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Building atmosphere in a horror game through environment design

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ABSTRACT

The primary feature of horror games is the sense of dread that is induced in the player in various ways. One of these methods is immersing the player in the game's setting, which is facilitated by creating an oppressive atmosphere.

This thesis explores the necessary aspects of environment design to achieve such an atmosphere suitable for a horror game. The study involves analyzing the feeling of fear from both psychological and physiological perspectives. The study analyzed the various approaches of different sub-genres of horror games in creating atmosphere, with a particular focus on environment design. Conclusions were drawn about the role of environments in the creation of horror video games based on the case study.

To support the theoretical study, a game concept was developed, and a series of concept art was produced, applying the findings of the study. This thesis describes the process of creating concept art, including its influence on game atmosphere and potential applications.

It also explores the relationship between atmosphere creation and environment design, as well as the role of psychology in horror game development. However, to gain a comprehensive understanding of the factors involved in creating a suitable atmosphere in a horror game, further research is required in areas such as level design, character design, and sound design.

Keywords: horror, environment design, atmosphere, concept art

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1 INTRODUCTION

Nowadays, games are part of everyday life, moving from massive arcade machines to personal computers, game consoles and smartphones. With technological advances and changing trends, the gaming industry has evolved rapidly over the past few decades. However, one genre has remained unchanged to the present day. According to Adolphs (2013), fear is a fundamental emotion present in all living species and a natural response to dangerous situations. Although horror games can evoke various emotions, fear remains the primary element of any horror media.

The key to horror games is immersion. The feeling of presence, both physical and mental, within the game environment enhances the emotional impact of the horror experience. (World of the Abyss 2023.) One of the fundamental tools for achieving player immersion in a horror game is to create an unsettling atmosphere within the game. This can be achieved through various means, including game mechanics and visual aesthetics.

This thesis aims to identify the key features of an environmental design to create an atmosphere suitable for immersing the player in feelings of dread and suspense. To achieve the objective, this thesis presents a theoretical study of the characteristics of the horror genre in video games, covering the features and visual aspects of different sub-genres and their impact on the perception of games. Additionally, the psychological component of horror will be explored, as an understanding of the factors and triggers of the emotion of fear is necessary for the creation of a tense and believable atmosphere. To identify visual features specific to the horror genre, the approach to creating horror in cinematography and game development will be compared to identify similar and different techniques. To understand how these techniques are applied in game development, a case study of a horror game will also be carried out. The research will lead to a developed concept of a horror game, as well as a series of concept artworks of its environment, clearly demonstrating the technique of creating an oppressive atmosphere and how this or that factor changes visual perception.

2 PHYSIOLOGY AND PSYCHOLOGY OF HORROR

Lynch and Martins (2015) studied the fear experience caused by video games and discovered that over half of the participants reported about sense of joy and excitement, which followed experienced fear. Fear is a fundamental human emotion that involves both a universal biochemical response and an individual emotional response that can vary significantly from person to person. (Fritscher 2023). The possibility to experience that individual emotional response is the main reason why horror games seem appealing to players.

Fear is an evolutionary mechanism designed to help humans survive. It is triggered when a person is exposed to a threat, whether physical or psychological, and is characterized by physical responses such as sweating, increased heart rate and shortened breathing. Commonly known as the 'fight or flight' response, this is the physiological response to a potential threat. (Fritscher 2023.) The fight-or-flight response is triggered by hormones that prepare the body to either face a threat and fight back or run for safety. According to Cherry (2022), fight-or-flight response can be divided into three stages. The first stage, called the alarm stage, is characterized by activation of the central nervous system. In response to stress, the nervous system initiates a sudden release of catecholamines, specifically adrenaline, noradrenaline, and cortisol. The second stage is the resistance stage. During this stage, the body is trying to recover from the fight-or-flight response. However, if the first and second stages are repeated at short intervals, the third stage may occur. This is the stage of exhaustion. The exhaustion stage is characterized by a constant feeling of tiredness and has a negative effect on the body. In contrast, emotional responses are highly individual. After experiencing a fight-or-flight response, some people may feel a sense of euphoria. This is caused by the release of endorphins, which promote feelings of well-being, safety, and pleasure. (Parks 2023.)

Fear is not typically a desirable emotion to experience. However, when it comes to fear induced by horror-related media such as films or games, the human body does not tend to experience fear with the same intensity as in real danger, because the brain evaluates the environment and realizes that the person is not

actually in immediate danger to life (Ringo 2013). This creates a sense of controlled fear. The hormones are still released even though the brain recognizes that there is no real threat. This is why the horror industry provides a platform for people to experience intense emotions such as terror, stress and euphoria in a controlled environment. By facing up to their fears in a film or game, people experience a sense of release, which helps to relieve accumulated stress (Ringo 2013).

The research of Michael Apter (1992) suggests that in order to enjoy the engagement with horror requires the use of a 'protective frame' concept. One example of a 'protective frame' is the feeling of physical safety and security. Therefore, in the context of video games, players will enjoy playing as long as they are confident that the threat is distant and theoretical, and that they are not in immediate danger. If players perceive a threat from the game extends beyond the game itself, their experience may become negative. The second category of protective frames is focused on the concept of detachment. It regulates the extent to which a player can distance themselves from the experience of fear. For example, if a character in a game is being chased by a monster, the player can activate psychological detachment by reminding themselves that it is only a simulation. A third protective frames category involves the confidence that all dangers are controllable. That means a player will only enjoy being chased by an enemy if they know they have a chance of escaping successfully.

Fear is primarily a biochemical process that is closely linked to an emotional response. Horror media provides the opportunity to experience building fear, sudden fright and the resulting feelings of euphoria and satisfaction in a safe, controlled environment. This genre of entertainment is attractive to people because it offers them the opportunity to experience intense emotions without exposing themselves to any immediate danger.

3 UNDERSTANDING HORROR GENRES IN GAMES

Horror games are one of the most suspenseful types of media available. This genre is designed to evoke fear, panic, and anxiety in the player by immersing

them in the storytelling and tense atmosphere. Horror games are highly accessible in terms of the skill required to play them as typically there is no need to use complicated keyboard shortcuts or have any practical experience. (NYFA 2016.)

The majority of horror games concentrate on characters and a captivating storyline, emotionally involving the player in the events on the screen. This occurs as horror games originated from horror literature and cinema. By using certain thematic elements or settings, game developers often incorporate classic works into their games. An illustrative example of this approach is Frogwares' *The Sinking City* (2019), which is inspired by the works of Howard Phillips Lovecraft.

In contrast to other horror media, games provide players with the opportunity to be at the center of events, rather than just a spectator. This is accomplished through the highly immersive nature of horror games, which makes the player feel directly involved in what is happening, as if the danger is aimed directly at them (Horror Gamer 2023). Game developers use various techniques to immerse players more actively in the experience, such as first-person view or minimal or non-existent user interfaces. The reason for this is that the emotional impact of an experience is enhanced when there is a sense of physical and mental presence in the environment (World of the Abyss 2023).

