Escape room design framework

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TONI HEINONEN: Escape room design framework

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Pakohuoneet ovat fyysisen viihteen muoto, jossa ryhmä pelaajia ratkoo päättelytehtäviä ja pulmia tarkoitusta varten rakennetussa tilassa. Pakohuoneet ovat olleet osa monen kaupungin viihdekenttää jo vuosikymmenen ajan. Pakohuoneita on myös käytetty osana erilaista tutkimusta, mutta niiden pelisuunnittelua ei ole paljoakaan tutkittu.

Tässä tutkielmassa luodaan viitekehys pakohuoneiden suunnittelua varten. Se hakee inspiraatiota videopelisuunnittelun tutkimuksesta sekä kirjallisuudesta ja pyrkii luomaan pohjan pakohuoneiden suunnittelulle. Samalla tutkitaan, mitkä ovat pakohuoneiden tärkeimmät elementit ja mitä pakohuonesuunnittelussa on hyvä ottaa huomioon.

Suunnitteluviitekehyksen kelpoisuutta sekä pakohuoneiden suunnitteluprosessia tutkittiin ammattilaishaastatteluilla. Neljää ammattilaspakohuonesuunnittelijaa haastateltiin puolistrukturoidulla haastattelulla. Haastattelu keskittyi nykyisiin suunnitteluprosesseihin, suunnitteluviitekehyksen kelpoisuuteen tuossa prosessissa sekä pakohuoneiden tulevaisuuteen.

Suunnitteluviitekehystä analysoidaan myös suhteessa toiminnassa olevan pakohuoneen suunnitteluun. Tutkielmassa verrataan miten huoneen suunnittelu noudattaa viitekehyksessä esiteltyjä konsepteja. Samassa yhteydessä pohditaan syitä löydettyihin poikkeamiin huoneen suunnittelun ja viitekehyksen välillä.

Tutkimustulokset osoittavat, että suunnitteluviitekehys vastaa läheisesti nykyisin käytössä olevia suunnitteluprosesseja. Se olisi hyödyllinen työkalu uusille suunnittelijoille prosessista paremman käsityksen saamiseksi. Viitekehyksen hyödyntäminen voisi säästää suunnittelijan aikaa ja resursseja.

Tutkimussa todetaan myös, että pakohuoneet ovat saavuttaneet vakaan tason osana viihdeteollisuutta. Jatkossa pakohuoneiden oletetaan laajenevan kattamaan myös pakohuoneiden kaltaisia elämyksiä.

Asiasanat: pakohuone, ammattilaishaastattelu, pelisuunnittelu

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Escape room is a form of physical amusement, where a group of players are solving puzzles in a purpose-built environment. Escape rooms have been part of many cities' entertainment space for more than a decade. Escape rooms have been also used as part of research but not much has been researched on their underlying design.

In this thesis, a framework for designing escape rooms is formed. The framework takes inspiration and references from digital game research and literature and tries to create a basis for future escape room design. At the same time, the thesis tries to find what are the most important parts to take into consideration when designing an escape room.

The viability of the framework and escape room design process was researched with professional interviews. Four professional escape room designers were interviewed in semi-structured interviews. The interviews focused on current design processes, the viability of the framework as part of said process and the future of escape rooms.

Framework is also compared to an operating escape room design as a case study to find out does the design under scrutiny match the concepts established in the framework. Reasons behind the decisions where the design deviates from the framework are also discussed.

Research indicates that the framework closely matches currently used design processes. The framework would be a useful tool for new designers to get a better understanding of the design and what to focus designer's energy and time.

The study also states that escape rooms have reached a stable holding in the entertainment space. In the future, more experiences will expand escape room to become a hypernym under multiple different types of entertainment options

Keywords: escape room, professional interview, game design

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1 Introduction

Escape rooms, or exit rooms, escape games and puzzle games are live-action group activities, where players work as a team to solve puzzles within a limited time. This often includes a purpose-built closed environment and the game's goal is to escape. Now escape rooms are more than a decade old phenomenon yet not much has been published about their underlying design. The first aim of this thesis is to answer the question; What are the most important design decisions when designing an escape room?

Although an escape room is a physical form of entertainment, an assumption was made that the principles of video games design could be applied to the escape room design process. In video game design few books are considered to be staples in the field. In this thesis we have developed an escape room design framework with a goal to help the design process but also to analyse already designed and operating escape rooms. The framework will combine escape room literature to video game design principles. The second aim of this thesis is to answer the question; Is the created escape room design framework a valid tool to design and assess escape room design.

As an owner of an escape room business this topic is close to my personal interest. I have been operating escape room business CLU TKU Escape Room in Turku, Finland. The business was opened autumn of 2016 and has had more than seven thousand players since. I have personally been involved in the design process of six

commercially operating escape room games from which three are currently ran and operating at CLU TKU. In this thesis I will also combine my personal experience to the previous research both on the escape room literature and video game design.

1.1   What is an escape room?

Cambridge University Press [1] dictionary explains an escape room as follows; "A game where people are locked into a room and have to find a way to escape by finding clues in it, and solving puzzles, or a special room where this is done." In a broader sense, an escape room is a team activity where a group of players solve puzzles that lead to an end goal. Traditionally that goal has been to escape the confined space in a specified amount of time. Now after 15 years after the first escape room opened in Kyoto [2] the term has broadened not to mean only rooms from where a team must escape but a wider range of experiences. Some are now called escape games, adventure rooms or something similar [3].

Professor Scott Nicholson conducted a survey in 2015 about escape room premises. From that survey, the most notable things to identify an escape room are the following:

- An escape room is often played inside a confined space which often is a room or multiple joined rooms that form the play area. Some escape games are held on more open premises, outdoors or in public spaces like museums.

- Playing in an escape room is a group activity. Usually, a group of two to six people play together in the same space as a team.

- By solving a series of puzzles, the group of players can reach the goal of the game. This goal is usually to get out of the room.

- Game has a fixed time limit during which the players need to achieve the goal.

In Picture 1, there is presented an escape room. The room is located at CLU TKU Escape Room in Turku, Finland and it is called Bank Heist. The game is played completely in the room pictured. The goal of the game is to steal of box of ancient coins before another group of bank robbers get there. The room in question is used as an example throughout the thesis. In Chapter 5 this room is talked in more detail.

Figure 1.1: Photo from Bank Heist escape room at CLU TKU Escape Room.

1.2   Thesis structure

This thesis consists of seven chapters. Chapter 2 introduces the escape room design framework. This framework relies in both escape room literature and video game

design. The framework was designed to be a self-contained package that can be separated from this thesis as backbone for the interviews. Therefore, all the literature references are included into the Chapter 2 and there is no separate background research chapter. This chapter first introduces the concept of the framework and introduces the core literature the concept relies on. Next, we focus on every core element of the framework separately starting from the fantasy and theme and how they should be presented in the escape room design. We continue to the story and game flow and talk their importance as well as how theme and fantasy should be present in them. We will also talk about puzzle design and reflect how it should fit to all other elements. To conclude, we present how the real life will and should affect the design.

In Chapter 3, we present how the research testing the feasibility of the framework was conducted. The research was done as a semi-structed professional interview and in it we also map out the current design process used by the professionals. We present the research method as well as explore the review material. The research findings are then analysed in the Chapter 4. First, we analyse the current design methods used by the professionals. Then we compare those methods to the framework alongside the professional's input on it. Lastly, we analyse how the interviewees see the future of the escape room business.

After the research we apply the framework to a real-life example in Chapter 5. In this chapter we dismantle currently operating escape room design from CLU TKU Escape Room. This analysis follows similar structure as the framework, and we aim to compare the actual design to the framework as well as find out the reasons behind decisions where the room design deviates from the concepts introduced in the framework.

After both the research and example case study we discuss about our findings in the Chapter 6. First, we discuss about the most important aspects that should be

included in every escape room design. Then we summarise the research findings and case study and discuss about the viability of the escape room design framework. This discussion will include topics about how well the framework matches the currently used designs methods as well as how video game design principles as part of the design work in this setting. Lastly, we discuss about the current state of escape rooms as part of entertainment business as well as the future of escape room business. In this chapter we also propose new research topics that would extend escape room design research and dive deeper in the concept of combining video game design into escape room design.

2 Escape room design framework

The escape room design framework is designed by combining work from multiple video game design frameworks and is an estimate of how those frameworks would work in a real-world escape room setting. Many concepts loan from the works of Ernest Adams [4], Jesse Schell [5] and Tomi 'bgt' Suovuo et al. [6]. The escape room design framework (see Figure 2.1) aims to split the design into five distinct elements.
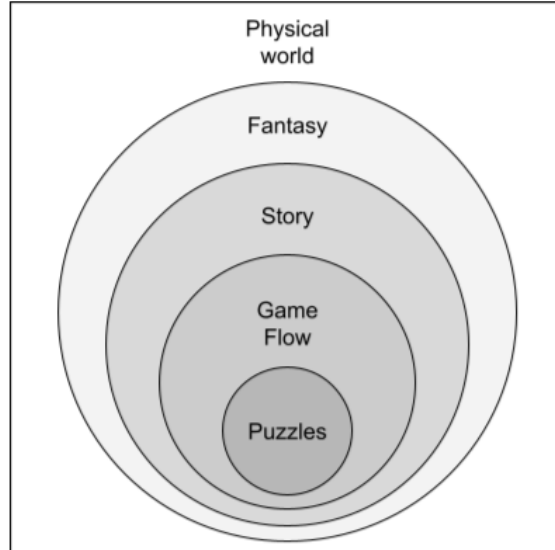
Figure 2.1: Escape room framework.

These pieces are nested into each other to signify that each element should work within the possibilities and limitations of its parent elements and emphasise them. Every escape room consists of puzzles. When puzzles are combined into a game,

they form a game flow. Game flow progresses the story that is conveyed through the puzzles. The story comes from the fantasy the game aims to create and all other elements of the game should empower it. All the other elements need to work in the restrictions and possibilities of a physical world.

2.1   Theme and fantasy

The theme of an escape room describes the overall feel and aesthetics of an escape room. This can be a vague description of the place where the game happens, a time in history, a fantasy setting or a combination of these and a lot more. Fantasy should also include the players' role in the theme. Term fantasy is not commonly used when describing elements of an escape room, however. This is to emphasize that fantasy is more than just the theme and narrative.

For example, the game's theme can be a bank heist in the 1970s. But the theme alone doesn't convey the role of the player. Are the players doing a heist, are they trying to stop it or are they bystanders who got in the way and need to escape in secret?

Not all existing games around the world have a theme or narrative. A 2015 study by Scott Nicholson [3] lists that 13% of escape room games do not have a theme at all. Nicholson also argues that not having a theme is also a valid option as not all players actively want or look for it. I would argue the opposite. Although some themes can deter players, mainly horror and other adult themes - players who are mainly looking for great puzzles will not turn down a room that has a well-established fantasy. Players who do want to immerse themselves in fantasy while solving puzzles would not choose an abstract or themeless game. Still, a game without a theme can be seen as a game-show-like experience where the players will be creating the narrative as their story about solving the puzzles. Both Katleena Kortesuo in her book Pakohuone (Eng. Escape Room) [7] and Adam Clare in his

book Escape the Game [8] agree that the theme is an important factor in escape room design. The theme should tie all the elements of the game together and works as a guideline for every step. As in Art of Game Design [5], Jesse Schell talks that the theme of the game should be emphasized in every possible way, the same applies to the escape room. The story of the game, the puzzles and aesthetics should all work towards reinforcing the fantasy.

As you do not want to spoil the game, the theme is the most visible aspect of the escape room from outside of the room. A good theme can be used to attract customers who like that theme or are looking for a theme that they cannot find anywhere else. This also works the other way around. Some players specifically want to avoid certain themes like horror.

The main reason why fantasy (and theme as part of that fantasy) is so important is that fantasy works as a backbone for everything else and should be reinforced through all other elements. In the Game Experience Model by Suovuo et al. [6], it is mentioned that experienced fantasy is not the same thing as designed fantasy. In escape rooms, this is emphasized as multiple players share the experience while everyone experiences the fantasy from their own perspective. In the Game Experience Model, the designer sees the game through mechanics, story world and aesthetics while the player sees mechanics as action, story world as narrative and aesthetics as a sensory stimulus. Suovuo et al. argue that all three of these pieces as essential or that the product in hand stops being a game.

Fantasy ties to the real world. Some themes are more complex and more expensive to construct than others but also require more from the players. For example, creating a confined room that appears to be an outdoors location can be more challenging to physically create. For the players this will require more effort to emerge themselves into the fantasy if they need to disregard a floral-painted wall that is supposed to be a view into an endless jungle. Figure 2.2 shows an escape room, which

aims to achieve exactly that. The physical walls of the room are hidden behind a printed canvas depicting a jungle. Considering the location of the escape room can also help to reinforce fantasy. A historical escape room in a historical location can pull people to the story well before the game starts.

Figure 2.2: Photo from The Temple room at CLU TKU Escape Room. (Senja Luuri, 2022)

2.2 Story

The story should come from the theme and fantasy. In general, the story can be anything, but a good story should enhance the experience while not coming in the way of puzzle-solving. Usually escape room stories have been lightweight intros to

the experience only to give a reason for the events before the game. Also, usually finishing the game will lead to the conclusion of the story. If the game is too difficult, most of the players will not experience the ending so there should be a way to ensure closure.

A story is a tool to reinforce fantasy. Not all escape rooms have a story but, as with the theme, it should be considered what type of players you want to attract. Having a story should not hinder the gameplay though and it is usually a good idea not to make players spend time interacting with the story unless it is directly connected to puzzles. Adam Clare [8] sums this up well: "Essentially, you want to tell the story via the puzzles." Players are focused on solving the puzzles so the puzzles should be the main way of telling the story. From this, it is easy to lead to the conclusion that the story should follow the game flow. (See Figure 2.3) If the game flow is not linear the story should also not be linear but progress through the same branches as the puzzles do.
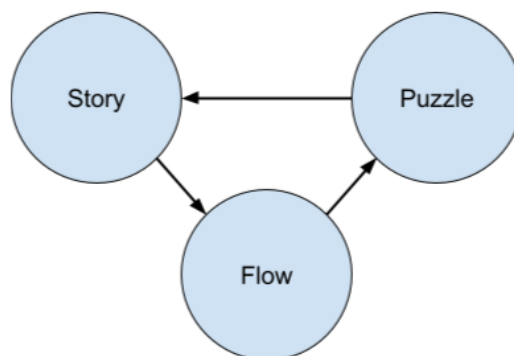
Figure 2.3: The story follows the flow which presents puzzles that convey the story.

