and puzzle game where the goal is to find six body parts of a girl's body in a cursed version of the main character Aki's school.

Apart from text cues to give hints to the player on what to do, *Misao* relies heavily on using iconography to help the player find important items and interactions. Whenever the player walks by something that is available for interaction, an exclamation mark pops up over Aki's head. Moreover, whenever an item is available to pick up, instead of letting the item blend in with the rest of the game, the items are portrayed as an animated sparkle that will grab the attention of the player. When interacting with these points of interest, a text box will appear and give a short explanation that can further help with solving the current puzzle.

Corpse Party

Corpse Party (2008) begins with a group of nine people gathered at a high school. The group wants to perform a charm known as *Sachiko Ever After*, which supposedly will allow the characters to remain friends for eternity. It seems like something goes wrong and the group is instead transported to another dimension. This dimension resembles the previous school that existed at the same location, a haunted elementary school. As the player progresses in order to find a way back to their own dimension, they learn that other people have been transported to this dimension as well, but most of them have been killed. The playable characters soon realise that the killings and the cause for the school's existence is Sachiko Shinozaki, a young girl who was murdered. In order to escape the dimension, the group needs to gather the remains of all the students Sachiko killed and return them to her.

At one point during the game, the player comes across a puzzle where something is on the ground across a large crack that splits the classroom in half. Upon entering through the other door to the same classroom, they discover that the item is now on the side they first entered. At this time, the player has

two characters at their disposal and could therefore come to the conclusion that one of the characters needs to be placed at one side in front of the object, while the other one walks back to the other side, forcing the object to be at one of the two places it moves between. If the player would not realise this by themselves, the characters themselves suggest that one of them could wait on one side and grab the item. There is also a spirit outside of the classroom that hints the player to “pay attention to [the item’s] location and find the exact spot where it once stood”.

Corpse Party relies on the write tool for many of the puzzles. Throughout the game, there are small notes on the walls and spirits standing in the hallways which will give the players some hints through writing. The characters themselves will also suggest how a certain puzzle can be solved.

The item moving to different sides of the classroom could arguably be described as the interact tool, since the player notices how the item moves around and will figure out a way to capture it with the help of the two characters currently in the party. If the placed character is in the wrong spot at first, the item seems to disappear temporarily. When the player solves the puzzle, they are rewarded with a key that progresses the story.

Pokémon Diamond and Pearl

In *Pokémon Diamond and Pearl* (2007), the player chooses either the male or female character to play as, the one which was not selected is utilised as a guide character for the player. In this example, the player chose the male character Lucas whose counterpart is Dawn.

Within the first half-hour of the game, the player is introduced to the serie’s famous mechanic of catching Pokémon. Dawn stops the player in their tracks as they venture towards a new area of the game. She walks up to the player and notes she has yet to show the player how to catch Pokémon and immediately demonstrates by starting an auto-battle. Dawn uses her own Pokémon to lower the opposing Pokémon’s health bar. She then remarks that low health implies that the opposing Pokémon is ready for capture. A Poké Ball is selected and thrown at the opposing Pokémon. After the capture succeeds, Dawn mentions that the health bar should be as low as possible for a better capture rate and adds “This is because a healthy Pokémon is very difficult to catch.” and also off-handedly mentions another mechanic known as status conditions (such as putting the opposing Pokémon to sleep) help. The dialogue with Dawn ends after being handed five Poké Balls.

Pokémon Diamond and Pearl make use of the write and show tools. Dawn firstly tells the player what the upcoming tutorial is about - how to catch Pokémon. Secondly, a battle commences and an offensive move is selected to deal damage to the opponent. Its health is lowered which indicates a higher success rate for the Poké Ball to work. This information is conveyed by the game visually showing the player how to capture Pokémon along with an icon of a pointing hand at the buttons used for the entirety of the auto-battle. As such, the information is handled in a way that players lacking reading skills or younger players can receive the tutorial accurately. To indicate the opposing Pokémon being caught, the ball ticks three times, then turns dark as stars pop out around it along with a clicking sound and a fanfare. Up to this point, the player cannot catch any Pokémon as the Poké Balls handed over by Dawn are the first ones they possess.

OMORI

OMORI (2020) follows the main character and his group of friends through an emotional story which seems wholesome at first, but will eventually develop into a battle against fears and post-traumatic events.

While the gameplay consists mostly of walking around and solving small puzzles to move forward, there is also a turn-based battle system. The first time a battle appears, there is no explanation of how it works, the player can however figure it out easily by pressing the *Attack* button for each character in the party. The battle system is explained in the next battle where one of the party members mentions how everyone can feel emotions, friends and foes. The emotions felt by the character will determine if their defence is higher, if they attack harder, or how high their attack accuracy is. The three emotions, sad, happy, and angry, will also determine how strong or weak an attack is against another emotion. A character with the happy buff will hit harder against a character with the angry buff, the angry buff is strong against the sad buff, and sad beats happy. Most of the time the characters will start a battle in a neutral emotion state, this can be altered with the help of abilities.

The different characters in the party have different out-of-combat abilities too. An example of this is the main character's ability to cut through small obstacles with his knife in order to progress.

At certain points in the game, icons will appear at certain points of interest, prompting the player to interact with them. Iconography is not the main method of conveying information, but it exists nonetheless.

OMORI uses writing to inform the player about the game mechanics. The writing is sometimes accompanied by an image further explaining the mechanics, an example of this is the emotion system and how they interact with each other.

Apart from writing, the game also uses the guess tool. In order to progress at times, the player needs to explore the world by themselves, fighting small enemies along the way. The player has to guess where to go, and only when getting close to something relevant the story will progress. The game world is big and the story is long, therefore letting the player explore by themselves increases the play time since it is not always clear where the player needs to go.

Mad Father

In *Mad Father* (2012), the main character Aya gets a hold of a mini chainsaw as she adventures throughout the mansion in search of her father. When the player acquires the chainsaw, they are immediately greeted with text covering the screen on how to use the chainsaw. The text thoroughly explains how the chainsaw is utilised and once refers to the player as "you". The chainsaw is equipped with either the C- or the Shift-key, then wielded with either the Z-, Enter-key, or the Space bar.

This presentation of information makes use of the write tool as it is directly viewed as text on the screen. The text is mostly objectively written as it is instructions to be followed in order to use the chainsaw as intended, leaving no room for misunderstanding of its functions. While the chainsaw is equipped, it is also stated that the player cannot investigate their surroundings or access the game's menu.