Fear in horror games is constructed by manipulating various phobias, fear factors and psychological techniques. One way to build suspense by creating an atmosphere of uncertainty about what is going to happen is through fear of the unknown. The player is made to be afraid of something abstract by the use of their own imagination, which is much more effective than presenting the player with a concrete threat (Horror Gamer 2023). In addition to fear of the unknown, the uncanny valley effect, claustrophobia, body horror, and sudden and abrupt sounds or events are other common techniques used in horror game design to frighten players.

3.1 History of a genre

According to Sihva (2016), Haunted House (1982) for the Atari 2600 is recognized as the first independent horror game, where the player navigated a labyrinth and evaded ghosts, with a limit of 9 hits before losing the game.. This game can be considered a precursor to the survival horror genre, featuring the primary mechanic of avoiding threats while facing the fear of losing progress.

The release of Haunted House was followed by other games such as 3D Monster Maze (1982) and Sweet Home (1989), which established the foundations of the horror genre and shaped future trends. Alone in the Dark (1992) marked the beginning of a new era for the horror genre in the gaming industry. Alone in the Dark introduced new features to the horror genre, such as puzzle solving and environmental exploration. These were made possible by 3D graphics, that expanded the possibility for players to immerse themselves in game environments. (Wildgoose 2022.)

As horror games have evolved, they have become more focused on immersiveness, storytelling, puzzle-solving quests, and psychological aspects. The Resident Evil series (1996) was one of the most important representatives of this tendency. Resident Evil (1996) became the cornerstone of the survival horror genre, despite some technical imperfections including a fixed camera and puzzles that could be tricky to solve. Resident Evil 2 (1998) improved on the original game with better visuals and storytelling, consolidating the franchise's success. (Sihva 2016.)

By the turn of the millennium, the survival horror genre had already been established with Silent Hill (1999) changing the genre by featuring an ordinary protagonist who lacked special skills and had to avoid enemies instead of confronting them, presenting a new perspective for players and developers to consider in horror games. Silent Hill (1999) revolutionized the horror genre by featuring an average person with no special skills as protagonist, so that the player would avoid the enemy instead of confronting them. (Richter 2021.)

In subsequent horror games, there has been an increasing emphasis on the psychological approach, as demonstrated by games such as *Condemned: Criminal Origins* (2005) and *Penumbra: Overture* (2007). These games rely on indirect storytelling and atmosphere rather than direct action. The release of *Amnesia: The Dark Descent* (2010) marked a further progression in the genre, featuring a simplified narrative and stealth mechanics rather than traditional ones. This game inspired a sub-genre of horror games known as 'stealth horror'. Another comparatively recent tendency in horror games is 'jump scare horror', represented by the *Five Nights at Freddy's* series (2014), which features monotonous gameplay interrupted by sudden and terrifying events known as 'jumpscares'. (Sihva 2016.)

Currently, the horror game industry seems to be going through a period of stagnation, with new games mostly sticking to established conventions, and even popular franchises such as *Resident Evil* (1996) and *Silent Hill* (1999) focusing primarily on remaking their original titles. However, this statement does not imply that horror games are obsolete and have no place in the future of the gaming industry. On the contrary, the immersiveness of games is increasing significantly as technology advances and virtual reality is integrated into games. These innovations allow the player to fully control the gameplay, resulting in a more personalized experience that is much more emotionally engaging. (Yu 2022.)

3.2 Subcategories of horror genres

Due to technological advances and game industry development, the horror game genre, like many others, has split into various sub-genres. Two of the most popular sub-genres are action horror and survival horror. Action horror incorporates shooter mechanics, providing players with fast-paced gameplay, adrenaline and jump scares. Survival horror, on the other hand, is more about the player's avoidance of danger rather than a direct confrontation with it. (Yu 2022.) The *Silent Hill* series (1999-2012) introduced elements of psychology to the genre early on. Since then, psychological horror has grown as a subgenre.

It is worth bearing in mind that these are just a few examples of the sub-genres into which horror games are categorized. It is essential to understand the fundamental differences between the subgenres to apply certain elements correctly when developing a horror game. Depending on the sub-genre of horror game, the gameplay mechanics will vary significantly. So will the visual aspects that are necessary to create the appropriate atmosphere.

3.2.1 Survival horror

Survival horror is widely considered to be one of the most common subgenres of horror games. Survival horror is a sub-genre that focuses on survival and exploration in an environment that emphasizes fear and anxiety. This sub-genre was established in early games such as *Sweet Home* (1989) and *Alone in the Dark* (1992), which featured elements of exploration and survival that laid the groundwork for the conventions of the genre. The sub-genre of survival horror was shaped by the release of *Silent Hill* (1999-2012), which defined many of the sub-genre's key characteristics. (Sterling 2012.)

According to De (2021), limited resources are a main feature of survival horror sub-genre. These include ammunition, health items and weapons, which are often scarce and must be managed strategically to ensure survival. Similar principles apply to the game environment, which usually provides very little pathfinding information for the player to navigate. The survival horror game is typically set in a dimly lit environment, which has many hallways and poorly visible dark corners, where threat might await player. Furthermore, resource scarcity forces the player to constantly explore new areas in search of supplies. In the early days of the subgenre, technical imperfections also contributed to the suspense of the game. One example is the fixed camera in previous titles, which prevented the player from seeing enemies and forced them to listen to environmental sounds for navigation instead. The limited number of savegames available was also a factor contributing to the overall suspense. Players were more afraid of losing a significant portion of their progress if they failed to encounter an enemy than they were of the horror elements around them. (De 2021.)

With careful exploration of new areas, repetitive resource management, and encounters with enemies in which the player applies logic to achieve the best possible outcome, rather than fighting monsters; survival horror manages to achieve a slow-paced gameplay. Slow pacing can be a versatile tool for creating the tension and atmosphere that survival horror, like other representative of the horror media, relies on.

Puzzles are also a slow-paced element that require careful thought, which is a feature of many horror games. Puzzles are a slow-paced element that require careful thought, which is why they are often used in horror games. They demand attention to clues, concentration, and comprehension of puzzle mechanics. This makes the puzzle-solving process quite similar to the rest of the gameplay in horror games. In addition, puzzles can also be used as a tool for level design. A sense of non-linear narrative can be created by placing clues or puzzle pieces in specific locations to guide the player as they explore the environment, increasing the player's immersion. The player's immersion in the game environment can also be enhanced by using puzzles as a narrative element. (pekooblaze 2021.)

Narrative plays a crucial role in survival horror games, not only the story itself, but the methods used to communicate it to the player. It is crucial to structure the events in a manner that establishes a personal connection between the player and the character, because that makes the game more than about surviving. The player experiences the crises and progressions along with the character, creating a strong sense of immersion. To ensure a seamless narrative, it is important to avoid methods that disrupt the player's immersion. An example of this approach is *Amnesia* (2010), which has no cutscenes. Instead, the game allows the player to control the character during flashbacks - an approach that maintains the continuity of the experience. (Engverson 2015.)