A linear story would progress with every puzzle solved. For example, in a game about a bank heist, the story about the insider who arranged to heist would open through the puzzles as players manage to solve them. This could be done through notes left for the players acting as the robbers. As seen in Figure 2.4, each point in

the flow would match an event in the story.
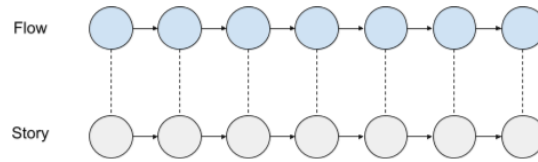
Figure 2.4: Linear progression where the story follows the same path as game flow.

In a more branching game flow where puzzles can be solved in varying order, another type of story might also be needed. Story events would open from puzzles but their connections to each other open only when all of them have been found. Marie-Laure Ryan [9, p. 173–174] calls this the hidden story. Murder mysteries often use this kind of story where pieces are opened, and it is up to the player to pull the story together. Figure 2.5 presents an example of a hidden story.
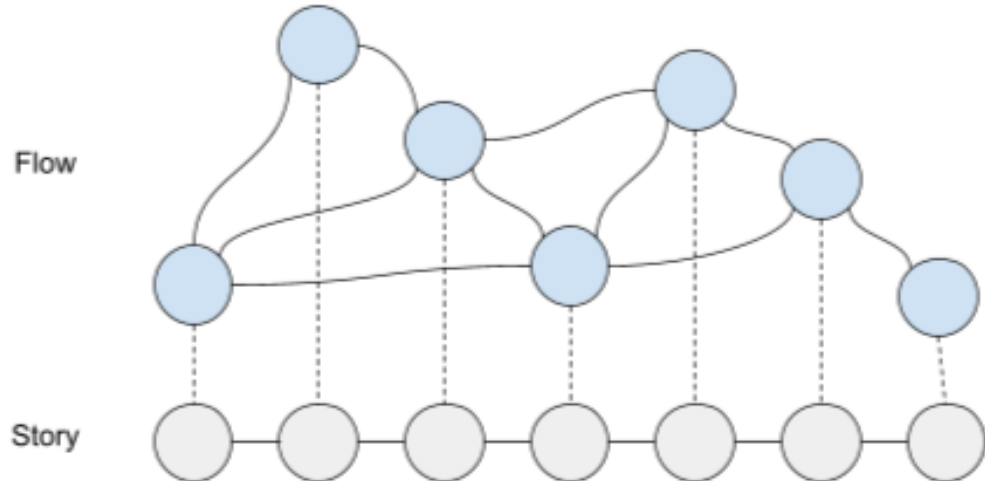
Figure 2.5: Hidden story [9, p. 174].

This is talked about in more depth in the next chapter, but in real-life scenarios, the game flow usually is not either one of these types but combines multiple flows.

Escape room might start from a linear story told by the operator or game master but branches later to sections that can be experienced in a different order.

2.3 Game Flow

In escape room literature [7] [8], game flow is often described as puzzle flow. Flow describes how the puzzles work together to form the whole mechanical side of the game. Flow also progresses the story by linking puzzles together. As flow also links to the story, I have decided to call it game flow and not puzzle flow. This also ties to the flow theory by Mihaly Csikszentmihályi [10].

The basic idea of flow theory in the scope of games is that there is a golden path between the challenge the game offers and the skills of players. While in flow, the game is difficult enough to keep it interesting but not too difficult to cause frustration. While in videogames the designer can assume that the players' skills will increase during the game this usually is not the case in escape rooms. At least within one playthrough of a single game, it can be safely assumed that there is not a huge amount of progress on player skill but players who have played multiple escape rooms can be much more skilled. Especially skills regarding recognizing what is a part of the game and what is just decoration can vary a lot between more skilled players.

Traditionally an escape room game flows from one puzzle to another. Figure 2.6 presents the most simplistic forms of game flow. From the start to the goal the game progresses forward with each puzzle solved. Usually, finding the solution for a puzzle opens a new puzzle or multiple new puzzles. Sometimes multiple solutions together form a new puzzle called a metapuzzle.
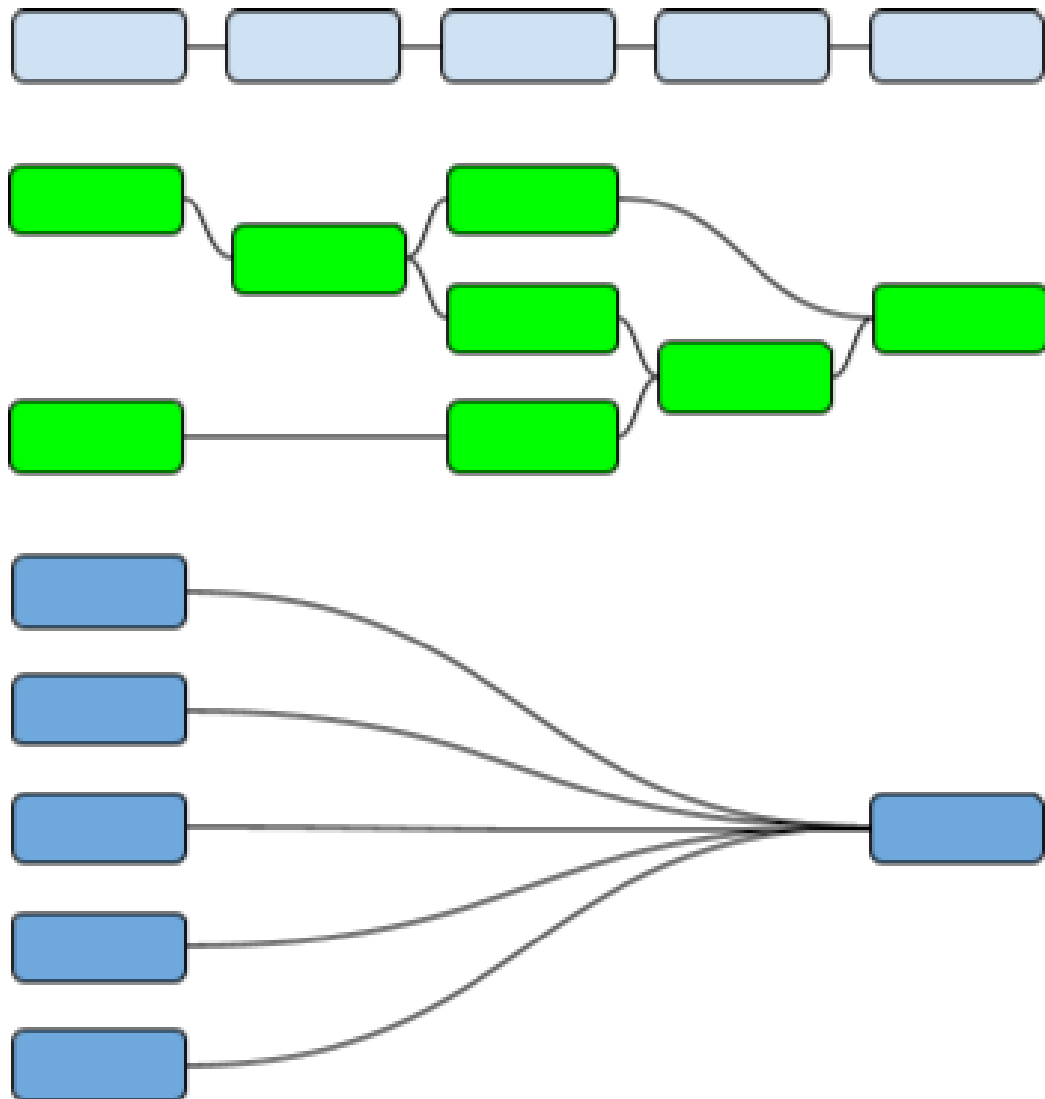
Figure 2.6: Linear flow, branching flow and open flow.

Usually, every puzzle needs to be solved in order to complete the game. But the game flow can and should be branching. For example, a locked box is just opened by a team of players. Inside it, they find two different puzzles. These puzzles can now either be solved at the same time or one after another. As with a larger group, it is rarely a case that four people could tackle one puzzle with the same level of

commitment so with two separate puzzles there is more to do for every player. At the same time, if teams struggle with a puzzle, they will have a chance to leave it for a moment and focus on another puzzle.

All branches should eventually join without leaving open ends. Open ends would mean puzzles that by solving, the players do not progress at all. As an escape room almost always has a time limit, it would be extremely frustrating to waste that time on puzzles that do not lead anywhere. This means that every puzzle needs to be solved eventually before the last puzzle. Combining branches can be done in multiple ways but often they lead to meta puzzles, which are talked about more in Section 2.4.

Optimal game flow should constantly progress. That is a difficult feat to achieve as the group's skill level can vary greatly. Also, as players play as a group but can experience differently, it might be difficult to keep everyone in the flow to the same degree. People might find different puzzles to be more difficult than other members of the teams would. Similarly, puzzles that require dexterity or perseverance will be perceived differently by different players. Optimally there would always be more than one puzzle to be solved. Figure 2.7 gives an example of game flow.
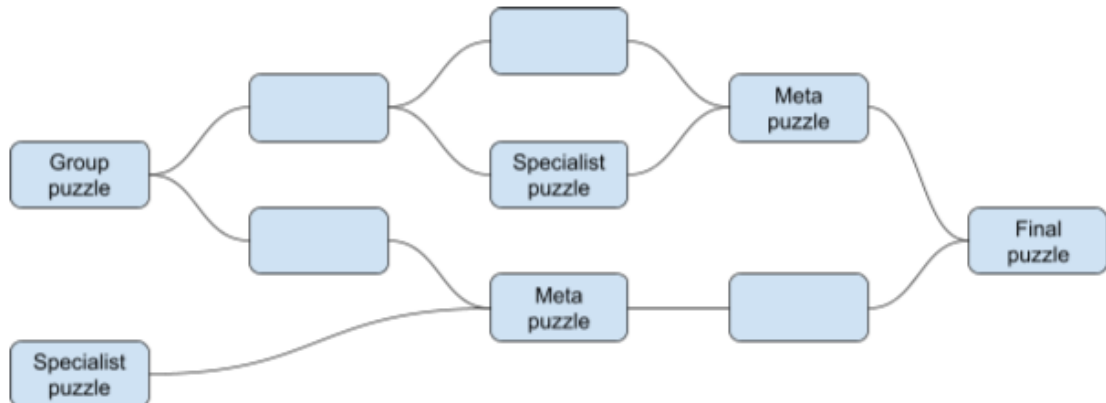
Figure 2.7: Example of flow between puzzles, puzzle types detailed in puzzle section.

Game flow also has ties to video game level design. Scott Rogers [11] has identified that there are two types of video game level designs, alleys and islands. Alley type of design breaks the levels into paths that both limit the directions where players can go but also what they can see in front of them. A linear escape room could utilize alley type design where players can focus their effort on what they have in hand and overcoming a puzzle will lead to the next alley with the next puzzle. Island design breaks the level into areas of interest that can be seen from far and offer players the possibility to choose which location they want to visit first. Island design also allows the creation of areas that can be observed to exist before they can be reached. In escape room design this can be a powerful tool to utilize. Rogers also talks about foreshadowing, giving hints of what is to come. A simple example of using this in an escape room would be to have a piece of the puzzle in sight but out of reach and only after solving another puzzle players can reach it.

In most video games, the game gets more difficult as players' skills improve. As within the constraint of a single escape room, this skill growth is not as large as the puzzle difficulty within the game cannot progress similarly. Still, there should be

some progress on puzzle difficulty. As in the beginning, it will take some time for the players to scout and investigate the room, the first puzzles should be relatively easy to solve. A group puzzle where everybody can contribute by finding pieces of the puzzle while they are familiarizing themselves with the room is a common starting point. Later in the game, the puzzles should become more difficult and can require more input from a certain player. After a certain point in the game, usually after half point or later, the difficulty should either reach a plateau or even lower closer to the end. As there is less time left for the players to solve that time pressure alone will add to the difficulty of easier puzzles. Juliana Patel and Ariana Rubin [12] called this a bell curve of difficulty on their talk at the Renegade convention in 2020 (see Figure 2.8). With multiple puzzles available at any given time, easier puzzles will be solved first leaving more difficult ones to be solved later in the game.
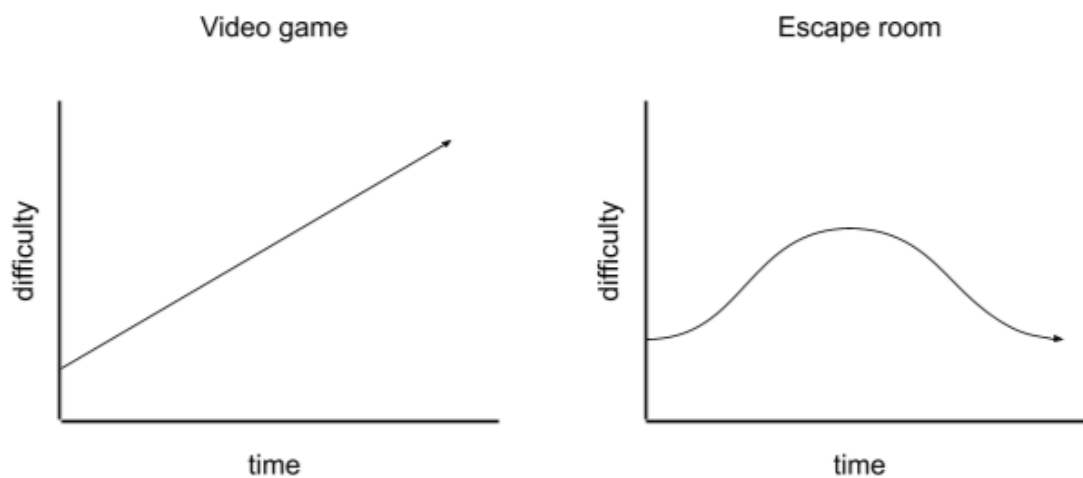
Figure 2.8: Change in difficulty as time passes between video and escape room games [12, 00:10:00–00:12:00].