The Witch's House

Throughout the course of *The Witch's House* (2012), the player character Viola might encounter many different ways which leads to an instant game over. A lot of things will prompt the player to investigate and if curiosity wins, the player either proceeds or meets an early end. Some puzzles the player comes across make use of short instructions or riddles, such as a basket with a teddy bear in it near a note stating there is room for another one, prompting the player to find another teddy bear to put in the basket. The instructions are sometimes clear i.e. the one stating to "save the butterfly" as there is only one butterfly the player has encountered thus far. Some items the player comes across can be used in more ways than

one, as some are supposed to be used as keys to unlock doors. Other items can be used directly from the inventory, such as the Book of Death which upon use makes Viola scratch her eyes out and die, when it is supposed to be put in a bookcase in another room.

This game makes use of multiple tools. Mainly the guess tool appears as the player advances throughout the house. It can be summarised as the "curiosity killed the cat" metaphor quite literally since many interactions in the game will lead to Viola's death. This guess tool, even if Gazaway stated it might frustrate the player, has in *The Witch's House's* case been celebrated for its creative and bizarre ways of having Viola suddenly die. Yet while some might sing its praises for the game's difficulty, keeping additional lore locked behind a run where the player never saves their progress is not in the best favour of the guess tool (even if it is mostly intended for a challenged rerun).

The write tool appears many times as well, mainly in forms of riddles where the player is to decode the text and figure out how to proceed onward. Some of the riddles are straight forward while the later ones challenge the player progressively.

The hint tool is used too. One example is early on in the game where a bloody bear paw print appears on the wall. This warns the player about the upcoming danger where they are chased by a large stuffed teddy bear down a corridor.

Game evaluation discussion

A common tool used in all the games is the write tool. As Gazaway (2021) stated, the write tool is useful as a complement to other informative tools, which is evident in the games evaluated above. Explaining how puzzles or certain mechanics work in writing can prove useful as a reminder for players who might not remember just from seeing an NPC do the act in question. Writing can also become a part of the game world with the help of notes given to the playable character instead of being a text box appearing on the screen only for the player to see. Using in-game writing helps with keeping a diegetic design and letting the player experience everything on the screen as a part of the story. By using too much non-diegetic text information, it increases the risk of boring the player and therefore disturbs the Flow.

The games are all also quite linear apart from a few multiple endings being included. The tools all mainly work in favour of pushing the player towards progressing the games' story. Yet some tools are available to let the player find usable items or to experience negative consequences such as game over.

An example of a game that uses long bits of non-diegetic text to explain certain game mechanics is *Genshin Impact* (2020). Whenever the player comes across a new puzzle, a text-written tutorial explaining the puzzle pops up. After clicking through the tutorial, an exclamation mark appears on the player's screen where the game's previous tutorials are all gathered. Upon pressing the icon, the player is taken to a screen where they once again can read about the puzzle, but they are not always given a proper solution so as to encourage problem solving. The text is directed to the player, which causes the player to be brought out from the immersion of exploring the world and instead has to read a text about how a puzzle works. Because of the length of these information texts, the player will risk becoming bored, damaging the Flow.

A Reddit user known as *Representative-Yam65* in the subreddit *r/patientgamers* expressed their opinion about how reading and video games do not necessarily go together. They mention how their mind is engaged in a different way during gameplay, where they analyse movements, observe enemies, and compare gears and inventory. When a sudden paragraph appears on the screen, they describe how their brain cannot slow down and concentrate on a larger quantity of text. The comments under the post are of mixed opinions, as some prefer text over audio logs and voice acting which is forced upon the player and

locks them from doing anything until the audio is finished. A comment from *PontiffHope* also mentions how reading text is not often an issue itself, but rather the pacing of the game when a block of text appears. It requires the brain to go from fast thinking and quick decision making, to suddenly relax and focus on the words at a much slower pace. Such wording can be compared to stopping a moving car, the stopping distance is calculated using reaction distance plus braking distance. If the player is immediately stopped by a heavy amount of text, there is no time for reaction distance nor braking distance, causing them to be thrown off. There needs to be an adequate amount of time for the player to transition between the gaming phase and information receiving phase.

Concerning the guess tool, one example is found within the *Etrian Odyssey* series (2007-2018). As the player advances throughout the dungeon crawler RPG, their party is oftentimes stopped as they stumble upon a scenario. The player is many times given a choice without knowing the immediate consequence beforehand. The scenario could concern finding a tempting item which is guarded by a monster, attempting to take this item could wake the monster or not since it seems to be sleeping softly. If the player decides to take the item they either receive it or their entire party suffers some damage since the monster awoke and attacked. There is no hint as to what will happen before the player decides to try getting the item or giving it up. However, since the series relies heavily on survival in dungeons, it could be argued that the guess tool benefits the immersion since no one can in real life predict the outcome.

The evaluated games are designed around a story with an open game space to explore. Because the game world is open, it allows the player to freely explore their surroundings in order to find the relevant locations and items needed to progress, therefore making use of the guess tool.

Study design - the design

To further explore how these tools affect not only the player's progression but also Flow, the next step was to conduct them into a game as mentioned previously. The game has five separate levels inspired and built upon the informative tools: Show, Write, Hint, Guess, and Interact. The levels are highly focused on the act of relaying information to the player. They were not designed with accessibility in mind, as such the levels are not adaptable to people with colour blindness etc. The player moves around using W, A, S, and D.

Interact Level

The level consists of four rooms. The player is in front of a locked door. To each side of the door are two rooms each containing a chest. One chest contains the key necessary to unlock the door leading to the exit. The other chest is a mimic which defeats the player and sends them to the starting screen if interacted with twice. The player interacts with the chests and the door using the E-key. The correct chest and the mimic swap places depending on their assigned values on start. Once the key is obtained, the player carries it to the door. To give the player a chance at opening the correct chest, the mimic will every now and then flaunt its fangs whilst it is disguised as a real treasure chest.

Since the interact tool heavily relies on informing the player through rewarding and correcting them, the logical approach to designing this level was to use chests which the player was to open by interacting with them. To "correct" the player whenever they try to interact with a mimic, the player character will be teleported back to the starting position, as well as wearing a frown.