3.2.2 Psychological horror

According to judytl (2022), the key feature of psychological horror is that it aims to frighten and unsettle the audience by exploring mental, emotional, or psychological states. It emphasizes psychological anxieties such as madness,

fear, guilt, and paranoia. This sub-genre uses elements of mystery, and its characters are often portrayed as having unstable, unreliable, or disturbed mental states. Psychological horror games are often characterized by complex and multi-layered storylines that explore themes such as mental illness, trauma, and the human psychology. The sub-genre of psychological horror is defined by the indirect encounter with the source of the fear. In some cases, it is possible for the player to go through the entire game without ever having seen a single monster. Healing items may be available, but combat is typically not a central aspect of the gameplay, as in the *Silent Hill* series. (Boacă 2024.)

Similar to survival horror, psychological horror also involves slow-paced gameplay. However, the mechanics of the game are limited; instead, psychological horror focuses on immersing the player in the atmosphere of the game by exploring the game world and solving puzzles. Storytelling is an important tool in the creation of psychological horror. Games in this sub-genre offer the player mechanics centered around decision making. The decisions made by the player often have significant consequences for the narrative of the game. (De 2021.)

Borrowed from film and literature, another characteristic of psychological horror is the absence of a clear threat. Unlike other horror genres in games, psychological horror does not always have an antagonist, monsters, or enemies. Instead, it uses manipulation of the human mind, trauma, and the fear of mental degradation. To maintain psychological tension, psychological horror uses minimal or no non-player characters for the player to interact with. Instead, it relies on indirect storytelling through the environment and the mental state of the protagonist.

Environmental design is the primary tool used to represent the protagonist's trauma in the game *OMORI* (2020). Each space in the game is linked to a specific psychological phenomenon. The White Space, for instance, represents escapism. The psychological aspect of this environment is demonstrated by the limited color palette of black and white, which means an absence of triggers for

the protagonist, but also makes the environment seem monotonous and empty. (Younis & Fedtke 2023.)

3.2.3 Action horror

Action horror games utilize shooter mechanics. Combat and action-oriented gameplay mechanics are key features for the action horror sub-genre. Players are often placed in situations where they must fight monsters or other supernatural enemies using a variety of weapons and combat techniques. While managing resources and surviving are still important, action horror games do not focus as much on lack of supplies. (De 2016.)

Although action horror provides players with a frightening experience, it is completely different from the established concepts of the horror genre. Action horror aims to scare the player through loud and obvious encounters, rather than inducing a sense of helplessness or fear of the unknown. Tension in action horror is achieved through the sometimes overwhelming intensity of the game's events and combat. Action horror games combine elements of the action, shooter, and horror genres to create a unique atmosphere with dynamic gameplay, where tension is building through combat. (Padilla-Rodriguez 2023.)

Although difficult situations and unexpected plot twists are an integral part of the sub-genre, they are not enough to create a terrifying experience. What distinguishes an action horror game from a shooter is the construction of a creepy atmosphere. Many action horror games use classic horror environments, such as asylums, dark forests, and catacombs, as their setting. Hostile-looking environments in action games create a constant sense of danger. In action horror games, the environment is often important to the gameplay, allowing the player to modify or destroy the space around them in order to achieve a more beneficial outcome in a combat situation. (Padilla-Rodriguez 2023.)

3.2.4 Stealth horror

A number of horror sub-genres make use of stealth elements to allow the player to avoid danger without having to engage in combat. Stealth horror games are a step further and are entirely about the avoidance of danger. The tension in this sub-genre is created by the fear of being detected by enemies, often resulting in instant death if the player fails to escape or hide. (Lennox 2022.)

The majority of stealth horror games use reactive stealth as their core mechanic, challenging the player to hide and avoid being detected by the enemy. With this type of mechanic, the player has the rare opportunity to use the environment to stop or slow down the enemy. (Bycer 2014.) Most stealth horror games aim to make the protagonist as vulnerable as possible, not only by removing any weapon for self-defense, but also by adding a certain obstacle, such as an injury that slows down the protagonist's speed. (pekoablaze 2022.)

The primary source of fear in stealth horror games is the threat of being detected by the enemy, as there is often no opportunity for the player to defend themselves, which leads to instant death and loss of in-game progress. The environment in stealth horror games is expected to match the horror aesthetic, but its main role is different. The environment has a direct impact on the player's success and plays a crucial role in the game's stealth mechanics. The player will often interact with the environment, using it to hide from the enemy or slow them down. In the creation of a stealth horror environment, it is important to have both aesthetic and practical aspects in mind. The player should be able to understand the movement paths of the enemies and be able to identify potential places to hide or interactive elements in the environment.

4 ROLE OF ENVIRONMENT IN HORROR GENRE THROUGH CASE STUDY

There are unique characteristics to each sub-genre of horror games. Over time, horror games have evolved considerably. However, in all the horror sub-genres the design of the environment plays a very important role. The player often

interacts with the environment, exploring it, solving puzzles, or confronting enemies. Therefore, in horror games, the design of the environment is an essential element in creating atmosphere. In addition, the environment in a horror game can also be used as an element of storytelling.

The Silent Hill series (1999-2012) is considered one of the founders and most important innovators of the horror genre in the gaming industry. Silent Hill series introduced new gameplay features and an original take on the horror aesthetic. The influence of Silent Hill series can be seen in many modern horror games. The Silent Hill series is commonly classified as a survival horror game, but it cannot be exclusively described as such. Beyond a foggy city full of monsters, Silent Hill series explores human psychology and immerses players in stories full of symbolism and unexpected twists, revealing the setting to be more complex than it first appears. There is a unique symbolism built into the narrative of each game in the Silent Hill series.

Silent Hill 2 (2001) was released in 2001 for the PlayStation 2. Featuring improved graphical aspects compared to the first Silent Hill (1999), Silent Hill 2 (2001) allowed the player to become immersed in the game. The game featured improved textures, models, and animations. Silent Hill 2 (2001) was also one of the first games to introduce dynamic flashlight lighting, which was a significant innovation in the gaming industry at the time. For a game released in the early 2000s, the inclusion of detailed and realistic shadows was a significant technological breakthrough, allowing the shadows to be accurately mapped to the environment, which is illustrated by Figure 1. (Blacksteinn 2022.)



Figure 1. A screenshot from Silent Hill 2 (Konami 2001)

However, the PlayStation 2 had limited technical capabilities, which forced the developers to make compromises. As a result, the fog that has become a legendary feature of every The Silent Hill series (1999-2012) game since Silent Hill (1999) was once again used to mask the technical limitations of the new console. The technical limitations are also the reason why most of the game's locations are small and enclosed, giving the player a claustrophobic feeling. (Blacksteinn 2022.) However, despite these limitations, Silent Hill 2 (2001) still succeeds in immersing the player in a dark psychological journey.