2.4   Puzzle

A puzzle can be anything that requires player action for the player to progress. The simplest example would be to find a key that opens a lock. Each puzzle should also be part of the game flow and progress the story of the game. Nicholson in his research [3] lists the most common types of puzzles in escape rooms which range from maths puzzles to finding hidden objects to deciphers. Table 2.1 presents the ten most common types of puzzles and how many respondents from Nicholson's survey stated having them in an escape room.

Table 2.1: Ten most common puzzle types in an escape room [3]

Searching for physical objects hidden in the room	78%
Team communication	58%
Light	54%
Counting	53%
Noticing something "obvious" in the room	49%
Symbol substitution with a key (suck as looking symbols up in a book)	47%
Using something in an unusual way (Out-of-the-box thinking)	47%
Searching for objects in images	43%
Assembly of a physical object (such as a jigsaw puzzle)	40%
Algebra and other mathematics	39%

All puzzles require the player to take steps to solve a puzzle and progress forward (see Figure 2.9). First, the player needs to find a puzzle and detect that it is something that needs to be solved. This can happen in two directions which will lead to a different type of chain of reasoning. The first contact with the puzzle can either come with the obstacle or the puzzle itself. For example, a locked box or a door that needs a code to unlock would present itself as an obstacle. The player then must figure out a way to get that code. If the lock would only accept a four-digit

combination, they should look for things that can generate a code in the correct format. The first contact to a puzzle can also be from the puzzle itself. The player would find something that they recognize that needs to be solved in order to use it to progress. This could be an equation or marking that is the player deduces is a part of a puzzle and not a decoration.
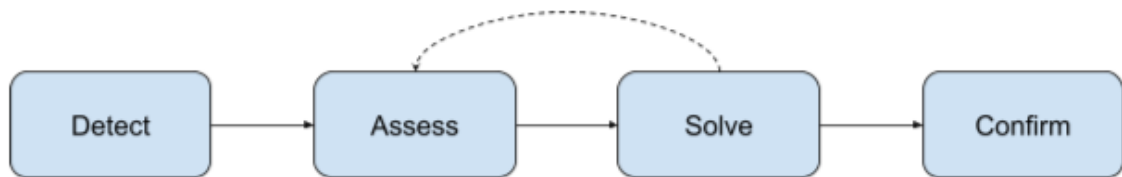
Figure 2.9: Steps for solving a puzzle.

After a puzzle is found, the player needs to assess its solvability. This means that player needs to figure out do they have all the pieces necessary to solve the puzzle. This can often happen while they are trying to solve the puzzle. The goal for the player is to assess that they are not wasting time trying to solve a puzzle that is still unsolvable as not all pieces of the puzzle have been found. For example, deciphering a word requires having a decipher key, which can be split into multiple parts. After finding the first part of the decipher key, the player needs to assess if they have enough to solve the puzzle. They might assess that they do not have enough to solve the puzzle, or they can solve the puzzle partially with that part of the decipher key and asses afterwards that they still need to find more pieces.

After the puzzle is solved, the player needs to be able to confirm that it is in fact solved. Only after they have confirmed that the puzzle is solved, they can move forward to solve new puzzles. In most cases, this seems obvious. If a code opens a lock, the code must have been correct so the puzzle that resulted in that code is solved. Sometimes, especially with electronic puzzles, it might be that when a lock

opens, it is not clear what caused it to open, and the puzzle might appear as not solved. An unlucky player might also get a code from an incorrectly solved puzzle that still opens another lock. This could lead to serious hindrance later in the game because the player has assessed that the puzzle is solved because the solution did open a lock.

Another example, the solution of a puzzle can be a part of another puzzle. To confirm that the first puzzle was correct, the player also needs to solve the second puzzle and confirm that. This kind of puzzle structure is called a meta-puzzle. Steps for solving a meta-puzzle are presented in Figure 2.10. The top puzzle on the figure can be confirmed only by solving the bottom puzzle. Adam Clare [8] (p. 67) believes that meta-puzzles are common in escape rooms because they keep puzzles that are completed early still relevant later in the game. As solving the puzzle does not end before one has also solved all other puzzles leading to the meta-puzzle, it might become more difficult than if the puzzles would be separate.
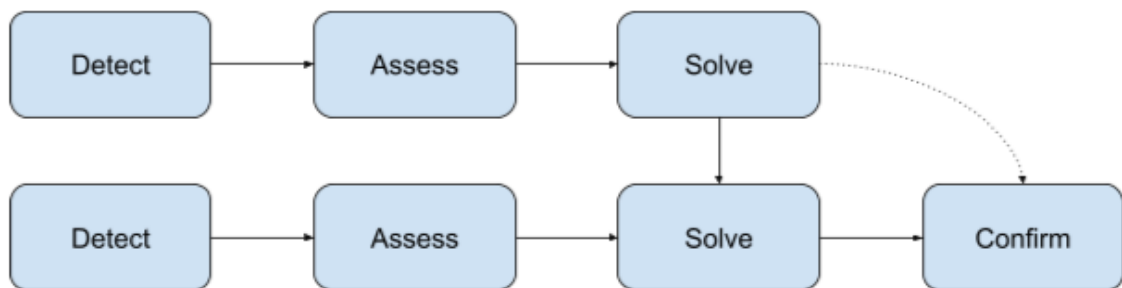
Figure 2.10: Steps for solving a metapuzzle.

Specialist puzzles are puzzles that focus on a certain skill that a player possesses. Mathematical equations and dexterity puzzles are easier for some than others. In many experienced groups, there are specific persons who are immediately directed to solve these puzzles. These can be a great way to give one player time to shine. Someone in the group is usually more interested in solving mathematical equations

than others but there is a chance that there is not that kind of person in the group at all. Specialist puzzles can in those cases become annoying blockades to a group where everyone finds them annoying.

Puzzles should not require any knowledge that comes from the outside of the game. For example, it should not be assumed that players know geography or a foreign alphabet. If the puzzle uses braille-alphabet (a writing system used by blind people) a key to convert them should also be given.

2.5   Real-world

Real-world will both limit the creativity in every part of an escape room, but it will also offer possibilities that are not possible in video games. Players are part of the game world physically and not experiencing it through an avatar. This means that the players need to be part of the story in the sense that they are the ones that need to escape the prison, or they are the ones trying to find the pirate treasure or they need to find the cure for the zombie apocalypse. Often the players play the game in their own clothing and are not prepared to roleplay. This should be reflected on the escape room's fantasy and story.

Aesthetics of the room also play a major role in immersing players to the fantasy. Elements of the room that do not meet the expectations of the players in their appearance or their build quality can easily break the immersion. Broken items, unless broken purposefully, should be repaired as soon as possible. Many usual items used in escape rooms are also used for the same purpose in the escape room. Keys usually open locks and the door handle opens the door that it is attached to. Affordances of real-world objects can also be used to create puzzles where the objects are not used the way they are meant to be used. As shown in Table 2.1, 47% of escape rooms use these Out-of-the-box thinking puzzles. Items in the room should in any case fit the theme although players will overlook clearly puzzle related

items like locks more easily even in themes one would not usually see them like medieval or science fiction themes.

Almost always there is an operator watching the game live through cameras in the room. Players can ask for help if they get stuck or in some cases, the operator will give hints at predetermined times or just when the operator feels that the players need a hint. Through messages and hints, the operator can edit the difficulty of the game live. A well progressing group might get a vague hint when asking for one. For the same puzzle, a struggling group, that will require more help to solve a puzzle, might get a hint that is much simpler and easier to understand. Some escape rooms also convey part of the story through messages from the operator to the players. For example, Time Run's *Celestial Chain*[1] in London used to have the operator talk to players as a friendly robot that gives hints but also tells parts of the story.

Usually, the game world and the real world are separated by a physical barrier. This can either happen when the players leave the lobby of the escape room company or go into the room where the actual game happens. Sometimes also the lobby is part of the game world. This barrier, usually a door, also works as a mental barrier. When a player moves into the game world there is a clear distinction that this is now a new world where the game takes place and not all real-world rules apply.

Something can and will go wrong. Failure can happen in multiple ways. A lock does not open with a correct combination or puzzle pieces break after being dropped hundreds of times. Problems will occur and they can break the immersion if the game cannot be continued without intervention. It is impossible to take all scenarios into account before they happen, but it is important to have a plan for unforeseeable events. In some cases, it is possible to include the intervention into the fantasy. If the employee is needed to intervene, an option would be that the intervention is done so that it would also fit the theme. For example, if a lock does not open with a

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[1]Time Run London closed 26.04.2018 website: https://time-run.sketchanet.com/

correct solution the easiest way to fix it would be to pause the game and remove the broken lock with appropriate tool like bolt cutters. If this can be achieved withing the fantasy of the game, it would be an event itself rather than immersion breaking blockade.

Lastly, an important part where the physical nature of an escape room comes to play a role is what happens between games. For each group of players, the room needs to be returned to the state it was when the game begins. Especially when designing the puzzles it is important to consider the time and effort it will take to return the puzzle back to its original state. Kortesuo [7] calls this step in running the escape room a "set-up step" and although this step only plays a role when the game is not actively played it can be an important one.

3 Conducting research

Testing the feasibility of the escape room design framework was done through professional interviews. The aim was to have about five professionals interviewed but because of the time constraints, only four professionals were interviewed.

Inclusion criteria for the participants were as follows:

- Professional escape room designer

- Escape room owner

- Or has designed an operating or previously operated escape room

Separate exclusion criteria were not set but it was decided that the study would focus only on European professionals to meet the time constraints and ease with interview scheduling. Participants were selected from my personal networks. Three of the participants were from Finland and one from Greece. All interviewed professionals met the inclusion criteria. In general, all the interviewees were happy to be able to participate and prior to the interview were excited for the opportunity to read the framework document.

3.1 Interview method

Chosen interview method was a semi-structured professional interview. This type of interview was selected to keep the interview as effortless as possible for the interviewees [13]. All interviews were conducted through an online meeting platform with

a possibility for live video. Every participant received a version of the framework (Appendix A) and a set of questions (Appendix B) a few days before the interview to have sufficient time to read the material in advance. They were instructed that they would not need to answer the questions in advance and that they were only to help drive the conversation forward. Interviews were scheduled to be one hour, but a strict time limit was not given.

Questions were separated into three topics. First, questions about the interviewee's own design process and methods. Then questions about the framework, and lastly general questions about their own escape room experiences and their thoughts about the future of escape rooms. Questions about interviewee's own design method focused on the design process. There were only two questions sent beforehand as participants were instructed to describe their design process in their own words. A question about what, in their opinion, is the most important part of a great escape room was also included.

Questions about the framework started from their impressions on it, but also more detailed questions on the possible use cases were asked. These questions were on the largest part only used to keep conversation progressing and eventually all the participants continued to discuss topics of the framework that were not originally included in the questions.

Final part of the interview focused on general questions about escape rooms. These questions included questions about professionals' personal escape room experiences and the escape room business in general. Topics about the current state of escape room business and the future we also questioned. During the interview, the questions were used to structure the discussion, but interviewees were allowed to talk as much as they wanted.

3.2   Interview material

The interview material consists of interview notes and video recordings. All four interviews were recorded using screen recording software and a total of 280 minutes of video was recorded. Interviews lasted on average 1 hour and 10 minutes.

All interviewees were escape room business owners who all had a leading or solo role in designing their current and in-production escape rooms. None currently had active rooms that were not designed by themselves. Based on Nicholson's study in 2015 [3, p. 24] it is extremely common for escape room businesses to design their rooms in-house.

Participants' escape room businesses are in cities ranging in population from 10 000 to 3.7 million people. The businesses have from two to six different escape rooms and all the interviewees had designed more rooms than their businesses currently have available. In some cases, these were rooms designed for non-escape room businesses and half had designed escape rooms for their business that are now retired from use. None of the interviewees mentioned to have designed other type of games than escape room games. Here is the list of businesses associated with the interviewees:

- Escape Artist, Turku, Finland[1]

- Hullut Siskot, Sotkamo, Finland[2]

- Labyrinth Games, Helsinki, Tampere & Turku, Finland[3]

- Paradox Project, Athens, Greece[4]

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[1]https://escapeartist.fi/

[2]https://hullutsiskot.fi/

[3]https://lgames.fi/

[4]https://paradoxproject.gr/

4 Interview analysis

As the interview questions were split under three themes, these are also analysed separately. The analysis tries to find the main factors of an escape room design process in the escape room business mentioned in Section 3.2 and how the framework could be part of that process.

First, we will analyse the current design methods as presented by the professionals. After that we analyse their opinions about the feasibility of the framework, how it would fit into their processes and possible improvements to it. Lastly, we analyse the current status of the escape room business as well as how the designers see the future of escape rooms.

4.1 Current design methods

Participants' design experience was not one of the questions asked beforehand, but all of them shared it during the interview. Most of the participants started their escape room design without previous knowledge of the process. None of them had read any literature regarding escape room design or game design in general. One interviewee owned an escape room business in another country before starting their own business or participated in the design process. That means that most of the escape room designing knowledge the interviewees had come from the experience of designing multiple escape rooms. Also, participants mentioned that they had learned a lot about escape room design from running the games after they are finished.