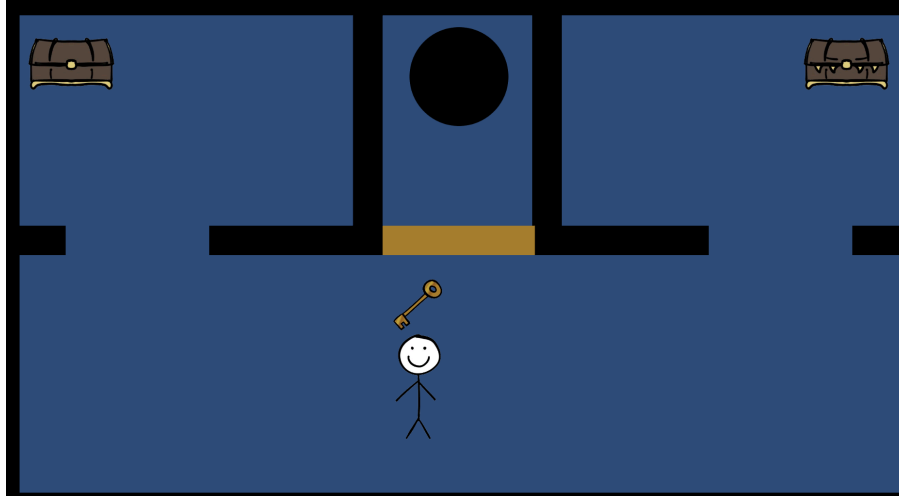


Figure 2. Interact level.

Show Level

The level includes three different statues of monkeys all doing a unique pose. The statues are colour- and number-coded. Along their own, other coloured circles appear around the level's room. The player is able to perform different poses in this room. Their task is to stand on the corresponding colour to the statue and simultaneously do the same pose. The poses are chosen by clicking the corresponding number on the keyboard. When all three statues' poses have been correctly performed on the right circles, the player can leave the room. If the player performs the incorrect pose, their progress is reset.

This level uses the saying “monkey see, monkey do”, which can be defined as “[...] the act of imitation, usually with limited knowledge [...]” (Wikipedia, 2024). The monkeys are the NPCs that show the player what to do in this scenario, as Gazaway (2021) mentioned. The level uses the unique interaction of doing different poses with the 1-, 2-, and 3-keys instead of simply interacting with the E-key, adding an interesting gameplay mechanic to this particular level.

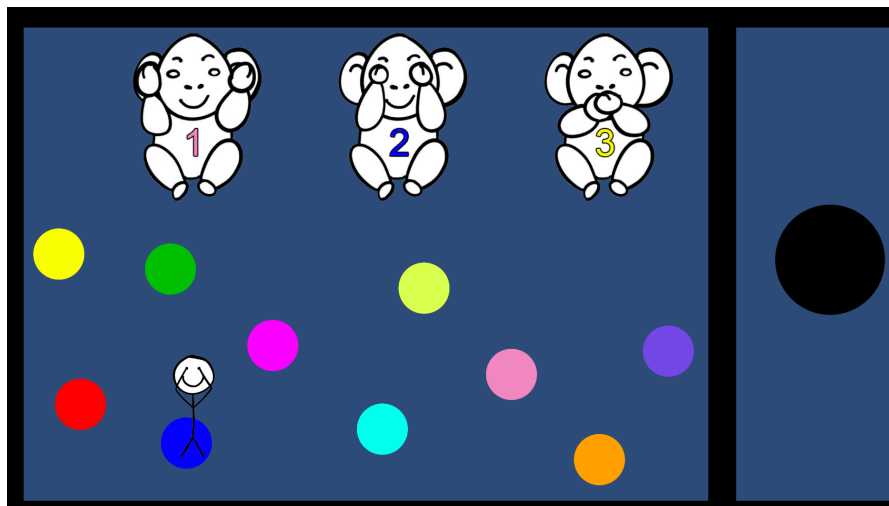


Figure 3. Show level.

Write Level

The level consists of a room divided into five columns. The leftmost column is the player along with four coloured circles as options. To the right, a question is displayed to which the player selects an option to answer using the E-key. If answered correctly, the player advances to the next column to the right and is presented with another question. If the player picks the wrong answer, they return to the start position, but they keep their progress. There are in total four questions the player has to answer but there is a catch. The player is not allowed to select the red coloured circle as an option ever. The questions are as follows:

- ❖ How many legs does a cat have? - the correct answer is four.
- ❖ How many stomachs does a cow have? - the correct answer is four, yet this option is red. The player is to select the previous option which they used to answer the cat question.
- ❖ What colour is the chow chow's tongue? - the correct answer is blue.
- ❖ What colour is NOT in the rainbow? - the correct answer is cyan. To throw off the player, the options do not match the options' colours.

Since the write level entails using text as the informative tool, the first choice for this particular level was to create a trivia quiz. A trivia quiz would mean the question had to be written on the screen and force the player to read if they want to clear the trivia quiz as efficiently as possible. The rules to be considered during gameplay are also conveyed through text.

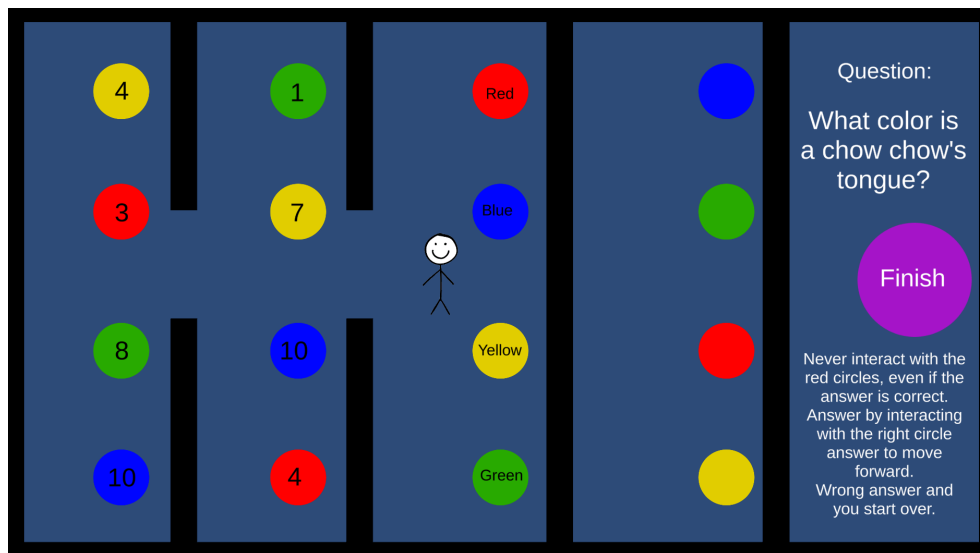


Figure 4. Write level.