On the surface, Silent Hill 2's (2001) plot may not seem particularly innovative. In summary, James Sunderland receives a letter from his deceased wife, Mary, inviting him to the town of Silent Hill, promising that she will be waiting for him there (Lexzie 2015). When he arrives in the town, James discovers that Silent Hill looks very different from the way he remembers it. Instead, he finds himself in an abandoned and foggy town, where he has now begun to search for his wife. In

the game, the town of Silent Hill serves as a representation of James' consciousness, containing his repressed memories and guilt. (Aich 2023.)

The visual style of the game uses shades of grey, brown, and red to symbolize blood, fog and rusty metal (robertoinchingolo 2013). The muted saturation and general fade of the game evoke a sense of gloom and depression. The empty, gloomy streets, covered in fog, force the player to wander around, feeling lost. The interiors of the buildings are for the most part represented by long, narrow corridors, creating a sense of claustrophobia. There are also many twists and turns that limit visibility, making the player tense as they are unaware of a potential threat around the corner.

Silent Hill welcomes the player with silence and detachment. After the opening cutscene, the player must walk through a foggy, deserted forest, which is shown in Figure 2, with a quiet tense ambient soundtrack playing. This creates a sense of total isolation and loneliness. As the player progresses through the forest, the sense that something is about to happen increases. However, nothing happens. This is an example of how Silent Hill 2 (2001) gradually immerses the player in a sense of anxiety and unease.



Figure 2. A screenshot from Silent Hill 2 (Konami 2001)

The environment in *Silent Hill 2* (2001) acts as a storyteller, revealing the true nature of the characters through their repressed emotions and flaws. Each character perceives a different version of the town, tailored to their own psyche. (Haffenden 2019). The city in James' subconscious is presented as dark and oppressive, symbolizing his depression. As the game progresses, the town becomes more and more full of enemies, reflecting the fact that James' subconscious is preventing him from getting to the truth. However, the environment also serves a constant reminder of Mary's illness and subsequent death. For example, there are gurneys all over the town as symbols of illness, and beds, which are covered with many white pillows, representing Mary's death by suffocation from one of similar to them. (Lexzie 2015.)

Brookhaven Hospital is a significant environment in the game, filled with symbolism and allusions. Alongside the motives of illness and death, James' consciousness transforms this environment with his own motives. Due to Mary's long illness, James spent a considerable amount of time within the walls of the hospital. James perceives Brookhaven Hospital as a place filled with monsters, reminiscent of sexualized and depersonalized nurses. The inference is that while Mary was in hospital, James must have been interested in other women. (Thegamingmuse 2013.)

The composition of the environment also represents James' subconscious and emotions. As James gets closer to finding out what happened to Mary, his subconscious becomes increasingly unstable. To symbolize James's detachment from reality, the familiar corridors are shown upside down, the floor is partly missing, and the overall environment becomes disassembled as shown in Figure 3. As he passes through these corridors, James falls several times, symbolizing a deeper dive into his subconscious, where his fears, repressed pain and the truth about Mary's death are stored. (Haffenden 2019.)



Figure 3. A screenshot from Silent Hill 2 (Konami 2001)

Silent Hill 2 (2001) is an example of how the environment in a horror game can be used as an indirect narrative tool, in addition to a means of frightening the player. The game maintains an oppressive atmosphere through the use of muted, dull colors and themed environments, such as an abandoned hospital or deserted areas, which evoke feelings of anxiety and loneliness, and through the construction of a narrative through the environment. Representing a character's mental state through their perspective on the environment increases immersion and creates a personal connection between player and character.

5 EXPLAINING GAME CONCEPT

Theoretical research, tested previously, demonstrates that to create a horror game it is necessary to create a believable and understandable setting, since the developers have the goal of immersing the player in the atmosphere. To apply the knowledge gained during the theoretical research, a game concept that will serve as a setting for creating a series of concept arts of the environment was developed.

The game concept is presented as a psychological horror with an emphasis on exploring the world around the player and solving puzzles, as the story is presented there through exploration of the environment. Horror elements are used to maintain a tense atmosphere throughout the game. They also help the

player to reflect the feelings and mental state of the protagonist. The game is set in an unnamed city in post-Soviet space. The main source of inspiration for choosing such a setting was the visual horror novel *Tiny Bunny* (2020). The visual style of the game concept aims to create a tense atmosphere and a sense of danger and threat. The setting also reflects loneliness and desolation, which reflects the state of mind of the protagonists during the game.

The game's logline follows Lika, a second-year university student, who becomes determined to uncover the truth about her missing friend and the paranormal forces involved, before she too becomes a target. At the start of the story, Lika observes that her friend has been absent from class and unresponsive to messages. Initially, Lika assumes her friend is skipping class, but upon receiving no response in the evening, Lika decides to investigate. Upon arriving at her friend's flat, Lika discovers that the front door is open, her friend is missing, and the flat is in disarray. From that point onwards, paranormal forces become involved and begin to hunt Lika, just as they did her friend previously.

The primary objective of the player is to explore the environment, gather clues and information about the missing person, and find a way to confront the paranormal forces before it is too late. The game concept does not involve many action fights or stealth mechanics, as it primarily focuses on the psychological aspect and exploration.

6 CONCEPT ART IMPLEMENTATION

Concept art is a visual framework created in the early stages of project development to convey the basic atmosphere and idea. It has applications in both the video game industry and the film industry. In the context of video games, concept art is used to define the aesthetic direction, the atmosphere and the visual style of the game. (Arc Academy 2023.) As a next step, 3D artists can use concept art as the basis for the creation of the game world. In the early stages of development, concept art can be presented to the team and sponsors as an example of what the final product might look.

Concept art is categorized into various directions, each with its own unique characteristics. For instance, character artists use concept art to portray a character's personality, characteristics, and traits. This includes anatomical features, character build, facial features, as well as armor and clothing. Sometimes, to create mixed races for game worlds, character concept art requires knowledge of animal anatomy as well as human anatomy. (Mevada 2023.)

Environmental art is a crucial aspect of game development. It defines the look, style, and atmosphere of the game world. Its main role is to illustrate the vision of the game designer and to help create a certain mood for the player to experience. It also allows the initial stages to determine the final mood of the product, contributing to aspects of game design such as storytelling and immersion. (Shaikh 2023.)

Environmental concept art involves world building to create a believable atmosphere and immerse the player in the game world. This includes geographical, architectural, natural, and cultural elements. Storytelling, by bringing the game world to life, is also crucial to creating an immersive and memorable player experience. To enhance the immersive experience of the game world, it is important to consider the mood conveyed by the game environment. This includes both general aspects such as color scheme, lighting, and textures, as well as details such as the effect of weather on the player's surroundings. (Shaikh 2023.)

Creating environment concept art is a long and time-consuming process that involves several important stages. According to Daniel McGowan (2017), The process of creating concept art for an environment typically begins with a brief description of the level or location to give an idea of the player's intended experience.