Everybody mentioned that they did not have a set of rules or guidelines that they follow but that they still have their own set way of designing. For everyone, that process was a result of their previous design work. One participant also described separate processes for when they design a room for their own business and another for when they design as a contractor. Figure 4.1 shows a simplification that tries to generalize the design process steps by every participant.
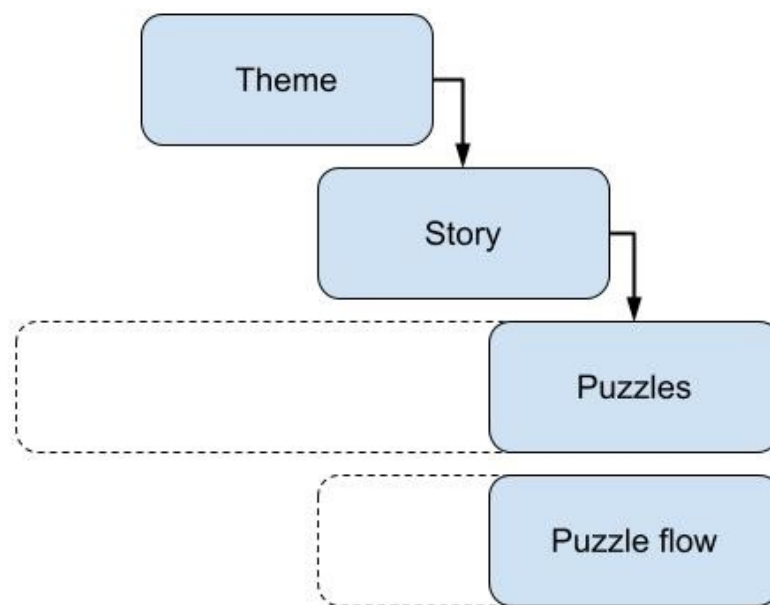
Figure 4.1: Simplification of design process.

In general, everybody starts with the theme for the room. When deciding the theme, the biggest factors to consider were the space where the room is going to be built but also with what kind of theme the designer wants to work with. Outside factors can also affect the theme. One participant described that for their in-progress design they set a goal that the theme should be adventurous but aimed at family audiences. When designing for others, one participant said that also the people who will be responsible for running the room will affect the theme.

All participants agreed that the game should have a story but to what extent

that story should be part of the game varied. One of the participants said that the story is the most important part of a great escape room while one called it "completely secondary". The same participant also continued that in their opinion the best kind of story happens only at the beginning of the game. All interviewees do include a story and it is laid out after the theme for the game is set. The story as well as the puzzles and flow of the game are not set at this point in the design and are allowed to be changed even after the design is finished.

All participants mentioned that they will start to work on the puzzles either during or after the story is laid out. The puzzle designing process also varied among the interviewees. Where one participant designed the puzzles to fit the points in the story others make sure that they fit the theme of the room. Overall, everybody agreed that the puzzles should fit the room on their theme and aesthetics. One of the participants described that their puzzle design process starts from objects that would fit the room and puzzles are then designed to utilise those objects. Another participant mentioned that they collect puzzle ideas constantly and when they design a room, they will go through all the collected puzzle ideas again to see if some of them would fit the design. Only one said that they also look for semi-finished puzzles that they can buy and integrate into their theme and story.

If puzzles are not designed straight into the story the last step participant said their process includes is puzzle flow. This usually happens while the room is physically being built. While designing the flow one participant also raised the point that it is important to map the flow out to make sure that there is no possibility to skip certain sections of the game.

When asked about what the most important part of a great escape room is, the answers varied a lot. This can be explained as every designer also being a player and looking for different kinds of experiences as mentioned in Section 2.1. Half of the participants raised aesthetics as the most important part while one said that

the story is the single most important thing. Everybody however agreed that the puzzles also need to be well designed in a great escape room experience. One of the participants also mentioned that every room should have something, that will be remembered from the room. "Some sort of wow factor or a great reveal should be included in the game." (Interviewee 1).

4.2   Framework

First topic to be asked the interviewees about the framework was their first impressions. All said that it was novel for them as no one had previously read any literature regarding escape room design. Most also stated that when the concept was introduced to them before the interview, they were excited to read it.

When asked to describe their design process, all of the interviewees started by stating that their process is close to the framework. Half said that their own process is on point with the framework. "Very much applicable to our current room we are building." (Interviewee 4) Interviewees struggled to have anything negative to say about the framework but only one of them saw that it could be useful for them or part of their design process. As reasons why they would not include the framework in their process, everybody expressed that they already have a system that works for them. One of the participants also raised a point that for them, "including more limitations to the process would limit creativity". The same participant wanted to use the framework to reflect on the room design after the room was completed. Most of the participants were also interested in hearing more about the topics covered by the framework.

Some raised topics that they felt should be included in the framework. One topic that was mentioned by multiple participants could be gathered around one theme, a topic about operating the room once it is in use. Participants also said the following:

"Common mistakes should be their own section" (Interviewee 3)

"It should have things about customer experience." (Interviewee 1)

"[The framework] should emphasize more why a puzzle is included in the
game" (Interviewee 4)

Only one of the interviewees wanted to utilize the framework as such in their
design process. However, all of them mentioned that it would be a great tool for
someone with less experience to learn the basics of escape room design.

4.3   Future of escape rooms

All participants said that now escape rooms have reached a level of stability that they
can be considered a permanent part of the entertainment industry. For most, that
meant that customers are also getting more demanding as they are more accustomed
to having a high-quality experience.

Another point raised by some of the interviewees was that there will be more
escape room experiences that break the traditional escape room experience format.
This was most apparent for the participant from Greece. In Greece´s Attica area,
which includes Athens, there are more than 130 escape room companies with more
than 300 separate games are available on one booking and review platform [14].
The interviewee mentioned that more and more untraditional escape experiences
are now available. And interviewee did not find all of these alterations a great
addition. "These experiences are called escape rooms and have multiple actors but
might not have puzzles at all" (Interviewee 2). Another participant from Finland
also mentioned that there are new concepts like outdoor escape rooms and online-
only escape rooms that will broaden the business space. Both participants feared
that this broadening of the escape room term might make it more difficult for the
customers to understand what they are getting when they buy an escape room

experience.

A topic outside the research was also brought out with all the participants. Escape room businesses seem to be surprisingly open to discuss business and design matters with other escape room owners and designers. This is not only limited to the interview in hand but a lot of discussion about room design and business decisions are discussed between the owners and designers on online platforms as well. A point was raised that as the nature of escape room business differs from a lot of other entertainment options in an aspect that the escape rooms are in most cases a single use experience. This means that the competition in smaller cities is not so fierce that other escape room businesses would be seen as enemies. A consensus was that every escape room experience should be a great one so a customer would want to continue the hobby and would eventually visit other businesses as well.

5 Applying the framework into real life

In this chapter we apply the framework to an existing and operating escape room design. The escape room under scrutiny is *Bank Heist* room at CLU TKU Escape room. In total, CLU TKU has three different escape rooms each with their own theme and puzzles. As mentioned in Chapter 1, CLU TKU has been operating since 2016 and Bank Heist has been open since the founding of the company. The room is originally designed by NERD New Escape Room Designs LLC and CLU TKU purchased the design but not the physical implementation. Even from the beginning the design at CLU TKU has not been the same as originally designed by NERD but the design was modified.

This chapter follows the same structure as the framework. It is separated into four different sections. Each section focuses on one of the elements of the framework. First, we look the theme and fantasy, then the story, game flow and last the puzzles. Real world is a part of every other element so it's limitations and possibilities are discussed among other chapters. Finally we summarize how well the room design follows the framework and discuss the reasons on the points the design deviates from it.

5.1   Theme and Fantasy

At CLU TKU Escape Room, the fantasy of the room cannot be surveyed without first discussing about the fantasy before the game. CLU TKU has an overall theme and fantasy that encompasses both the escape rooms themselves but also the experience before the game. At the lobby, which is decorated to give an impression of 1800's train carriage's interior, the players are greeted by an employee in costume. Figure 5.1 shows the lobby hall at CLU TKU viewed from the entrance to the lobby. While waiting their game to start the employee explains that "CLU is one of Turku's oldest time-travelling interdimensional detective agencies".

Figure 5.1: Lobby room of CLU TKU Escape Room viewed from the entrance.

This story is then carried through the rules and regulations of the game. Players

part in this fantasy is to become the newest agents for this detective agency and conduct their first mission. Each mission is one of the three escape rooms.

As the name of the room implies, the theme of the room is a bank heist. The room itself is decorated to immerse the players into a 1970's bank manager's office. Although most of the items are not actually old enough to be from the 1970's they do give the impression that the room is in another time. The actual date or year of when the events of the game are not told. In Figure 5.2 is show the view into the room from the entrance. This shows what the players will see when they first enter the escape room.

Figure 5.2: View from the entrance into the Bank Heist escape room. (Senja Luuri, 2022)

Players' role in the fantasy is to become bank robbers although in the story their role is to save the target item by robbing it first rather than being the ones robbing it in the first place. The players can be seen more as the heroes rather than villains as even though they are doing the bank heist it could be argued that they get to perform it in a good will. In the original design by NERD, the players' role in the story was more generic as it was designed that the players are the bank robbers. The switch was done to give different players more chances to enjoy the fantasy. As robbing a bank can be seen as morally wrong thing to do, doing it for a greater good was thought to allow more players to enjoy it. In its current state the fantasy will cater both the people interested in being a master thief but also gives a relief to the players who would not want to act unmorally. The 1970's theme was also added later to better fit CLU TKU's time travel theme.

Many of the elements and furniture in the room aim to enforce the theme. A lot of elements one could imagine to be in a bank managers office are present. For example, the room includes the bank manager's desk with antique lamp and other office supplies including a calculator. There is also a small standing safe but also a hidden safe plus a door to a vault. Theme and fantasy are part of every aspect of the room's design. In later chapters about the story and puzzles we discuss more on how the theme is incorporated on both.

The real-world limitations have a major role on the theme of the room. One of the walls of the room has a full width bookcase fixed permanently to it. This bookcase can be seen in Figure 1.1. CLU TKU leases the space from a landlord and was not allowed to make modifications to the permanent fixtures of the space. Theme for this room was decided to be something that could include the bookcase in it. In the design the bookcase is filled with binders that are neatly organised to fill most of the bookcase. Another example of the challenges of the space is also visible in the Figure 5.2. The room has a big window which could easily break the

immersion if not covered. If the fantasy takes place in another time and another location, seeing the street the players entered to the building could easily break that immersion. In this case the actual view through the window is covered with an image depicting a city scape. The image enforces the story that the room is manager's office which is probably on a higher floor in the bank building as well as establishes that the game happens during the night. As a conclusion, the framework encourages to include the theme and the fantasy in every aspect of the escape room design. In the Bank Heist this fantasy starts immediately when the players enter the business' lobby and continues throughout the game and even after the game itself is finished. Theme is emphasized in the aesthetics, narrative and the puzzles. The aesthetics of the lobby, the room and the employee guiding the experience all reinforce the theme. How the story and the puzzles emphasize the fantasy are talked in more detail in their respective chapters.

5.2 Story

As mentioned in the Section 5.1 the first pieces of the story are presented before the game itself start while the employee goes through rules of the game. The mission at hand is to perform a bank heist. The employee explains to the players that there happened a heist at the bank manager's office in the late 1970's. A group of thieves stole a box full of ancient coins. It was rumoured that the heist was an inside job and someone from the bank helped the thieves. Players are tasked to figure out how the real thieves managed to steal the coins by stealing them first. The players also hear that they have only sixty minutes before the actual thieves get into the room.

During the game the story in conveyed as small pieces of information embedded into the puzzles and into the elements into the room. The story is not linear although it is presented to the players in a set order. Each piece of the story is presented in a way that it is up to the players do they want to follow it or not. This makes it

possible for the players that are not interested on following the story to not feel that they are forced to spend time with it.

The Figure 5.3 present the story points in relation to the game flow progression. The first story point is the main mean of conveying the story and it happens before the game starts. During the game the story is mostly conveyed through the puzzles but the room itself also gives points to the story. As players are exploring the bank manager's office, they will learn who the manager is as well as about another character who is one of the manager's customers. As more pieces of the story in unveiled, the players learn that it is most likely that the bank manager herself is the person behind the robbery and one of her customers is helping her.
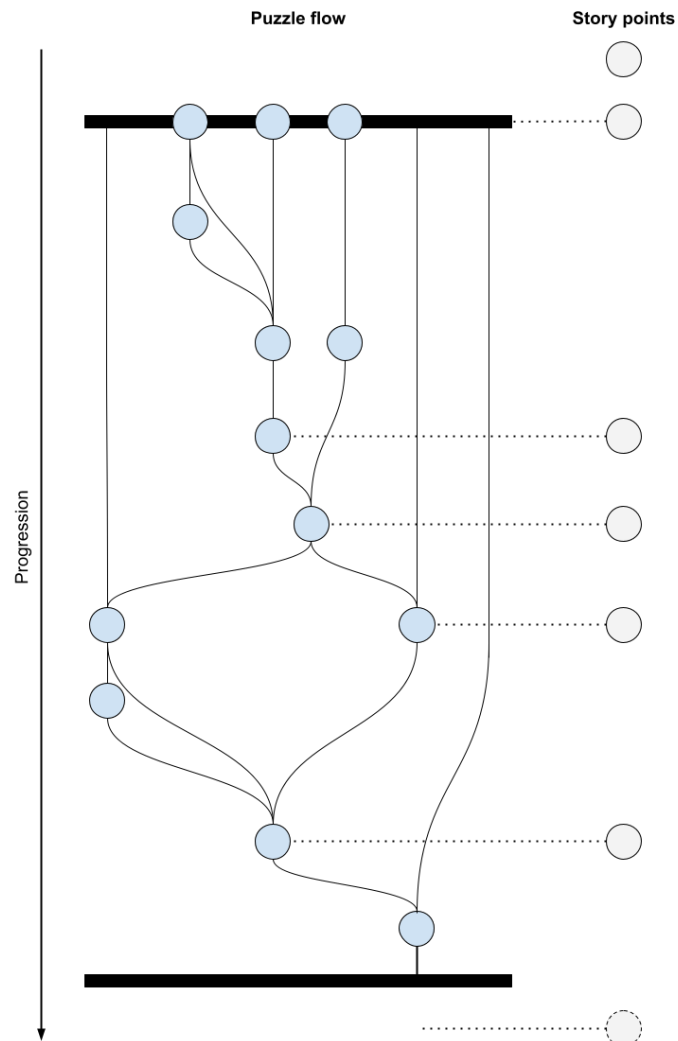
Figure 5.3: Story points in relation to the puzzles and progression of Bank Heist escape room.