Hint Level

The level includes many circles moving across the room, bouncing off the walls similar to an old screensaver logo. When the player collides with a certain correct circle, an exclamation mark appears above the character's head to indicate that the circle is the correct one. The task is to find the correct circle among the many lookalikes within the room and to press the E-key when it has been found. The correct circle's colour is somewhat brighter than the rest to hint towards it being correct. This task is to be repeated five times.

With Gazaway's explanation on how the hint tool could be utilised with the help of icons, the first idea was an exclamation mark above the player character's head, the same principle that is used in the evaluated game Misao (2011). Because having moving circles would prove challenging and engaging for

the player since it would require focus and attention. To further hint towards which circle is the correct one, Ware's (2010) definition of "pop-out effect" is also utilised for this level.

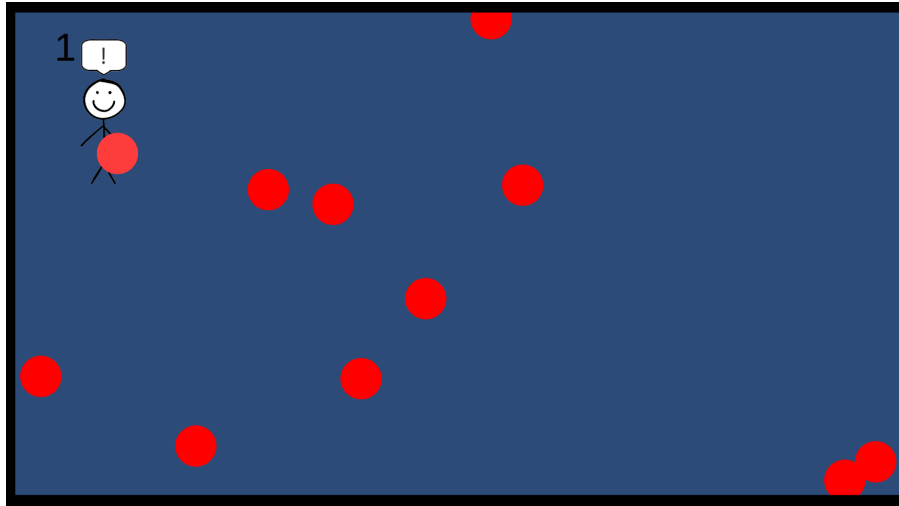


Figure 5. Hint level.

Guess Level

The level consists of multiple circles in red and blue. The player can interact with the circles and if interacting with the correct one for the current stage of the level using the E-key, more circles will spawn. As the player continues to interact with the current correct circle, a line appears in-between the correct circles. When the player has successfully interacted with all the right circles, the lines will have formed a star. The player is given no instructions of the order expected of them nor about the shape they will create at the end.

For this particular level, creating a certain pattern seemed to be a reasonable approach. The beginning is simply guessing which circle is the correct one, but as the player progresses through the level, the pattern's final shape is more noticeable.

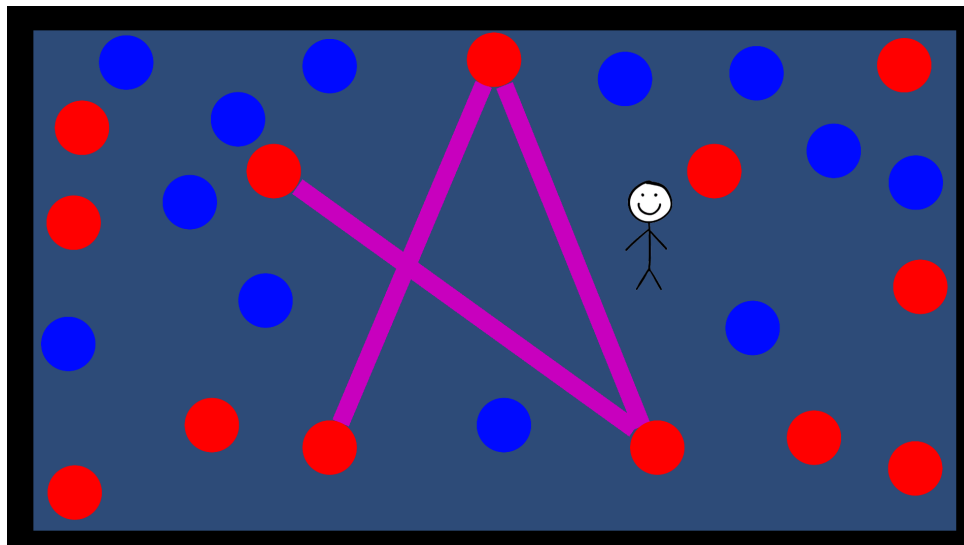


Figure 6. Guess level.

Game test

In order to answer the second question in this research paper, five game testers were asked to play the game and then answer a series of questions regarding the experience. The game testers were recorded with permission during gameplay and questioning in order for three outsider observers to later review the footage and give their opinions on how they experienced the game testers' engagement with the game.

Prior to actually playing the game, the game testers were informed of how to actually play the game. They were instructed to use W, A, S, and D to move around the character, in the main menu they were to use the left mouse button to click on the level they want to play, for interactions during gameplay they should use E, except for the Show level, which has some special rules regarding interactions, as stated above.

The questions which the game testers were asked were in Swedish as they are all Swedish speakers. The questions and answers have been translated to keep the language used in this paper consistent. To keep the ones partaking in the test anonymous they have been renamed to Game Tester A, B, C, D, and E, additionally the observers were renamed Observer A, B, and C. All participants agreed to partake in the test and have been informed of how their answers were recorded and used, additionally they are aware they received codenames. Answers have been paraphrased to keep a professional language and all keep the jist of their responses. The following questions were:

Game Testers

Which level was the easiest to understand? Why?

Three of the testers thought the Interact level was the easiest one to understand, since it was straightforward. One tester answered the Write level since the text made it obvious, and the only real challenge was to know the answer to the questions. Lastly, one tester said that the Hint and Guess levels were the easiest, but gave no explanation as to why they felt this way.

Which level was the hardest to understand? Why?

All but one of the testers expressed that the Show level was the most difficult level. A common thought amongst the testers was that the coloured numbers were not clear as to what they meant. Some interpreted the numbers simply as the order that the circles were to be interacted with, but not that the numbers themselves were the key inputs. One person believed that the coloured numbers were the number of times that specific coloured circle had to be interacted with. The fifth tester answered that the Guess level proved to be difficult at the end when they had to interact with the first circle again in order to complete the star shape, since they thought they had to interact with a new, untouched circle.

What were your first impressions of: guess, hint, write, show, interact?