The subsequent stage involves gathering references and materials for the environment's creation. This stage is crucial as it determines the final product's

overall appearance and significantly expedites the work process. References can be chosen for everything from the atmosphere to specific objects in the scene. The next step is the creation of sketches, such as thumbnails and layouts, to quickly communicate form and idea. These initial drawings do not need to be detailed, but they should demonstrate the ideas being created to the rest of the development team. Once the idea is clearly defined, the next step is to create a high-resolution image based on the selected sketch. At this stage, additional details are included, and the perspective and color balance are adjusted. Typically, concept art is still created in monochrome. The final stages of creating concept art involve adding light sources and colors in several iterations, from which a final version is selected, which is then finalized and becomes the finished concept art.

6.1 Research stage

The initial concept art is based on the moment when the protagonist discovers her missing friend's apartment is empty and messy. The main objective of this environment is to convey a sense of loneliness, isolation, and indirect threat. To create the concept art, research was conducted to determine both aesthetic and technical aspects, such as the interior, overall style, and arrangement of objects in the room. As the environment relies heavily on real-life settings, this step was necessary to create a believable atmosphere.

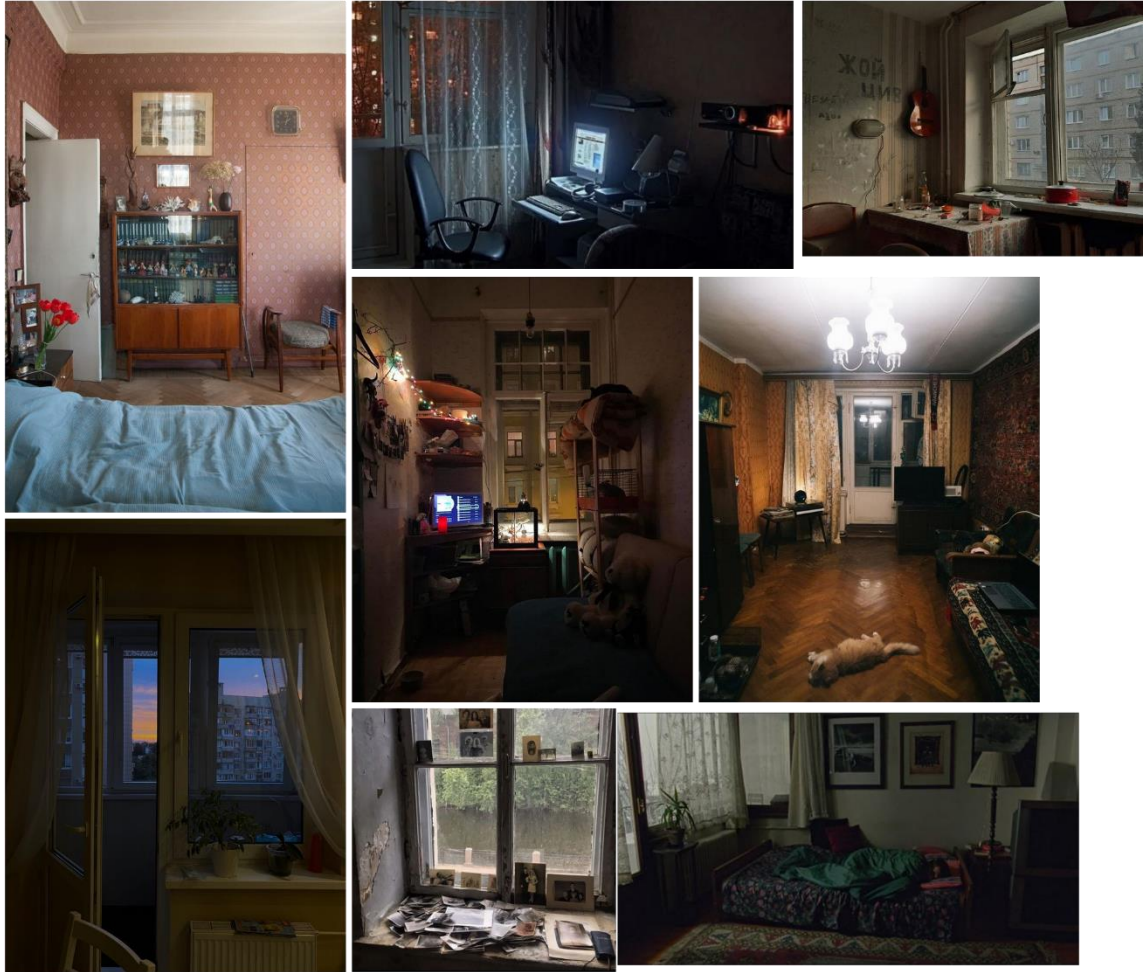


Figure 4. Mood boards for the overall style

Figure 4 displays photographs of various Soviet-era apartments that were used as the main references. This aided in identifying not only the arrangement of objects in relation to each other but also the general style and characteristic features. Additionally, research was conducted to identify the typical layouts and sizes of the rooms presented in the references.

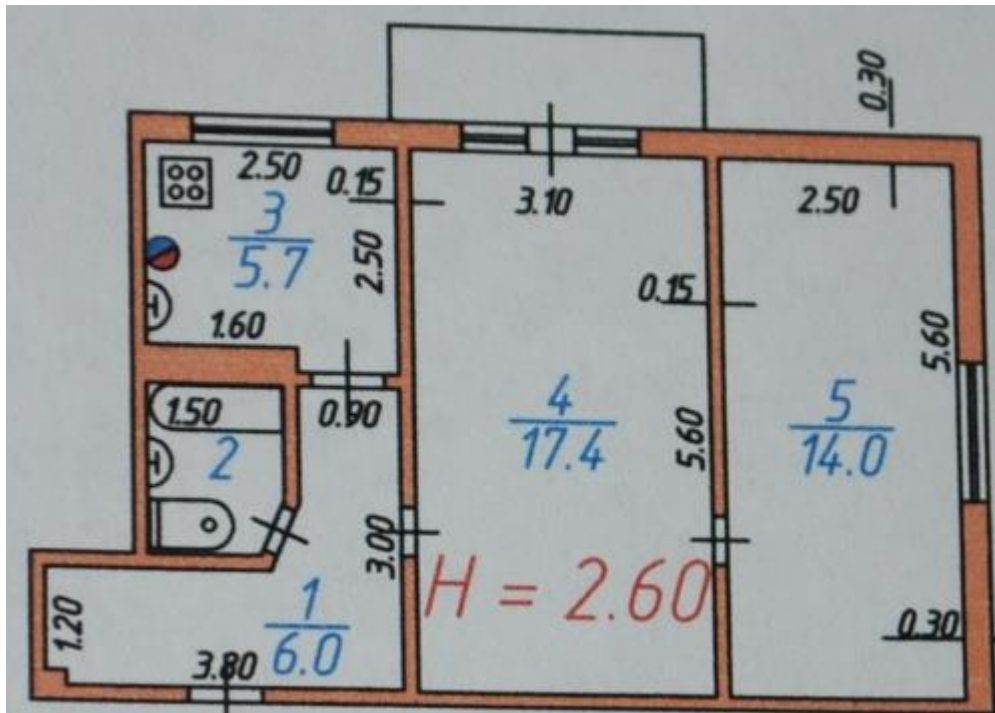


Figure 5. The Khrushchevka floor plan

The Khrushchevka panel blocks of flats were used as a basis for the creation of concept art. They were widely used in the Soviet Union between 1953 and 1964. The main purpose of this mass construction was to solve the problem of the lack of housing, and so the Khrushchevas were small apartments with a typical floor plan. (Polyakova 2022.) Figure 5 shows a floor plan with the dimensions of one of these apartments, which was later used for the creation of concept art.