The last piece of the story happens after the game, and it is only told to part of the players who were most interested in the story and ask questions about after the game. As the players solve the final puzzle and manage to steal the coins the timer stops, and the game is finished. At this point some of the groups raise questions about the involvement the of manager or they question what the actual robbers stole if they were the ones who left the office with the coins. This gives an opportunity

for the employee to further tie the story of the game to the larger fantasy of the business. The last part of the story confirms to the players that it in fact was the bank manager who helped to steal the coins but that she also works for CLU.

The story in general fits the theme and is mostly conveyed through the puzzles but also through items in the room. The story does not form a linear continuous story although its events are presenter in a linear manner. As proposed in the framework, the story in Bank Heist does not hinder the players who are not interested in it. On the other hand, it will reinforce the fantasy for those players who are interested on learning more about the characters and event that might have acted before the players became part of the story.

5.3 Game flow

The game flow combines multiple types of flows presented in the framework. This puzzle flow is presented on Figure 5.4 along with the perceived difficulty. At the beginning of the game there are multiple puzzles that can be solved immediately. These puzzles both open new puzzle opportunities as well as pieces of the puzzle to be used later in the game. These puzzles are later combined into one puzzle which again hands the players pieces necessary to solve puzzles that were visible from the beginning of the game. Some elements of puzzles are also visible from the beginning of the game but those can only be solved later. In other words, the game flow starts as an open flow with multiple puzzles to be solved. Later the flow becomes more branching, and the last branch is closed in the last puzzle of the game. Each puzzle must be solved to complete the game.
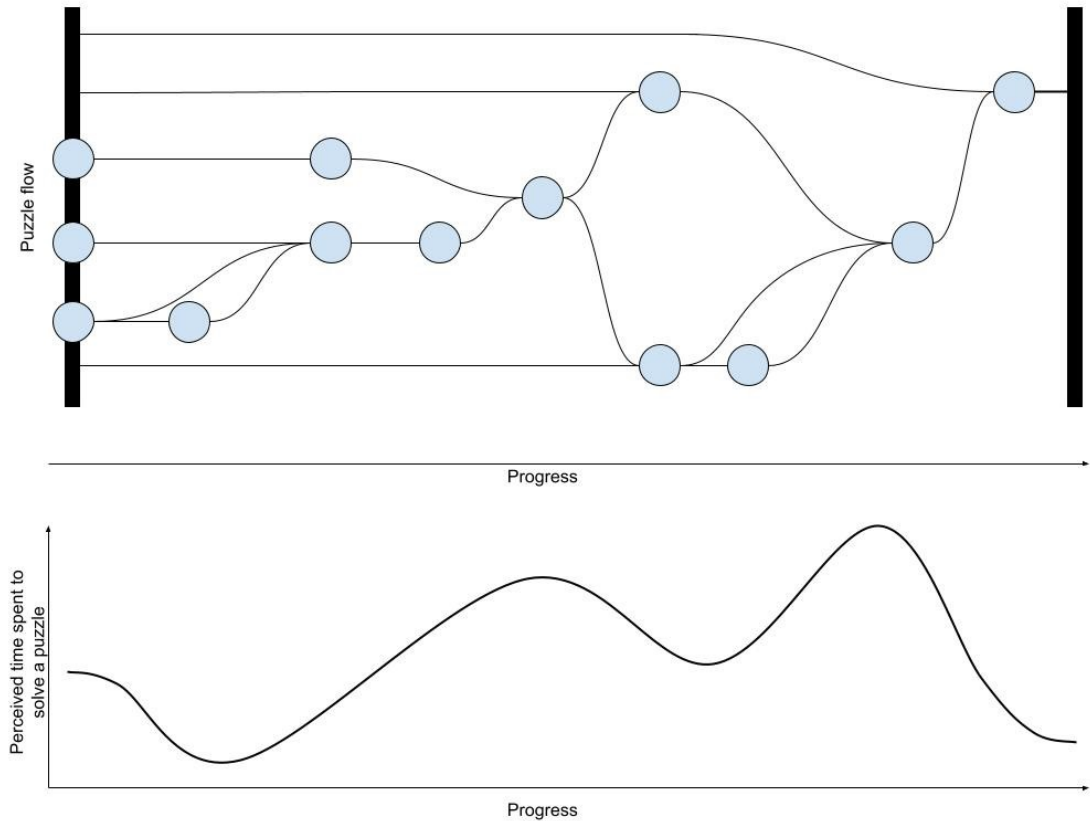
Figure 5.4: Puzzle flow and perceived difficulty during the progress of the Bank Heist escape room.

The framework states that the game should feel that it is constantly progressing. At the Bank Heist, some puzzles lead to more progression than others which might cause players to feel that game is stagnating. In the middle part of the game this is most apparent. A lot of the puzzles rely on information or physical barriers from previous puzzles to be cleared for the game to progress. At the same time there are apparent puzzle pieces available from the beginning of the game that are only useful or solvable at the very end. This can cause players to feel that even though they are solving puzzles they are not progressing.

Perceived difficulty in the Figure 5.4 is a personal estimate on how the groups

that have played the room in past 5 years have spent their time in different stages on the escape room. As a generalisation, groups spend a lot of time at the very beginning, at the middle and just before the last puzzle. The perceived difficulty of the game has similarities to the proposed model of the framework although it seems to start as more difficult. Also, the peak of difficultness appears later during the game rather than at the middle. As the game offers multiple puzzles at the very beginning as well as pieces to later puzzles, there is a lot to do right from the start. This can cause the players to lose interest early in the game unless they are aided through hints. On the other hand, it could be argued that as CLU TKU advertises this escape room as their most difficult, the more demanding start sets the tone for the experience. For the groups who were drawn in with a promise of difficult room, a difficult start will immediately bank up on those promises.

Physical space and puzzle construction can cause problems within the flow. One of the puzzles in the room could be solved even without first solving the puzzle before it in the flow. In Figure 1.1 at page 3 a large clear pipe can be seen. Inside the pipe is a container. From the previous puzzle the players acquire a retractable pointer. The pointer can be inserted through holes on the underside of the pipe to nudge the container forward. When the container reaches the end, it will drop out and the players can open it. In the real-world environment though some players are much taller than others and a tall player can reach the pipe without the retractable pointer and use a finger through the holes to move the container. This effectively solves the puzzle before the pointer is even accessed. Players will get the pointer later in to the game which might make them not to realize that it should have been used for the pipe and will continue to find ways to utilize it. This can cost them time and make later puzzles more complicated to solve.

In conclusion, the puzzle flow on Bank Heist starts as an open ended but branches starting from the middle of the game. This makes the difficulty of the game to be

high at the beginning of the game. Also, the difficulty increases until the very end.
This contradicts the model presented in the framework but as the room is advertised
to being extremely difficult the payers will be more likely to overcome the possible
problems of stagnation and boredom at the beginning.

5.4   Puzzles

In total, there are thirteen puzzles in the game. They are presented in Appendix
C in the order they appear in the game. Most common type of puzzle is that the
players need to notice something extraordinary or something that is out of place.
For example, in the room there is a wall full of binders on a bookshelf. One row
of five binder is upside down. That row is just a façade of the backs of the binders
Behind that façade is a safe and to open it another puzzle needs to be solved. In
Table 2.1 this type of puzzle is listed as *Noticing something "obvious" in the room.*
They are a common type of puzzle as 49% of the rooms have them.

Most of the puzzles in the room follow the steps of solving presented in the
framework. Usually either the puzzle or the barricade requiring a solution in found
noting the player that this specific thing requires a puzzle to be solved. Puzzle
pieces all have something in common with their respective barricades. For example,
a locked suitcase has a 3-digit combination lock indicating a puzzle that produces
a 3-digit code needs to be solved to open the lock. The suitcase also has a sticker
that reads "I <3 NY" that it can have something to do with either travelling or New
York. On one of the walls there is four clocks with names of four cities under them.
A clock of New York is missing. This presents itself as a puzzle to the players but
also ties it to the suitcase. Now players know that to open the suitcase they need to
solve the puzzle about New York's missing clock. From another suitcase players will
find a world map that has time zones marked on it. With this map the players can
figure out what the time would be on New York, which will be the correct solution

to open the suitcase with "I <3 NY" sticker. Opening the suitcase then confirms to the players that the puzzle is solved correctly.

Some of the puzzles can be solved before the players even have all the necessary information to do so. A correct way to solve a puzzle can be found before the all the pieces of the puzzle are found. This can happen in multiple occasions during the game. The players figure out how the puzzle is solved from the pieces they have gathered but before they can do so for all the pieces of the puzzle. Then, what is left for the players to do when they eventually find the missing pieces is to do the manual work of applying the found solution all the pieces. The last puzzle can be solved this way. From the start of the game players can find two images that are copies of a larger image on a wall. Image is an art piece made of numbers from one to nine. The large picture on the wall has the full image but the smaller copies have errors on them. The small copies are missing all occurrences of a single number. Behind the small images is a Roman numeral. On the two copies players find at the beginning are the numerals I and IV indicating that they are missing pieces II and III. At this point the players have effectively solved the puzzle and when they eventually get their hand on the last missing pieces, they know what they need to do with those. Of course, only after the players have all the pieces they can assess that their solution was correct.

Three of the puzzles in the game form a metapuzzle. The players cannot assess have they solved the two previous puzzles before they solve the puzzle that merges the answers of those two puzzles. Figure 5.5 depicts the puzzles and their relations to the puzzle flow and information flow. These puzzles are numbered 6,7 and 8 in the Appendix C. Figure 5.6 displays a closer look to the puzzle pieces and their relation to each other. In the first puzzle, the players get five jute sacks with green letters. These sacks can be ordered by their weight in ascending order which will form a five-letter word "BROWN". At this stage the players usually go through all

the locked items they have available to test if the code "BROWN" would open any of them and as they cannot confirm that the puzzle is solved, they will leave the puzzle to this stage until further information is revealed.

Figure 5.5: Bank Heist puzzle flow including meta-puzzle. Numbers refer to puzzle numbers in Appendix C

Another step of this metapuzzle is a note that reads "Mr. D wants his account balance updated with these new additions" accompanied with four rows of deposit and withdrawal sums. On a rolodex there is a list of account opening balances from various customers. One of those customers is named David Brown. The code "BROWN" players got from the jute sacks accompanied with the message mentioning Mr. D together point that the David Brown is the correct customer. After calculating the new balance for David Brown players will have a number code, which is this case is "5508". Still, this code does not open any of the barriers the

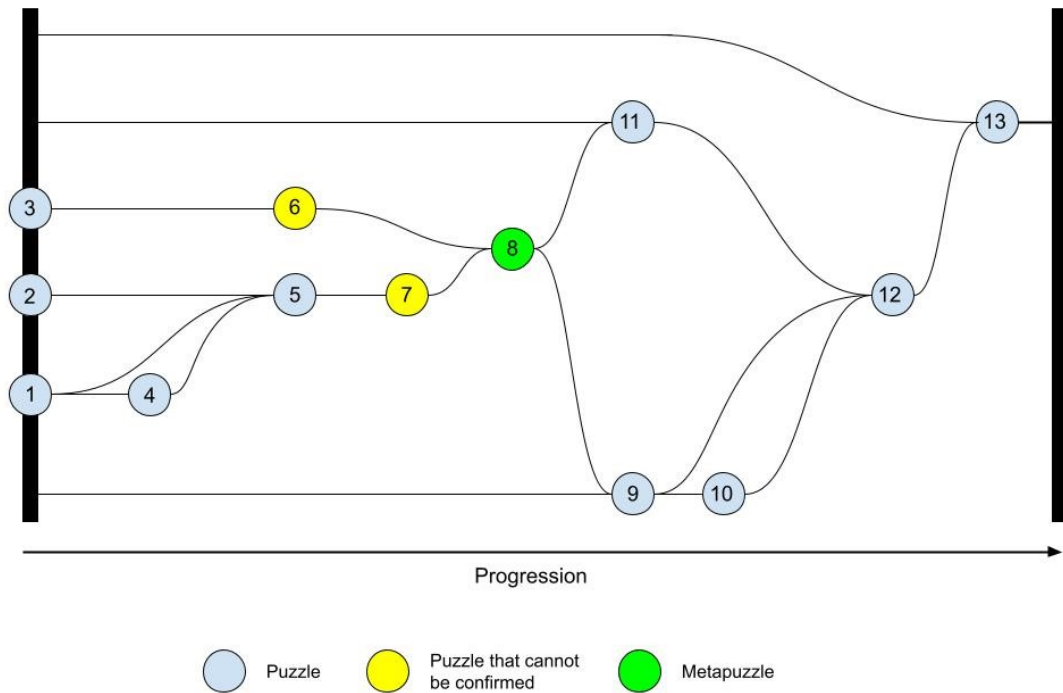
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players face at that moment.