- ❖ Guess: Some testers were unsure in the beginning on what to do, but when the shape became more clear, they generally did not have any difficulties finishing it. Halfway through the puzzle, two testers thought they were making an “illuminati” (triangle) shape. One tester said to themselves that they needed to remember how to draw a star.
- ❖ Hint: The testers quickly realised that the correct circle was slightly desaturated compared to the other circles. One tester said it reminded them of an old screen saver and wanted to see if one of the circles would hit the corner. Overall, the Hint level was easy to solve.

- ❖ **Write:** One tester summarised their experience with “that’s just *Who Wants to Be a Millionaire?*.” The majority of the testers did not read the text completely and would instead start interacting with the different circles without knowing what to do. While some simply did not bother to read the text, one tester revealed that the text was too far to the right on the screen, and therefore paid no attention to it. One tester thought it was funny to pick the wrong answer and watch the player character get teleported back to the beginning over and over. Another tester liked the aspect of having the red colour always be the wrong choice, forcing them to backtrack.
- ❖ **Show:** All of the testers deemed the Show level to be frustrating and hard to understand. The numbers were confusing and the majority of the testers needed a reminder or some time to remember the special key inputs. Once the special key inputs were considered, the level was considerably easier to solve. One tester thought the monkeys looked cool and wanted to pick them up. Another tester had some trouble differentiating the colours from each other.
- ❖ **Interact:** The testers thought the level was easy and straightforward. What happened when interacting with the different chests was obvious to the majority of the testers, but one tester thought the key they had acquired from the correct chest was meant to open the other chest. The mimic’s fangs were not noticeable at first, the same tester only noticed the change in appearance because they had to spend extra time on the level when the key did not work on the mimic.

Which level made you feel most immersed?

Four of the testers answered that the Hint level was the most immersive one. A common response between the testers was that the act of tracking/chasing the circle felt engaging. Apart from the chasing aspect, one tester would physically lean in closer to the screen to observe the circles in hope that they hit the corners. Two testers also mentioned the Write level, with the reason being that they enjoyed the question based challenge. Apart from these responses, the other levels were mentioned only once.

Which level made you feel most frustrated or bored?

Three testers said that the Show level was the most frustrating one, the reason being that it was unclear how to solve the puzzle in the beginning. One tester mentioned the Guess level since they did not know how to complete the star shape. Another tester said the Write level made them feel bored and would compare it to a computer/mobile game consisting of questions with convoluted answers.

Was there any level you felt that more guidance was necessary? If so, what information was missing?

Four testers had some input regarding the Show level. Instructions should be clearer regarding the special key inputs, for example by using key-icons instead of just numbers on the monkeys’ stomachs. Instead they were mostly interpreted as the order in which the player had to interact with the circles. Another suggestion was to show a number above the player character’s head when standing on a circle, and when that number had been pressed on the keyboard, it would change to the next number. One tester suggested that the Write level’s layout could be improved. Because the rule text was shoved to the far right at the bottom, it was easy to miss it and only focus on the gameplay. Their advice was to put the text closer to the player character, either above them or right next to them.

Was any level too easy or too difficult? Did this affect your immersion?

The answers for this question were diverse. The Hint and Interact levels proved little to no challenge. One tester stated that the Write level’s questions could prove to be too difficult, while another tester found the

questions to be too easy. Yet another tester expressed that their immersion was positively affected by the Write level's mechanics. The Show level received most negative feedback and proved to be too difficult. While one tester stated that it affected their immersion negatively, another tester said it did not affect their immersion in any obvious way. Though the latter stated they were not particularly immersed either way.

Was any level challenging you in a satisfying manner? If so, would you want more of that specific puzzle and that way of receiving information?

As with the previous question, the answers were quite different. While one tester deemed the Show level satisfying once the controls were figured out, another tester appreciated the Guess level because the pattern appeared once the puzzle came closer to the end. One tester liked the backtracking element in the Write level, and another one stated that the Write level could be further developed into something engaging. The Interact level was also considered to be fun by one tester and they would have liked to see more levels of this particular puzzle, or at least a higher difficulty of it since the game test version was considered too easy.

Did any bugs occur which affected your immersion?

No bugs occurred during most of the testers' gameplays. One notable bug occurred during one playthrough of the Hint level, where the correct circle was stuck in the upper right corner for the duration of the level's duration. Additionally, the rigid bodies of the Unity engine has a standard collision detector which in this game's case caused the player character to constantly spasm against the levels' walls.

How would you describe yourself as a learner? (Visual learner, auditory learner, writing, etc.)

All of the testers answered that they prefer to learn by doing. A common response amongst the testers was that they do not appreciate being given a lot of written information and then trying something according to the written instructions. Instead they said they wanted less information that they could later utilise when trying different approaches and finding patterns on their own. One tester stated that some auditory elements mixed in with visual instructions were preferable.

Do you have any prior experience with puzzle games, problem solving, game development, etc.?

Most testers have experience with games and puzzle games. Some of the testers have experience with game development as well.

If you feel comfortable, do you have any diagnoses or the like which can affect your ability to receive and process information?

None of the players had any diagnoses or conditions that would affect the way they perceived the information, and if they were to have any condition, they are not diagnosed or aware about it. The only thing that could affect their ability to process information would be their patience.

Observers

The observers' perspective were utilised as an outsider's point of view that knew about the game's mechanics beforehand, but were only recently aware of them. Since during the development of the game, it can be easy for a game designer to find all the solutions obvious, the designer is the one who came up with the solutions after all. By having observers see how other people act and react during gameplay, there are insightful opinions to be had that would not be easily discovered for someone who has been

spending their time developing the game since the beginning. As mentioned previously in this paper, Schell states the importance of understanding a target audience. Since the observers have not been there from the start, they can aid the development and analysis by seeing the game from a player's perspective that otherwise would be hard to see.

The three observers were shown the game and the levels' solutions while being told about them, then they were shown recordings of the gameplays. Their task was to judge how well the levels were being cleared by the game testers so as to with knowledge of the answers, they could determine whether *they* think the player received enough information.

Observers inputs

Interact Level

For this level the observers reflected that the testers went straight ahead to face the task. The level was straightforward and required little problem solving by the testers. There was a common curiosity of all testers, however. They wondered what the mimic would do if interacted with no matter if they had received the key already or not. One observer noted that the reason behind the quick acting before thinking could be a result of the tester simply preferring the learn-by-doing method.