6.2 Sketching stage

The sketching stage was aimed at creating an idea that would become the basis for the final concept art. A number of layouts were created on the basis of the previously presented references, in order to define the overall layout of the environment and the objects on which the player's attention should be focused. The layouts are shown in Figure 6, a higher resolution version of which is available in the appendices.



Figure 6. Room layouts

All the rooms follow the same floor plan, which was demonstrated in the previous chapter. Furnishings typically include a desk, chair, rug, and bookshelf. Some rooms have additional seating or bedding. The placement of doors, windows and balconies is also included in the layout of each room.

After careful consideration, options 1 and 6 were chosen to be used for further concept art creation. Option 1 shows a home office with a prominent desk, which is an important aspect of designing the level. Option 6, on the other hand, shows mostly a private room and offers many opportunities for indirect storytelling using details.

The selected options were used to create a basic scene using 3D modelling software. This is shown in Figure 7. This method gives a clear representation of the appearance of the environment and optimizes 2D concept art creation by simplifying the work with perspective. The chapter on the research phase was the source of information for the precise determination of the relative sizes of the objects.

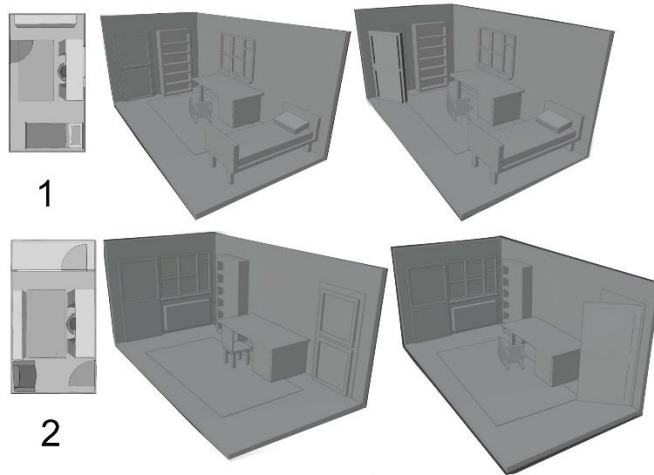


Figure 7. 3D scenes

During the creation of the 3D scene, changes were made to the original layout. The purpose of these changes was to show the most important elements of the environment, such as the desk and the bookshelf. These were the items that the player would interact with the most, according to the levelling design for this environment. Therefore, option 2 was chosen as the foundation for further concept art development.

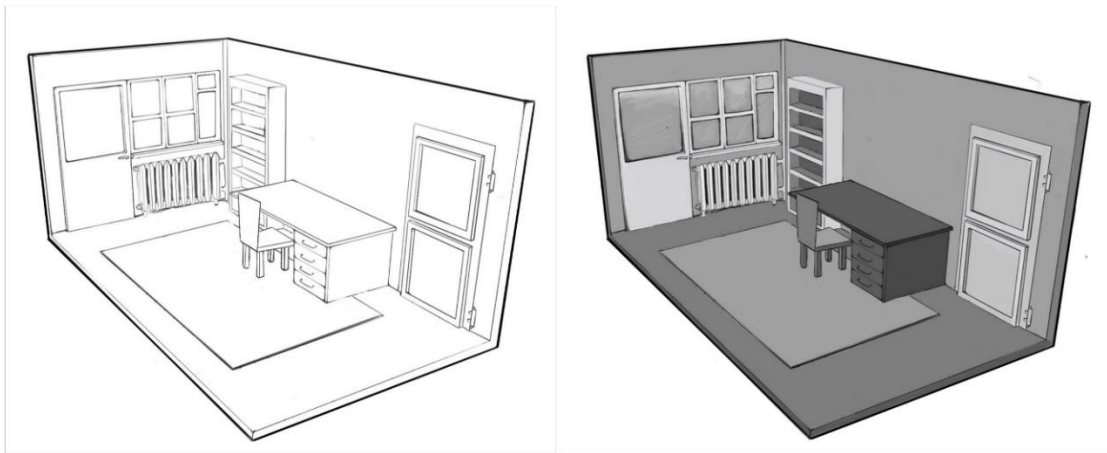


Figure 8. Line and tonal work on a concept

The next step in the process was the creation of a draft of the thumbnail for the 2D concept art. Figure 8 illustrates the process of working on it, both linear and tonal. At this point, no shadows or details have been added, which was a deliberate decision. This thumbnail will be used later in the process to add color and light.

6.3 Environmental storytelling

The environment can serve as a platform for environmental storytelling, as the case study in Chapter 4 concludes. Environments in games are the basis for world-building. As such, the addition of detail is crucial to the creation of atmosphere through the environment. To illustrate the role of detail in environmental design, Figure 9 compares a rough sketch with a more detailed version.

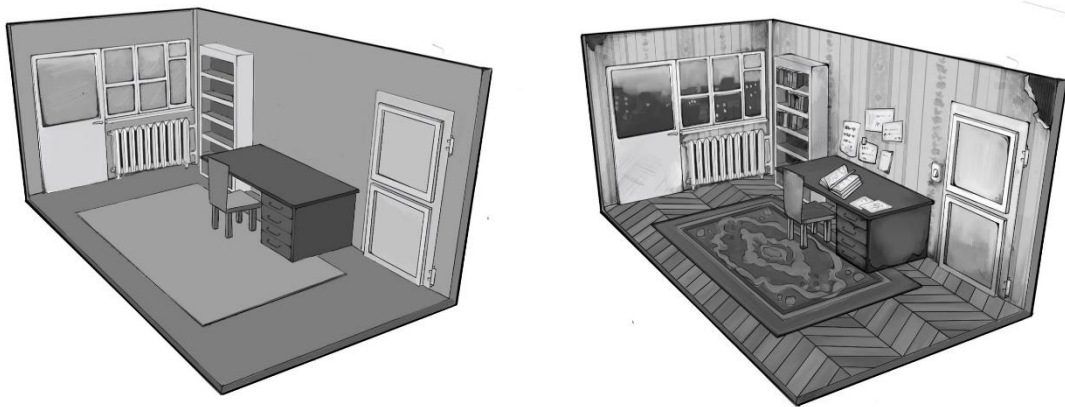


Figure 9. Comparison draft version and the detailed version

Using specific textures such as wooden floors, patterned wallpaper and carpets can add authenticity by placing the player in a specific place and time. This in turn makes the player more immersed in the experience. Conversely, a combination of styles and time periods can lead to a loss of immersion.