The last piece of the metapuzzle is to follow the example given in a picture frame on the desk. Picture in the frame has an older man holding calculator upside down on both of his hands so their displays form a message "HELLO LILLIE". This is a hint for the players to look the new account balance upside down as well and form a word, rather than number code, from it. When turned upside down the account balance "5508" shows a word "BOSS" which is a correct code to a padlock. This will finally make it possible to assess that both the green lettered jute sacks and the new account balance were also correctly solved.
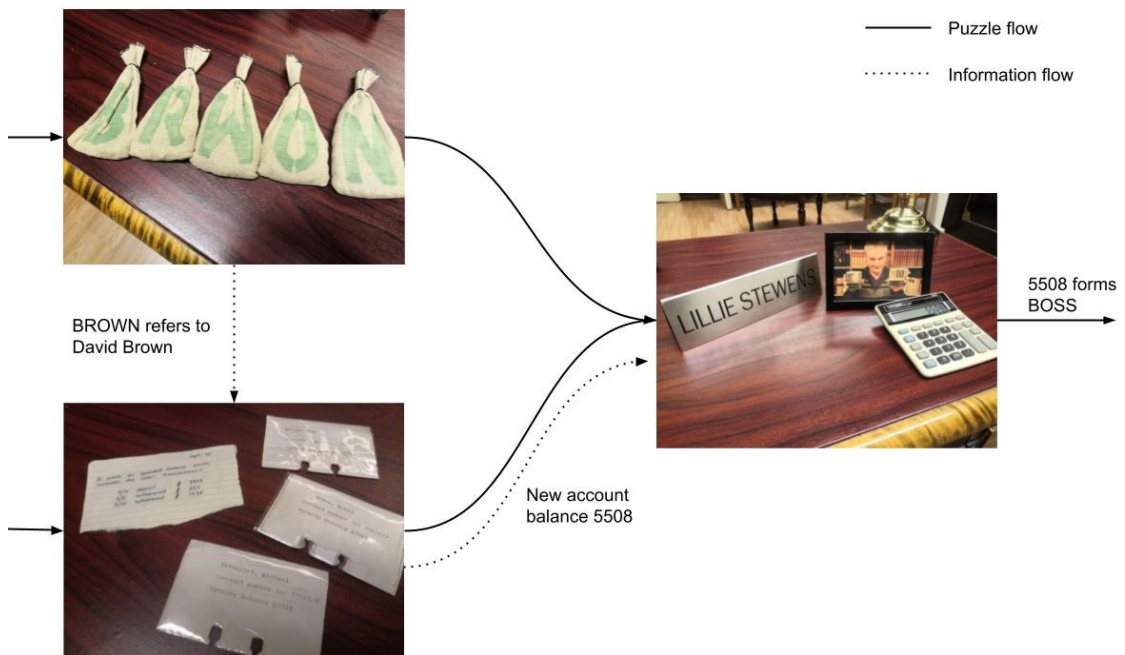

Figure 5.6: Metapuzzle formed by three puzzles. Only by solving the puzzle on the right, the two on the left can be assessed as solved.

Puzzles of the room are in general well fitted to the theme. They utilise items that are would be common in an old bank setting like calculators, money bags. Some items fit to a bank manager like suitcases, clocks and phonebooks. Puzzles include

mathematical themes and numbers even though they do not require mathematics other than addition and subtraction.

While the puzzles in the room fit the theme, the actions players perform are not related to actions one would associate with a bank robbery. None of the puzzles or tasks in hand include actions one could see in other entertainment depicting heist scenarios. For example, there are no puzzles that include alarm systems or opening safe without the correct code. This for some might break the fantasy of being bank robbers. This is especially true as there are items around the room that would clearly be valuable if stolen like bags of money. On the other hand, the story specifically states that the players are not there to steal anything but the box of coins.

5.5   Summary

When applying the framework to the design of the room some points can be raised. As the framework suggest a room design should have a theme and fantasy which are emphasized in every level of the design. In Bank Heist the theme is present throughout the game including the introduction and space before the game itself starts.

The theme and the fantasy are present in the story as well. The story is mainly told at the beginning of the game and pieces of information extending it can be found during the game. This way the story does not come in the way of the puzzle solving experience but allows the players who are invested in it to dive deeper also after the game.

6 Discussion

In this chapter the aim is to reflect the research questions against the findings from the interview. First, we discuss about escape room design in general and aim to point out the most important decisions to make while designing an escape room. These findings are reflected against video games design and especially the Game Experience model by Suovuo et al. Then we discuss about the viability of the escape room design framework and the possible use cases of it. We also discuss the findings regarding the current state of the escape rooms and their future. Lastly, we propose a topic for extending this research further.

6.1 The most important parts of escape room design

The aim of this study was to find out the most important parts of a great escape room. Based on the research the basis for the escape room design should always be the theme of the game. The theme should be then emphasized in every other part of the design as much as possible. Also, all the physical elements included should either emphasize the theme or be part of the puzzles.

In the participants' opinions, the aesthetics were raised as the most important element that will distinguish a great escape room from a good one. It could be argued that in this case aesthetics also means the quality of the physical objects in

the escape room. Physical quality should include both that the materials used are good quality and that they fit the theme. In general, As escape rooms are now an established entertainment business and customers are looking for more high-quality experiences, the quality of the aesthetics will raise into a bigger role in the future.

As some of the participants also raised the story of the game as being important and every participant includes it in their design it cannot be overlooked as an important part of escape room design. Every escape room should have a story which ties to the theme of the room. To what extent that story is utilized during the game varies but a great story is present and progresses as the game progresses, but it should not come at a cost of the puzzles. As mentioned in Section 2.2 the story should not hinder the puzzle-solving experience.

Although only one participant mentioned that puzzles are an important part of the escape room experience it could be argued that without puzzles an escape room is not a game anymore but some other type of experience. As Suovuo et al. found in their research [6], a game needs to have narrative, aesthetics and mechanics to be considered a game. It was also mentioned that the puzzles need to be of good quality to be included in the escape room.

Overall, as in the Game Experience model by Suovuo et al.[6], three main parts of a great escape room are aesthetics, narrative and mechanics. When reflecting on these parts of the escape room design framework we could see the theme, fantasy and puzzle flow forming the narrative, puzzles forming the mechanics and the real-world room construction forming the aesthetics.

6.2   Viability of the escape room design framework

All the interviewees had already formed their own design processes and although everyone seemed interested in the framework most of them would not see much practical use for it in their processes. All the interviewees still stated that it would

have been useful for them before they started designing escape rooms. Because of this, it could be argued that the framework would be a useful tool for new escape room designers.

Framework managed to match the design process of all the designers to an extent that it can be said to match a general design process. Although the framework did not exactly match anyone's process it was proven to be a good generalization of the escape room design process.

When comparing an established escape room design of an operating escape room it could be seen that the elements of the framework are present in it. The framework was able to confirm the design decisions of the room and for the most part the room under scrutiny matched the expectations of the framework. Points where the escape room deviated from the framework could also be identified as well as possible reasons behind them. From these remarks also suggestions for improvement could be made. This further proves that the framework could be a useful tool also for assessing escape room design of already finished design or when the room is already operating.

As the framework relies on video game design concepts, it could be argued that video game design principles can be applied to escape room design as well. As mentioned in Section 6.1, the Game Experience model by Suovuo et al. [6] could also be extended to escape room design.

6.3   Future and extending research

Escape rooms have reached their own steady place in the entertainment market. Customer expectations are rising as more people have previous experiences. There is still room for new niches that expand what an escape room is. New experiences that break the traditional format can also cause problems with the audience. An escape room might become a hypernym that will include a variety of different experiences. Otherwise, multiple types of experiences under the same name might cause confusion

amongst the players. As with videogames, it might become topical to apply genres to the escape rooms. Where some games focus on the story exclusively other might only have extra difficult puzzles. Different terms would make it easier for consumers to make decisions based on their personal taste without limiting what an escape room can be in the future.

As mentioned in Section 6.1, the theme of the escape room is extremely important. The framework aims to extend this to include the role of the player in the theme although this concept was not mentioned to be part of any of the participants. Also, the room used as an example did not cater to the fantasy in other level besides the setting and the theme. Therefore, the concept of player fantasy in the context of an escape room should be researched more. Research on the player fantasy should also include the players in it.

7   Conclusion

This thesis aimed to create an escape room design framework by combining previous research done both in the escape room literature as well as in the video game design. The framework splits the escape room design into five elements, each of which have influence to another. First element in the framework is theme and fantasy, which should be the cornerstone for any escape room design and all other elements should emphasise it. From the theme comes the story of the room which is influenced by the theme. Usually, this story should not come into way of the puzzle solving aspect of the game but should still manage to reinforce the fantasy and help keep the game progressing. This progress of the game is in the framework called game flow. Game flow describes the order in which the puzzles are presented to the players, but it can also be used to assess the difficulty of the game. A great game flow will keep the players interested, makes them feel progression as well as drives the story forward. Puzzle design is also present in the framework and different types of puzzles are presented as well as steps that the players need to take to solve a puzzle. A concept of meta-puzzle, a puzzle which require multiple puzzles to be solved before all of them can be assessed by the player to be solved. Lastly, the framework includes how the physical world will affect escape room design. Real life limitations but also possibilities are introduced.

Research was conducted with an aim to validate the framework as a useful tool as part of the currently utilised design processes. Research was done as a semi-

structured professional interview and their results were analysed. Based on interview results the escape room design framework closely resembles to currently used design processes used by the professionals. However, as their current methods have been tuned from years of experience it was concluded that the framework would not offer new opportunities to learn. Based on the analysis, the framework would be useful for new designers as a learning platform and to use as basis to create their own design processes.

The research also formed a basis to answer the first research question which asked: What are the most important design decisions when designing an escape room? The theme of the room forms a basis for all the other design decisions. Theme should then be emphasised on every other element of the escape room design. The framework presents that the fantasy of the game which includes the player's role in the theme is also important but based on the interviews this will require more research. Aesthetics of the room were also raise as a single most important factor that separates a good escape room from a great one.

The escape room design framework was also applied to a real-world example. An operating escape room's design was compared against the structure of the framework. Findings from the discussion show, that the design of the room also matches to elements of the framework. Greatest deviation point in the operating room's design is the difficult. It can be argued that the decision to deviate has been a thoughtful decision which is done to emphasise the difficulty of the room. With this decision the room more closely matches a promise made for the consumer in the marketing of the room.

Second research question asked was: Is the created escape room design framework a valid tool to design and assess escape room design? The research as well as case study that applied the framework to a real-life room display that the framework manages to express the core of the escape room design process. In the future the

framework can be utilised by new designers as well to assess already created escape toom designs. The framework matches closely to the design processes currently in use and as such, does not offer new learning points to established escape room designers.

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Appendix A Escape room design framework at the point of interviews

Escape room design framework

The escape room design framework is designed by combining work from multiple video game design frameworks and is an estimate of how those frameworks would work in a real-world escape room setting. Many concepts loan from the works of Ernest Adams (2014), Jesse Schell (2020) and Tomi 'bgt' Suovuo et al. (2020).

The escape room design framework (see Figure 1) aims to split the design into five distinct elements. These pieces are nested into each other to signify that each element should work within the limitations of its parent elements and emphasize them.

Every escape room consists of *puzzles*. When puzzles are combined into a game they form a *game flow*. *Game flow* progresses the story that is conveyed through the puzzles. The story comes from the fantasy the game aims to create and all other elements of the game should empower it. All of the other elements need to work in the restrictions and possibilities of a *physical world*.
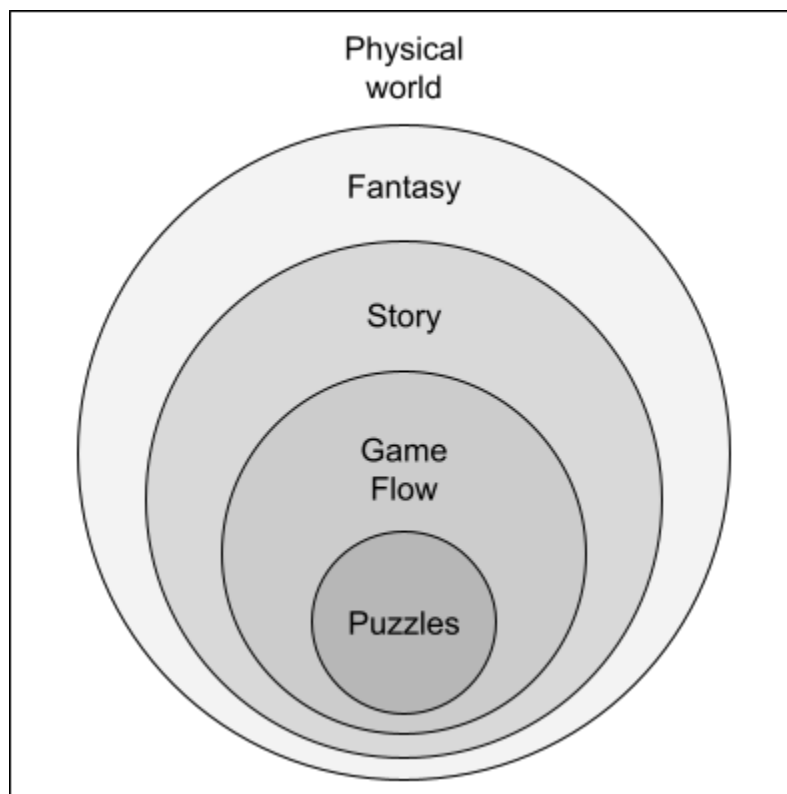

Figure 1. Escape room framework

1 Theme and fantasy

The theme of an escape room describes the overall feel and aesthetics of an escape room. This can be a vague description of the place where the game happens, a time in history, a fantasy setting or a combination of these and a lot more. Fantasy should also include the players' role in the theme. Term fantasy is not commonly used when describing elements of an escape room, however. This is to emphasize that fantasy is more than just the theme and narrative.

For example, the game's theme can be a bank heist in the 1970s. But the theme alone doesn't convey the role of the player. Are the players doing a heist, are they trying to stop it or are they bystanders who got in the way and need to escape in secret?

Not all existing games around the world have a theme or narrative. A 2015 study by Scott Nicholson lists that 13% of escape room games do not have a theme at all. Nicholson also argues that not having a theme is also a valid option as not all players actively want or look for it. I would argue the opposite. Although some themes can deter players, mainly horror and other adult themes - players who are mainly looking for great puzzles will not turn down a room that has a well-established fantasy. Players who do want to immerse themselves in fantasy while solving puzzles would not choose an abstract or themeless game. Still, a game without a theme can be seen as a game-show-like experience where the players will be creating the narrative as their story about solving the puzzles.