Show Level

The Show level took very long to solve by every tester. It invoked frustration within the testers, as well as the observers. The observers stated they were more frustrated since they knew the solution while watching someone not knowing it, but they would probably not figure the answer themselves had the roles been reversed. One observer mentioned the testers became too locked in on the movement and interaction keys, so much that they forgot about the earlier instructions that this level had special key inputs. The observers commonly found it odd that the testers rarely tried a new approach during the level, as most of the testers only walked around and did the same thing over and over again to no avail. However, it was most frustrating to observe that the testers mainly had the right idea but not the right approach towards the level. Another observer stated that it seemed that since much time and frustration was spent on this level, they appeared to be more immersed than they probably acknowledged.

Write Level

The observers had a unified understanding that the majority of game testers did not read the text shown on screen. Observer C speculated that this could be because of a lack of concentration or attention. Because of the testers not reading the information, the level took longer to complete than it should have. It was unclear to the observers whether the game testers just wanted to see what happened when they interacted with the different circles, or if they genuinely did not know the answers to the questions.

Hint Level

Observer A and C deemed this level the most immersive, with the reasoning being that they noticed how the chasing aspect of this level seemed to capture the game testers' attention the most. The observers saw how the game testers figured out what to do quickly, there was no confusion amongst them. Observer B noticed how some did not interact with the correct circle right away, but easily figured out what to do.

Guess Level

All of the observers noticed how the game testers would get through this level pretty easy. Some struggles were noticed near the halfway mark, before the pattern was obvious. There was some confusion amongst the testers who did not know if the blue circles were to be interacted with or not.

Conclusion

All of the observers have experience with playing puzzle games before. Observer B has made some games in their free time, mostly walking simulators and arcade-like games.

With a few external sets of eyes to analyse gameplay, a greater understanding of what was lacking was achieved. Since the ones making and designing the game are biased towards its difficulty, it was deemed necessary to have more second opinions. To reinforce that the tools would immerse and aid the player in understanding the game's rules, it was crucial to ask more people the question: "Does this make sense?" as well as "Is this too far fetched?"

The observers themselves also interjected with good ideas on how to improve the game. It led to nutritional discussions for both parties as some of them said: "The aspect of X was interpreted this way, I think adding Y and Z could help ease the confusion and make it more sensible." While not every idea was added, they were all taken into consideration.

Results

The first research question: "What different ways exist today in which information about game mechanics is communicated to the player within the chosen scope of game genre?", can be answered with Gazaway's informative tools. Not only has he explained them, but they were also found in the evaluated games. The tools could efficiently be used in different levels to evaluate how well they are perceived in the developed game. While Gazaway had sorted the tools from most to least efficient, the game test did not align according to the efficacy of the tools.

The game was refined according to the feedback from the game testers and observers. From the observers, they noticed how the Hint and Show level were the most immersive for the game testers. Apart from the observers' opinions, the game testers had a mixed response about which level was the most immersive. The testers had varying personalities and tactics when it came to problem solving. Depending on their individual strengths and abilities, the game testers approached most levels differently.

The Guess level stirred some confusion as some of the game testers were not sure about the end goal of the pattern, others noticed the pattern quickly and figured out which circle to interact with next in order to complete it.

The Hint level proved to be noticeably enjoyable by the game testers, almost to the extent some wanted it to be longer. The game testers liked that the circles moved around freely, and even the observers stated that they found it engaging to chase something.

The Write level was proven to be a hassle from a concentration lacking point of view. Most game testers ignored or did not notice the written instructions and did not stop to consider what the answers in the circles might mean. They rushed in to guess and see what happened, and when this tactic did not work, they resorted to reading the instructions.

The Show level became the most disliked level as it for too long trapped the game tester. Every game tester but one did not attempt to tackle the level in any new view, instead they repeatedly tried the same tactic over and over again - even if they received no feedback upon doing so. One game tester

stopped to consider what the numbers actually could mean, and as such tried tackling the problem with a new tactic - using different keys. Even though this level proved to be a challenge, the unique interaction element proved to be fun for the game testers and once figured out, they seemed to like the different animations. The observers also noticed how the game testers would lean in and think hard about how to solve it, causing them to unknowingly be immersed in the difficult puzzle.

The Interact level was cleared quickly by all game testers, so much so that no one really stopped to consider what the difference between the chests could be, since very few actually managed to notice the mimic's fangs. As this level was cleared so fast, it proved no challenge and as such was not even mentioned to be a memorable or fun one.

As such, the question: "How can the information be visually presented so as to not disturb the game's Flow?" could be answered with that using the hint, as well as the show tool, are considered to be the most engaging for players, and therefore would let them achieve the state of Flow. While the Show level was disliked because of its difficulty, the puzzle still engaged the game testers in a way that got them to think about different approaches, even though some approaches were tried multiple times. The Hint level was considerably more enjoyed than any other level, as noticed and stated by observers.

Revision of the game

The renewed iteration of the game has been modified in all aspects. When presenting information in a comestible way, it is essential to keep in mind the lens of a game designer, as such the following changes were made in order to enhance the experience:

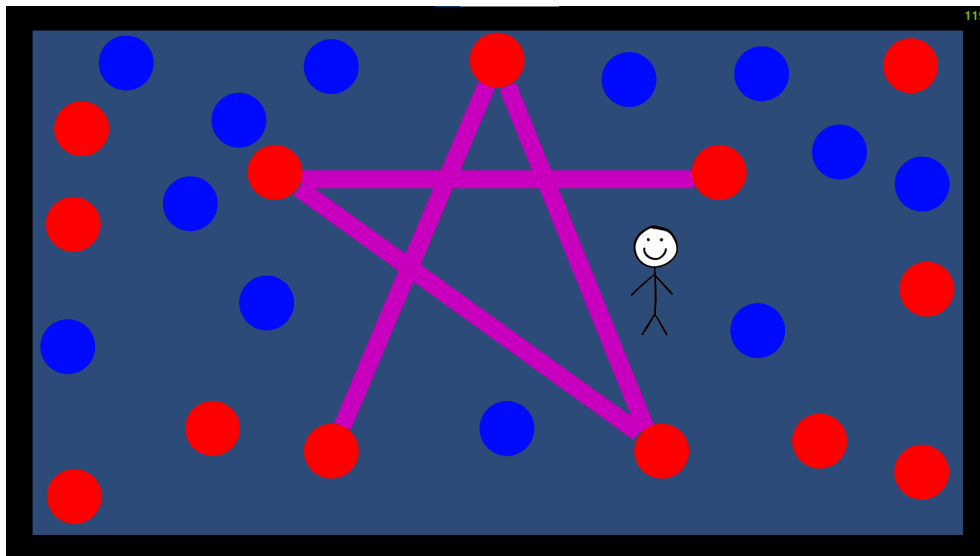


Figure 7. New Guess level.