The dilapidated state of the room, with the peeling wallpaper and the dirt, creates an uncomfortable atmosphere, which is an essential part of a horror game. The general desolation of the room gives the player a sense of loneliness and unease, which has a tendency to evoke unpleasant associations in the player. The notes are chaotically arranged. Some are on the table, while others are randomly pinned to the wall. This is also a contributing factor to the state of disarray in the room.

The notes that are used in the environmental design, however, serve a dual purpose. They not only contribute to the unpleasant atmosphere but also assist

the player to navigate and understand what to do next within this location. The book on the table is the most noticeable object. From a level design perspective, it serves as a guide to the player through the level and signals that they must explore in order to advance the game's progress.

6.4 Light

Light is a crucial element in creating atmosphere in horror games. This conclusion was reached during a case study that analyzed an innovative approach to light and shadows in *Silent Hill 2* (2001) by developers. Horror games typically use poorly lit locations to create an oppressive atmosphere that stimulates the player's imagination by exploiting the fear of the unknown. A series of thumbnail images with different light sources were created to determine the type of light to be used in the design of the environment for a horror setting. These are presented in Figure 10.

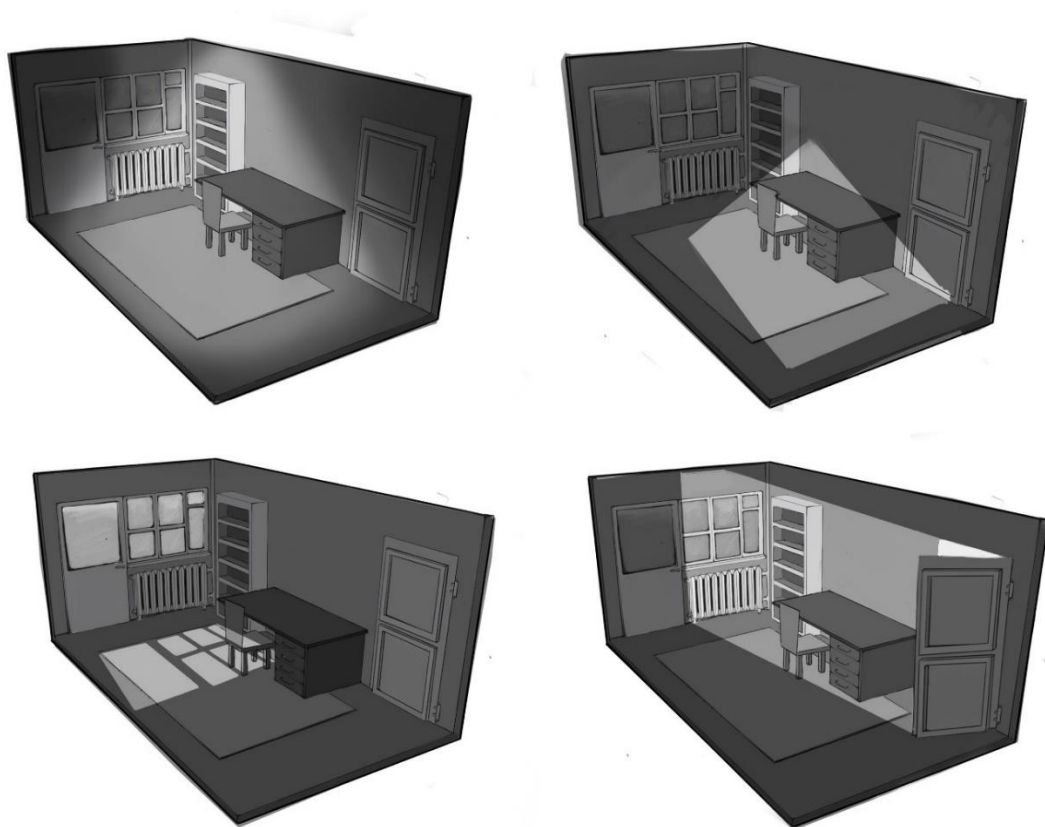


Figure 10. Light thumbnails

Option 1 provides a dim, diffused light from a ceiling lamp. This lighting creates an uncomfortable atmosphere as it fails to illuminate the entire room, leaving dark corners where potential threats or unpleasant objects may be present.

Additionally, it draws the player's attention to the desk, which is advantageous from a level design perspective. Option 2 presents the use of a desk lamp for lighting. The lighting in the room is not evenly distributed, creating a division between illuminated and dark areas. This contrast may evoke certain associations for the player, with the illuminated area providing a sense of safety while the dark area may suggest the presence of an unknown threat.

Option 3 creates a dim and poor lighting effect that draws attention to the window and the outside environment. Option 4 divides the room into two parts with and without light. The light emanating from the corridor could indicate safety or danger, prompting one to hide in the darkness. Which means both options 3 and 4 create different lighting effects that can influence the player's perception of safety inside and outside the room. Also, both options can serve as a signal to the player about the safety level of the outside environment.

After analyzing the resulting thumbnail, it was decided to combine several of the previously described options to create more comprehensive lighting. For this purpose, options 1 and 3 as well as 3 and 4 were combined with each other. The result is shown in Figure 11.

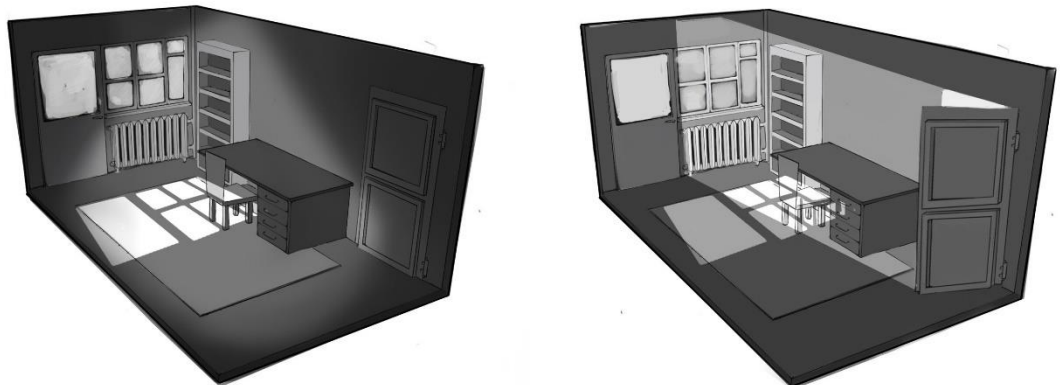


Figure 11. Light thumbnails combinations

The initial option can be utilized for level design purposes. Areas illuminated by ceiling lights can be designated as conditionally safe, while dark areas should be avoided by the player due to the lack of knowledge of what may lie in the shadows. At the same time, the player's attention and navigation through the level can be aided by a bright light emanating from a window, indicating the next location to explore. The second option is similar to the first in that there is also a division of the room into zones, but the light from the window is more dimmed. It does not encourage exploration, but it does give the player information about the outside of the room. In this case, the light is used to highlight important objects in the level design, such as the exit from the corridor and the desk.