Both Katleena Kortesuo in her book *Pakohuone* (2018) and Adam Clare in his book *Escape the Game* (2015) agree that the theme is an important factor in escape room design. The theme should tie all the other elements of the game together and works as a guideline for every other step. As in *Art of Game Design* (2020), Jesse Schell talks that the theme of the game should be emphasized in every possible way, the same applies to the escape room. The story of the game, the puzzles and aesthetics should all work towards reinforcing the fantasy.

As you do not want to spoil the game, the theme is the most visible aspect of the escape room from outside of the room. A good theme can be used to attract customers who like that particular theme or are looking for a theme that they cannot find from anywhere else. This also works the other way around. Some players specifically want to avoid certain themes like horror.

The main reason why fantasy (and theme as part of that fantasy) is so important is that fantasy works as a backbone for everything else and should be reinforced through all other elements.

In the "Game Experience Model" by Suovuo et al. (2020), it is mentioned that experienced fantasy is not the same thing as designed fantasy. In escape rooms, this is emphasized as multiple players share the experience while everyone experiences the fantasy from their own perspective. In the Game Experience Model, the designer sees the game through mechanics, storyworld and aesthetics while the player sees mechanics as action, storyworld as narrative and aesthetics as a sensory stimulus. Suovuo et al. argue that all three of these pieces as essential or the product in hand stops being a game.

Fantasy ties to the real world. Some themes are more complex and more expensive to construct than others but also require more from the players. Taking into account the location of the escape room can also help to reinforce fantasy. A historical escape room in a historical location can pull people to the story well before the game starts.

2 Story

The story should come from the theme and fantasy. In general, the story can be anything, but a good story should enhance the experience but not come in the way of puzzle-solving. Usually escape room stories have been lightweight intros to the experience only to give a reason for the events before the game. Also, usually finishing the game will lead to the conclusion in the story. If the game is really difficult, most of the players will not experience the ending so there should be a way to ensure closure.

A story is a tool to reinforce fantasy. Not all escape rooms have a story but, as with the theme, it should be considered what type of players you want to attract. Having a story should not hinder the gameplay though and it is usually a good idea not to make players spend time to interact with the story unless it is directly connected to puzzles. Adam Clare (2015 p. 17) sums this well: "Essentially, you want to tell the story via the puzzles." Players are focused on solving the puzzles so the puzzles should be the main way of telling the story. From this, it is easy to lead to the conclusion that the story should follow the game flow. (see Figure 2) If the game flow is not linear the story should also not be linear but progress through the same branches as the puzzles do.
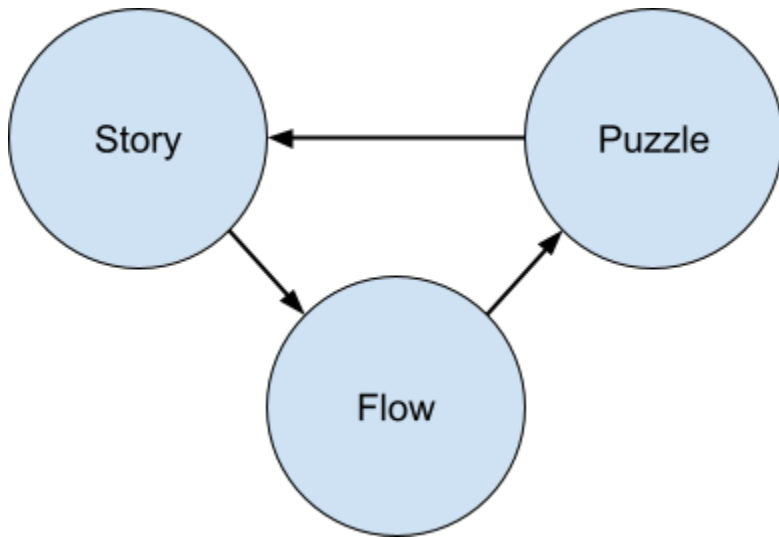
Figure 2 The story follows the flow which presents puzzles that convey the story

A linear story would progress with every puzzle solved. For example, in a game about a bank heist, the story about the insider who arranged to heist would open up through the puzzles as players manage to solve them. This could be done through notes left for the players acting as the robbers. As seen in figure 3.3, each point in the flow would match an event in the story.
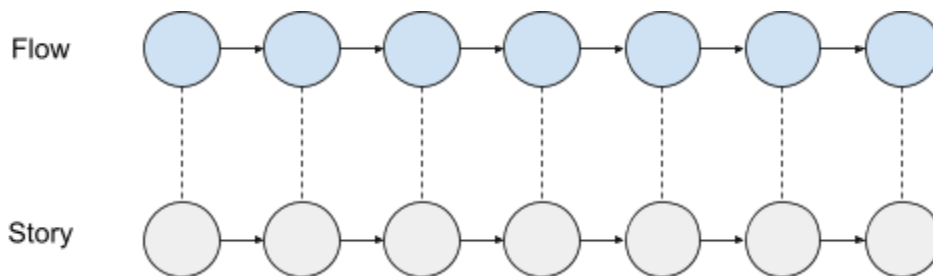

Figure 3 Linear progression where the story follows the same path as game flow

In a more branching game flow where puzzles can be solved in varying order, another type of story might also be needed. Story events would open from puzzles but their connections to each other open only when all of them have been found. Marie-Laure Ryan (2015, p. 173-174) calls this the hidden story. Murder mysteries often use this kind of story where pieces are opened and it is up to the player to pull the story together.
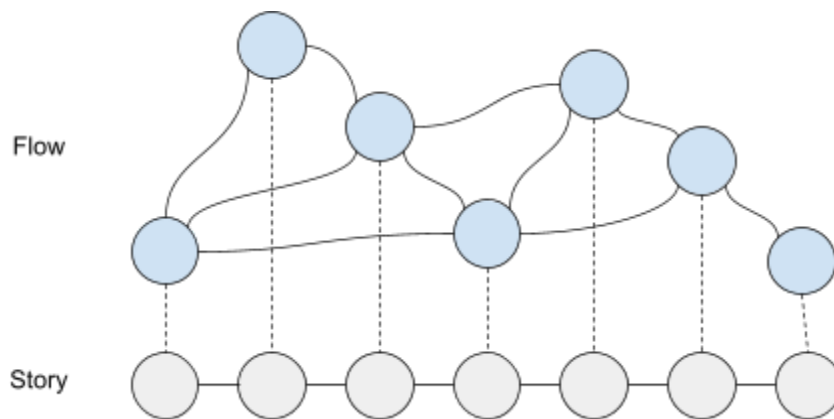
Figure 4 Hidden story (Ryan 2015, p. 174)

This is talked about in more depth in the next section, but in real-life scenarios, the game flow usually is not either one of these types but combines multiple flows. Escape room might start from a linear story told by the operator or game master but branches later to sections that can be experienced in a different order.

3 Game Flow

In escape room literature (Kortesuo 2018, Clare 2015), game flow is often described as puzzle flow. Flow describes how the puzzles work together to form the whole mechanical side of the game. Flow also progresses the story by linking puzzles together. As flow also links to the story, I have decided to call it game flow and not puzzle flow. This also ties to the flow theory by Mihaly Csikszentmihályi (2005).

The basic idea of flow theory in the scope of games is that there is a golden path between the challenge the game offers and the skills of players. While in flow, the game is difficult enough to keep it interesting but not too difficult to cause frustration. While in videogames the designer can assume that the players' skills will increase in the course of the game this usually is not the case in escape rooms. At least within one playthrough of a single game, it can be safely assumed that there is not a huge amount of progress on player skill but players who have played multiple escape rooms can be much more skilled. Especially skills regarding recognizing what is a part of the game and what is just decoration can vary a lot between more skilled players.

Traditionally an escape room game flows from one puzzle to another. Figure 3.5 presents the most simplistic forms of game flow. From start to the goal the game progresses forward with each puzzle solved. Usually, finding the solution for a puzzle opens up a new puzzle or

multiple new puzzles. Sometimes multiple solutions together form a new puzzle called a metapuzzle.
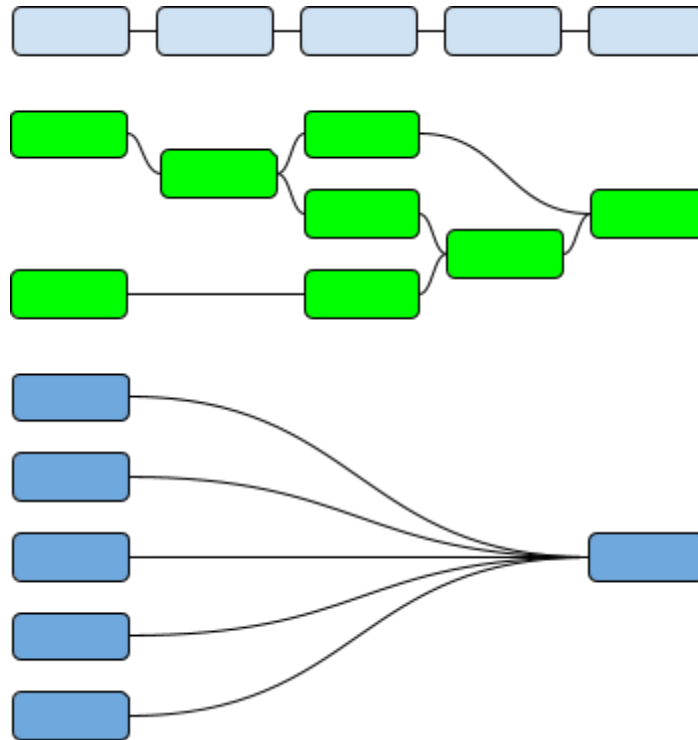

Figure 5 Linear flow, branching flow and open flow

Usually, every puzzle needs to be solved in order to complete the game. But the game flow can and should be branching. For example, a locked box is just opened by a team of players. Inside it, they find two different puzzles. These puzzles can now either be solved at the same time or one after another. As with a larger group, it is rarely a case that four people could tackle one puzzle with the same level of commitment so with two separate puzzles there is more to do for every player. At the same time, if teams struggle with a puzzle, they will have a chance to leave it for a moment and focus on another puzzle.

All branches should eventually join together without leaving open ends. Open ends would mean puzzles that by solving them, the players do not progress at all. As an escape room almost always has a time limit, it would be extremely frustrating to waste that time on puzzles that do not lead anywhere. This means that every puzzle needs to be solved eventually before the last puzzle. Combining branches can be done in multiple ways but often they lead to meta puzzles, which are talked about more in the puzzle section.

Optimal game flow should constantly progress. That is a difficult feat to achieve as the group's skill level can vary greatly. Also, as players play as a group but can experience differently, it might be difficult to keep everyone in the flow to the same degree. People might

find different puzzles to be more difficult than other members of the teams would. Similarly, puzzles that require dexterity or perseverance will be perceived differently between different players. Optimally there would always be more than one puzzle to be solved. Figure 6 gives an example of game flow.
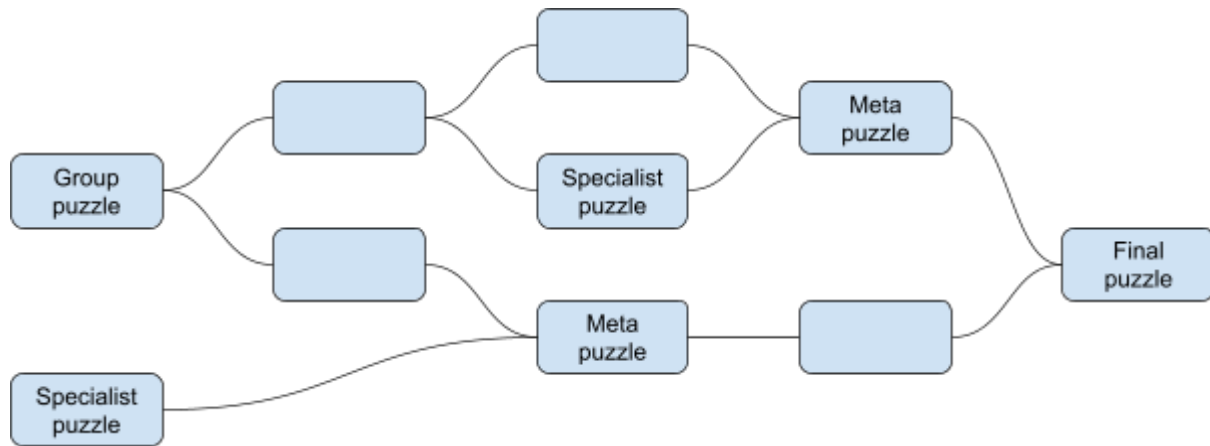
Figure 6 Example of flow between puzzles, puzzle types detailed in puzzle section.

Game flow also has ties to video game level design. Scott Rogers (2014) has identified that there are two types of video game level designs, alleys and islands. Alley type of design breaks the levels into paths that both limit the directions where players can go but also what they can see in front of them. A linear escape room could utilize alley type design where players can focus their effort on what they have in hand and overcoming a puzzle will lead to the next alley with the next puzzle. Island design breaks the level to areas of interest that can be seen from far and offer players the possibility to choose which location they want to visit first. Island design also allows creating areas that can be observed to exist before they can be reached. In escape room design this can be a powerful tool to utilize. Rogers also talks about foreshadowing, giving hints of what is to come. A simple example of using this in an escape room would be to have a piece of the puzzle in sight but out of reach and only after solving another puzzle players can reach it.