Guess level - All correct circles remain red, to remove doubts about being able to interact with the same circle twice.

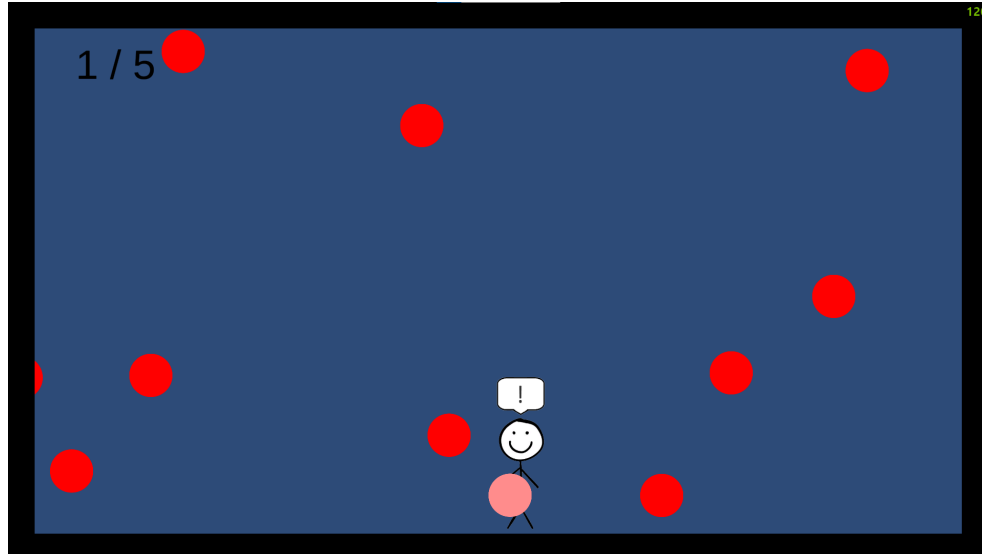


Figure 8. New Hint level.

Hint level - The correct circle became even more desaturated to further indicate it being the one to chase. The counter was accompanied by the number five to indicate the number of times needed to interact with the circle.

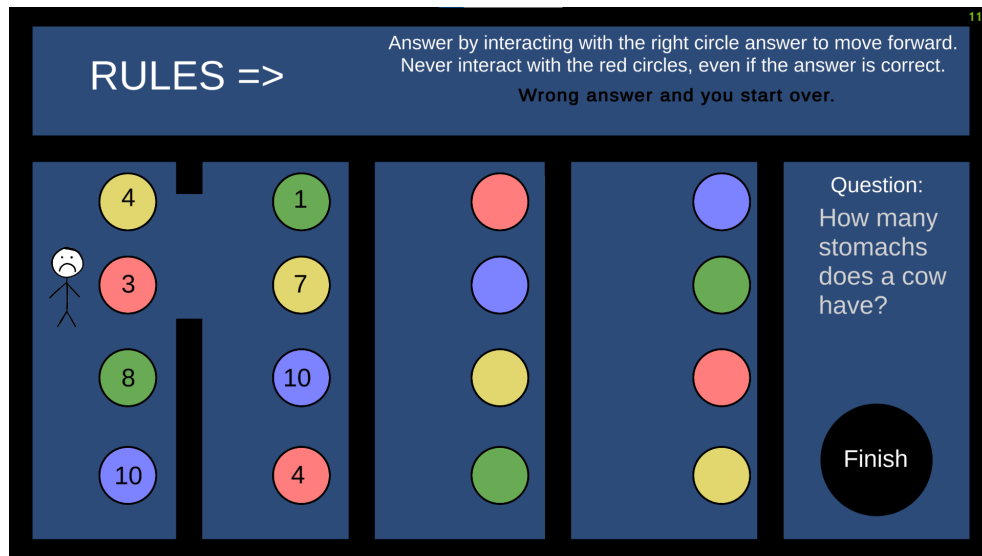


Figure 9. New Write level.

Write level - The circles became desaturated to be easier on the eyes and not rob the instructions' attention. The placement of the rules are at the top of the screen to enhance their importance. Additionally, when the wrong answer is selected, the player character now frowns momentarily.

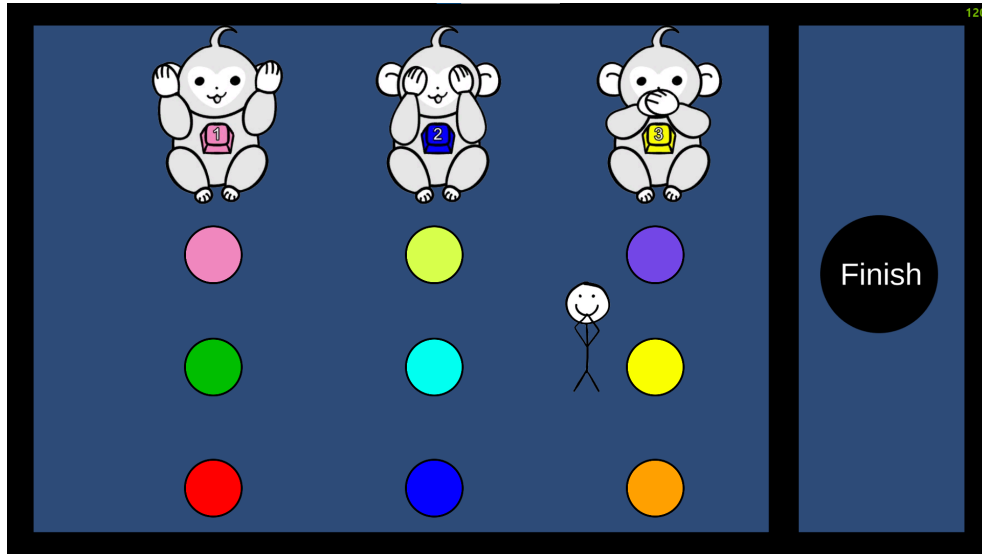


Figure 10. New Show level.

Show level - The statues were revamped to indicate what key to press in order to trigger the correct solution. The available answers are positioned beneath the statues to narrow down choices.