In most video games, the game gets more difficult as players' skills enhance. As within the constraint of a single escape room, this skill growth is not as large the puzzle difficulty within the game cannot progress similarly. Still, there should be some progress on puzzle difficulty. As in the beginning, it will take some time for the players to scout and investigate the room, the first puzzles should be relatively easy to solve. A group puzzle where everybody can contribute by finding pieces of the puzzle while they are familiarizing themselves with the room is a common starting point. Later in the game, the puzzles should become more difficult and can require more input from a certain player. After a certain point in the game,

usually after half point or later, the difficulty should either reach a plateau or even lower closer to the end. As there is less time left for the players to solve that time pressure alone will add to the difficulty of easier puzzles. Juliana Patel and Ariana Rubin (2020) called this a bell curve of difficulty on their talk at the Renegade convention in 2020 (see Figure 3.7). With multiple puzzles available at any given time, easier puzzles will be solved first leaving more difficult ones to be solved later in the game. This should also be taken into account.
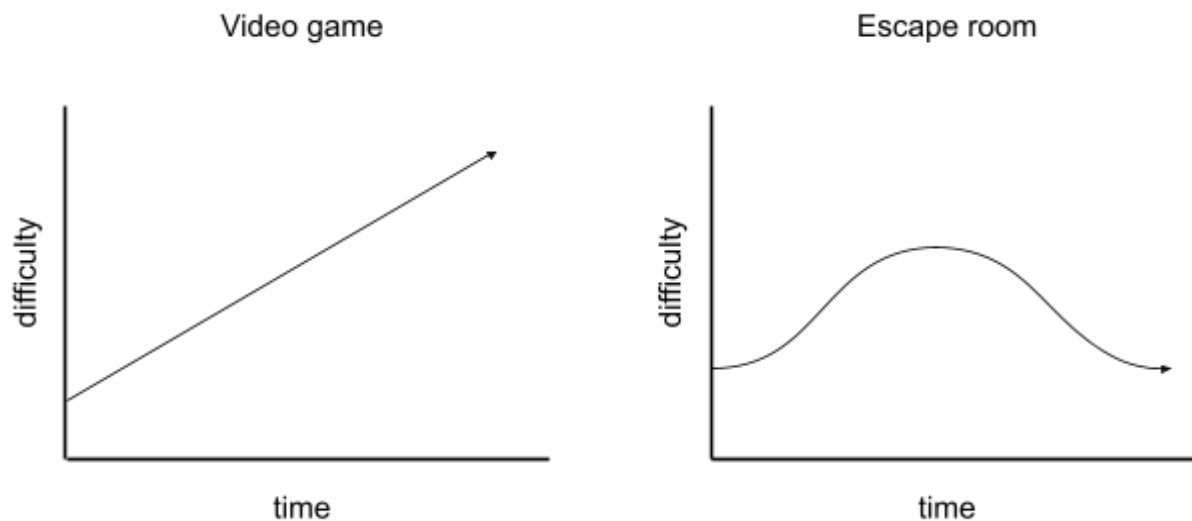

Figure 7 Change in difficulty as time passes between video and escape room games (Patel, Rubin 2020 00:10:00-00:12:00)

4 Puzzle

A puzzle can be anything that requires player action for the player to progress. The simplest example would be to find a key that opens a lock. Each puzzle should also be part of the game flow and progress the story of the game. Nicholson in his research (Nicholson, 2015) lists the most common types of puzzles in escape rooms which range from maths puzzles to finding hidden objects to deciphers. Table 1 presents the ten most common types of puzzles and how many respondents from Nicholson's survey stated to have them in an escape room.

Searching for physical objects hidden in the room	78 %
Team communication	58 %
Light	54 %
Counting	53 %
Noticing something "obvious" in the room	49 %
Symbol substitution with a key (suck as looking symbols up in a book)	47 %
Using something in an unusual way (Out-of-the-box thinking)	47 %
Searching for objects in images	43 %
Assembly of a physical object (such as a jigsaw puzzle)	40 %
Algebra and other mathematics	39 %

Table 1 Ten most common puzzle types in an escape room (Nicholson 2015)

All puzzles require the player to take steps to solve a puzzle and progress forward (see figure 8). First, the player needs to find a puzzle and detect that it is something that needs to be solved. This can happen in two directions which will lead to a different type of chain of reasoning. The first contact to the puzzle can either come with the obstacle or the puzzle itself. For example, a locked box or a door that needs a code to unlock would present itself as an obstacle. The Player then has to figure out a way to get that code. If the lock would only accept a four-digit combination they should look for things that can generate a code in a correct format. The first contact to a puzzle can also be from the puzzle itself. The player would find something that they recognize that need to be solved in order to use it to progress. This could be an equation or marking that is clearly part of a puzzle and not a decoration.
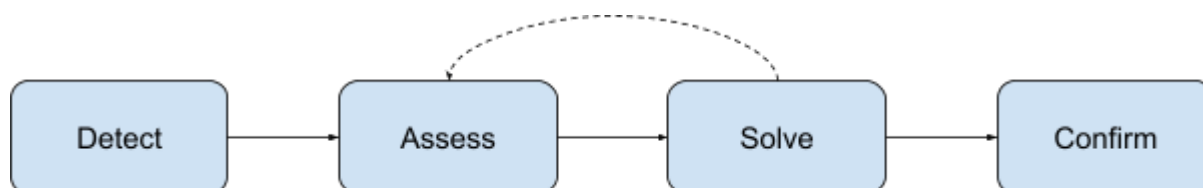

Figure 8 Steps for solving a puzzle

After a puzzle is found, the player needs to assess its solvability. This means that player needs to figure out do they have all the pieces necessary to solve the puzzle. This can often happen while they are trying to solve the puzzle. The main point here is to not waste time trying to solve the puzzle that is still unsolvable because not all pieces of the puzzle have been found. For example, deciphering a word requires having a decipher key, which can be split into multiple parts. After finding the first part of the decipher key, the player needs to assess if they have enough to solve the puzzle. They might assess that they do not have enough to solve the puzzle or they can solve the puzzle partially with that part of the decipher key and asses afterwards that they still need to find more pieces.

After the puzzle is solved, the player needs to be able to confirm that it is in fact solved. Only after they have confirmed that the puzzle is solved they can move forward to solve new puzzles. In most cases, this seems obvious. If a code opens a lock, the code must have been correct so the puzzle that resulted in that code is solved. Sometimes, especially with electronic puzzles, it might be that when a lock opens, it is not clear what caused it to open and the puzzle might appear as not solved. An unlucky player might also get a code from an incorrectly solved puzzle that still opens another lock. This could lead to serious hindrance later in the game because the player has assessed that the puzzle is solved because the solution did open a lock.

Another example, the solution of a puzzle can be a part of another puzzle. To confirm that the first puzzle was correct, the player also needs to solve the second puzzle and confirm that. This kind of puzzle structure is called a meta-puzzle. Steps for solving a meta-puzzle are presented in figure 9. The top puzzle on the figure can be confirmed only by solving the bottom puzzle. Adam Clare (2015 p. 67) believes that meta-puzzles are common in escape rooms because they keep puzzles that are completed early still relevant later in the game. As solving the puzzle does not end before one has also solved all other puzzles leading to the meta-puzzle, it might become more difficult than the puzzles would be separate.
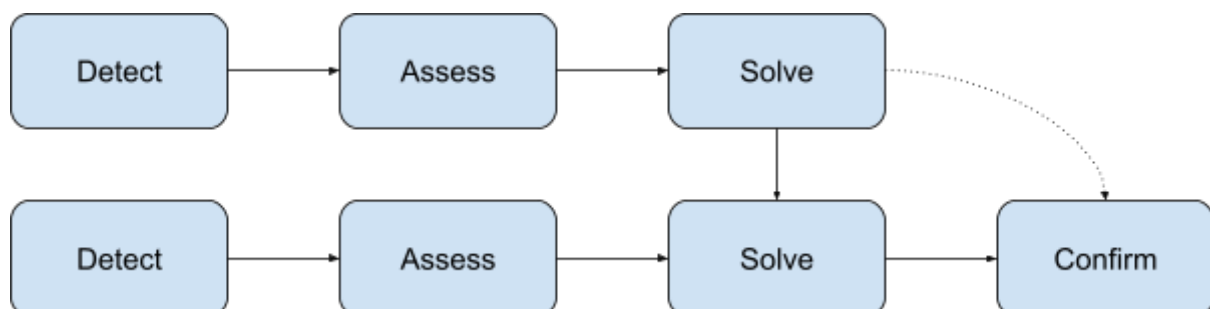
Figure 9 Steps for solving a metapuzzle

Specialist puzzles are puzzles that focus on a certain skill that a player possesses. Mathematical equations and dexterity puzzles are easier for some than others. In many experienced groups, there are specific persons who are immediately directed to solve these puzzles. These can be a great way to give one player time to shine. Someone in the group is usually more interested in solving mathematical equations than others but there is a chance that there is not that kind of person in the group at all. Specialist puzzles can in those cases become annoying blockades to a group where everyone finds them annoying.

Puzzles should not require any knowledge that comes from the outside of the game. For example, it should not be assumed that players know geography or a foreign alphabet. If the puzzle uses braille-alphabet (writing system used by blind people) a key to convert them should also be given.

4 Real-world

Real-world will both limit the creativity on every part of an escape room but it will also offer possibilities that are not possible in video games.

Players are part of the game world physically and not through an avatar. This means that the players need to be part of the story in the sense that they are the ones that need to escape the prison or they are the ones trying to find the pirate treasure or they need to find the cure for the zombie apocalypse. Often the players play the game in their own clothing and are not prepared to roleplay. This should reflect the escape room's fantasy and story.

Many usual items used in escape rooms are also used for the same purpose in the escape room. Keys usually open locks and the door handle opens the door that it is attached to. Affordances of real-world objects can also be used to create puzzles where the objects are not used the way they are meant to be used. As shown in Table 3.1, 47 % of escape rooms use these Out-of-the-box thinking puzzles.

Almost always there is an operator watching the game live through cameras in the room. Players can ask for help if they get stuck or in some cases, the operator will give hints at predetermined times or just when the operator feels that the players need a hint. Through messages and hints, the operator can edit the difficulty of the game live. A well progressing group might get a vague hint when asking for one. For the same puzzle, a struggling group, that will require more help to solve a puzzle, might get a hint that is much simpler and easier to understand. Some escape rooms also convey part of the story through messages from

the operator to the players. For example, Time Run's *Celestial Chain* in London used to have the operator talk to players as a friendly robot that gives hints but also tells parts of the story.

Usually, the game world and real world has been separated with a physical barrier. This can either happen when the players leave the lobby of the escape room company or into the room where the actual game happens. Sometimes also the lobby is part of the game world. This barrier, usually a door, also works as a mental barrier. When a player moves into the game world there is a clear distinction that this is now a new world where the game takes place and not all real-world rules apply.

Something can and will go wrong. Failure can happen in multiple ways. A lock does not open with a correct combination or puzzle pieces break after being dropped hundreds of times. Problems will occur and they can break the immersion if the game cannot be continued without intervention. It is impossible to take all scenarios into account before they happen but it is important to have a plan for unforeseeable events.

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Appendix B Questionnaire

1. Escape room design methods

1.1 Design process

Briefly describe your design process.

What are the most important parts of a great escape room?

1.2 Tools

Do you utilize a framework or set of rules while designing?

If so, can you tell me more about that and what led you to utilize it?

If not, what has been the biggest reason to not?

2. Escape room design framework

What was your first impression of the escape room design framework?

Does the framework have something that was especially good?

Does the framework have something that was especially bad?

Would you add or remove something?

Would you see this being useful for yourself?

Would you see this being useful for someone else and who?

3. General Questions

Do you enjoy playing escape rooms and why or why not?

What is your favourite thing in escape rooms?

How do you see the future of escape rooms?

Appendix C Table of puzzles in Bank Heist

No	Puzzle description	Puzzle type	Type of barrier
1	Clear box on a wall with words "Solution is clear", a lock on the box can be opened with a word "clear"	Noticing something "obvious"	5-letter padlock
2	Suitcase with a combination lock on it. "I <3 NY" sticker on the side of it. On the wall clock of New York is missing. Other clocks in the room show times of other cities. The lock open with New York's time.	Counting	3-digit padlock
3	Hidden in the plain sight among a wall of binders is one row of five binders that are upside down. Behind those is a safe.	Noticing something "obvious"	-

4	A large transparent pipe is on a ceiling level. Inside the pipe is a container. Through holes on the bottom side of the pipe a player can move the container with a retractable pointer. Moving container to the end of pipe releases it.	Using something in an unusual way	-
5	Two transparent films with symbols can be placed on top of each other. In a correct orientation they form a 5-digit combination to open the safe.	Assembly of a physical object	5-digit digital safe lock
6	Five small jute sacks each have a green letter on them. By arranging the sacks in order by weight a word "Brown" is formed.	Noticing something "obvious"	-

7	Small torn piece of paper asks players to find out a correct customer and their bank account's opening balance. New deposits and withdraws needs to be added or reduced from the amount to get customer's new account balance.	Mathematics	-
8	A picture shows a man with two calculators upside down. A code needs to be inputted to the calculator and when looked upside down the code forms a word.	Using something in an unusual way	-
9	A painting on the wall depicts a money lender counting coins. One of the coins is an actual coin held on the painting with a magnet. A pouch full of similar coins needs to be placed on other magnetic spots on the same painting after which they form a 4-digit code.	Noticing something "obvious" Using something in an unusual way	4-digit bolt lock

10	Four stamps have the same text and a serial number. If stamped on a paper each stamp is missing one letter. Missing letters form a code in the order of serial numbers.	Noticing something "obvious"	3-digit padlock
11	A map of United States on the wall has a route through four cities marked on it. Between each city along the route there is either a plus, times, or divided sign. A phone book has area codes for each of those cities. Calculating the area codes along the route with correct symbols gives a code.	Noticing something "obvious"	3-digit padlock

12	Small jute sacks with black letters and form a word SAFE, which is also written next to a 4-digit padlock. By weighing the sacks against another sack with a black number on them reveals the weight of each letter. Those weights in the order on the word SAFE form a code.	Mathematics Noticing something "obvious"	4-digit lock
13	Abstract art piece on the wall has a lot of numbers from one to nine. Four small copies of the art piece have a roman numeral on them. Each of the small copies of the painting is missing every occurrence of a single digit. In the order of roman numerals, they form a code.	Noticing something "obvious"	4-digit padlock