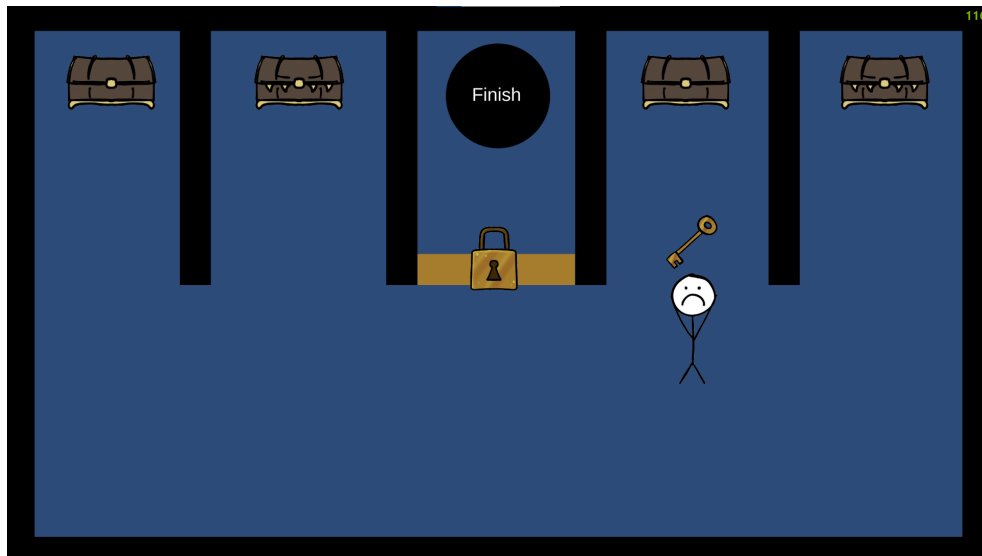


Figure 11. New Interact level.

Interact level - The number of chests increased to four to discourage the player from charging ahead for a 50/50 probability of receiving a key. A lock was added at the gate to indicate where the key leads. When the key is obtained, the player character reaches upwards to show something is being held, this was implemented since the key was not always visible immediately since the player character was high up on the screen, making the key appear outside of the viewable area.

Discussion

While it could be argued that such a simple artstyle with just a stick figure and single coloured circles could impact the experience of the gameplay, no game tester nor observer made any notable remarks of the artstyle chosen for the game's design. If the style is deliberate behind the functionality and it does not disturb the core of the purpose, there is logically no reason why this particular artstyle should be considered a bad impact.

Since immersion and Flow can be heavily dependent on the diegesis of the game, the next question would be how a game of a different game genre would differ in results compared to this one. By using a top-down style game with very simple graphics, the diegetic design is lost and the game instead has to rely on other aspects to enhance the immersion wanted in order to achieve Flow. If the game were to be made into a first person view game with 3D graphics, the diegetic design would probably be more prominent and therefore achieve the Flow state easier, but further research comparing the two game genres would have to be done in order to find those differences and answer that question.

The Show level gained the most negative feedback, most of it directed towards the uncertainty on how to solve the puzzle. The numbers were not clear as they could refer to the order in which the circles were to be interacted with or if they had some other meaning. In the refined version of the game, the numbers on the stomachs are portrayed as keyboard keys with their respective numbers, giving a hint to the player to use the numbered key inputs during this level.

The refined version uses a lot more hints than the prototype made for the game testers. As previously mentioned, hints are used to aid players in progression of the game. When the player chooses the wrong answer during the Write level, not only does the player character teleport to the beginning, but now also frowns for a brief moment, further enhancing the signs that the picked answer was wrong. The hints can also be seen during the Interact level, the hint in this case being the chests' fangs occasionally showing, indicating that something bad would happen if the player were to interact with them. Because of this, as well as two of the observers stating that the Hint level appeared to be the most immersive, one could argue that the hint tool is one of the most useful tools for game mechanics. Hints help players figure out if something is interactable, and could potentially tell if the interaction has a good or bad outcome.

In order to know for sure that the refined version of the game has a better way of telling the player about the game mechanics, a new game test would have been beneficial. Due to the date that the first game test was conducted, there was no availability for another game test to be made. Given the constructive feedback from the game testers and observers, the hopes are that the refined version of the game mirrors what the game testers and observers felt was missing from the first version.

None of the game testers had any diagnosis nor condition that could affect their way of interpreting the information, but that is not the case for every player that exists in the world. One of the game testers also started questioning whether they were colour blind because they had trouble comparing the colours of the circles and numbers during the Show level. Whether it was the game tester actually having trouble differentiating between the colours or the screen on the computer which the game test was conducted on had problems showing the contrast between the colours is impossible to know at this time. Further research would need to be made regarding how colour blindness as well as other conditions could affect the outcome of the game test. It did however enlighten the fact that there is an issue about having colours that look too similar in a challenge revolving around finding a certain colour. Be it the person being unable to differentiate between them or the monitor, it is beneficial to keep a mindfully chosen colour palette in order to counteract such visual misunderstandings.

As Ware (2010) states, in order for something to be easily found, it should be made different according to a primary visual channel. Examples of primary visual channels are a different colour, a different size, or different curvature; something abnormal amongst normal. Because the interactable circles do not have something amongst them that indicates whether it is the right or wrong answer apart from one of the colours matching a monkey, the player has to rely solely on being able to match the colours, which proved to be difficult for some. The same can be said for the refined version of the Interact level, the fake chests are all blinking sometimes, but this does not cause them to be easily found at first. If only one chest were to blink and show its fangs, it would be much easier to figure out the solution.

Conclusion

As the results revealed that the hint and show tool were the ones considered to be the most immersive in this context, it does not mean that this paper was made to diminish the efficiency of any other tools. All the other tools used in the game proved useful for some game testers, since everyone had different approaches and experiences. What is considered immersive for one player does not necessarily mean that it is for another, it all comes down to the player having their informative needs met.

The hope is that this paper provides some useful insights on how to present game mechanics. Yet, it is ultimately up to the game designer to choose whether or not to use a certain informative tool. Certain ways information is presented might also be a mechanic in its own way. The tools can be used together or separately, and it should be up to the game designer when the mixing is necessary. As mentioned in the beginning of this paper, game development is a lot like following a recipe and the game developer is the chef (Kramarzewski & De Nucci, 2023). There needs to be a balance between the ingredients, but at the end of the day, someone will still prefer the dish to be more salty while someone else prefers sweetness.

In the game created, the hint tool was found to appear in multiple levels because a player simply rushing in and guessing their way through a puzzle is often not the goal of the puzzle. Instead, the players should be given a chance to think about what the puzzle actually wants from them, and sometimes one single tool is not enough for that to be conveyed. It is however important to keep in mind that the answer should not be spoon-fed to the player, since that defeats the whole purpose of a puzzle being a fun challenge.

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