6.5 Color

Color is an essential element in the creation of an atmosphere. The same image with different color corrections can create opposite emotions. A mood board with different types of color palettes was used as a basis for the color palette decision. Figure 12 illustrates the mood board.

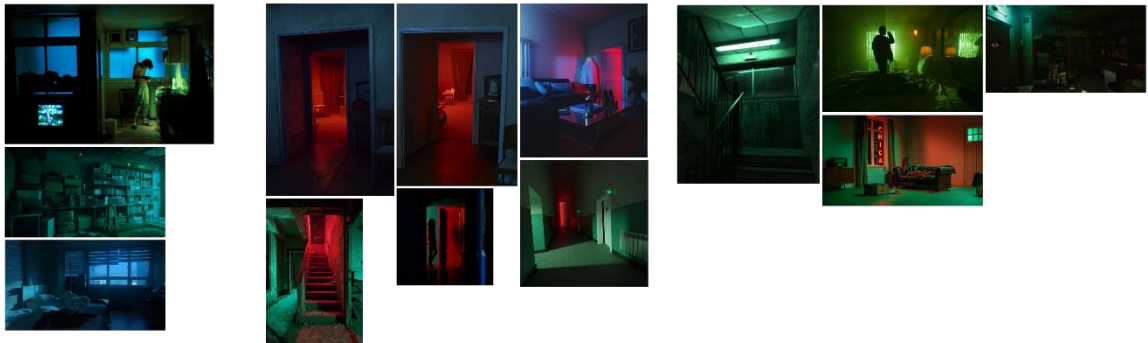


Figure 12. Mood boards for light and color

After analyzing the references presented on this mood board, a series of detailed thumbnails in different color palettes were created to examine how color affects the perception of the environment. The thumbnails are presented in Figure 13.

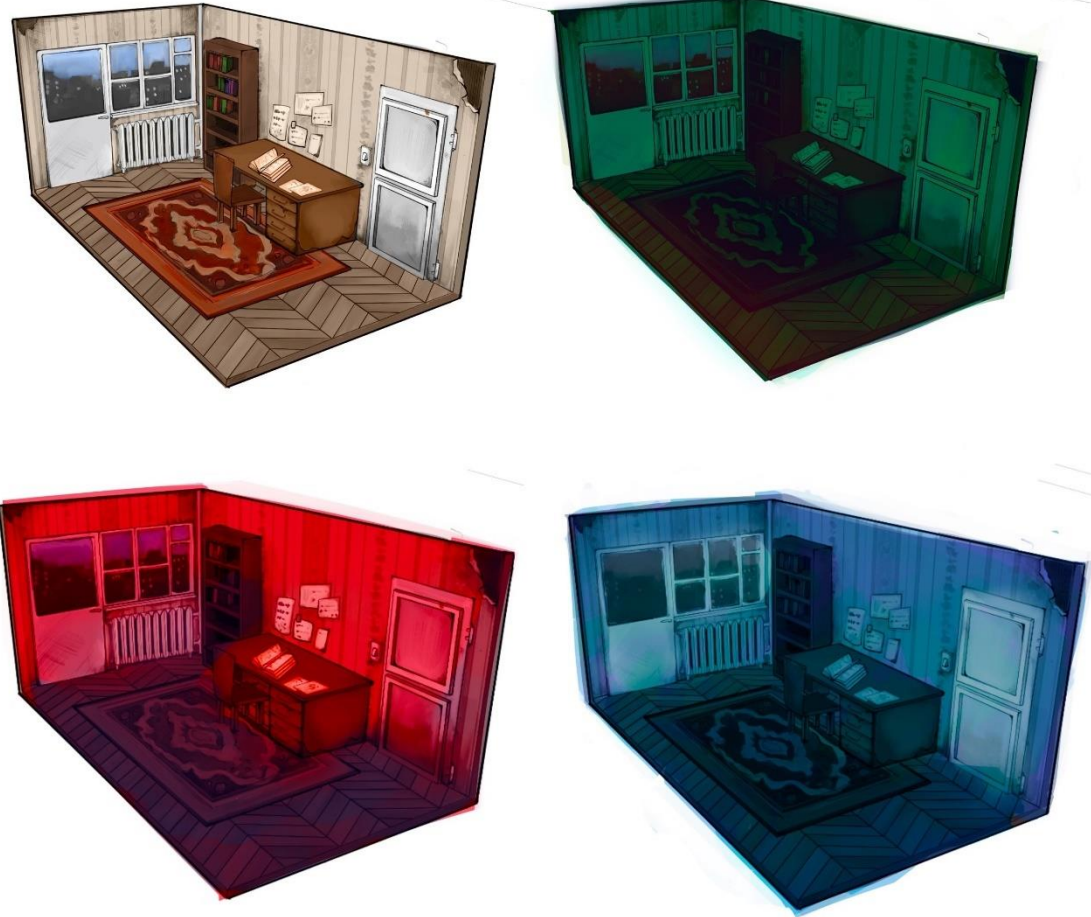


Figure 13. Color thumbnails

Option 1 presents a color palette that closely resembles reality, with warm shades of beige and brown. The color saturation is average, and the environment does not evoke negative emotions. Option 2, on the other hand, is dominated by green tones, creating a more oppressive and uncomfortable atmosphere that can cause feelings of anxiety and tension. The given example of Option 3 illustrates how the room is associated with danger and alarm due to the predominant shades of red. Similarly, Option 4 portrays the room as aloof and cold, with the predominance of blue shades associated with coldness and melancholy.

To get the strongest reaction from the player, a combination of colors can be used. For example, Figure 14 shows thumbnails of lighting regarding color combinations. Perception and response are enhanced by the use of contrasting colors.

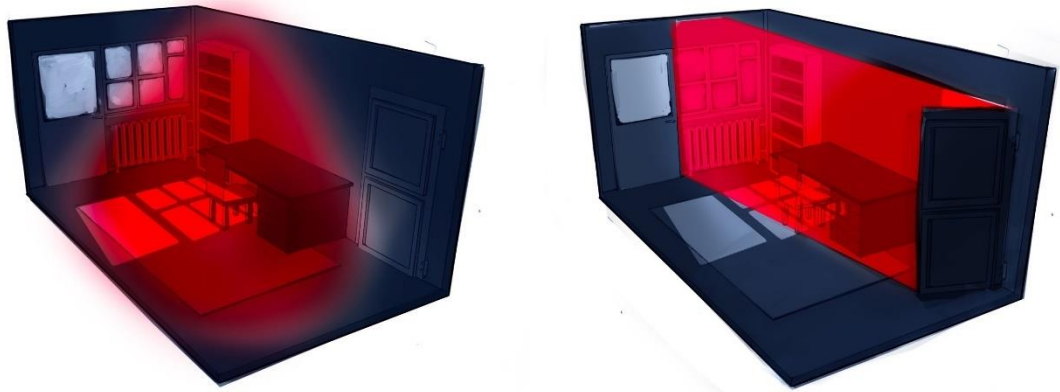


Figure 14. Light color thumbnails

The concepts feature a blend of unsaturated blue and bright red. Muted blue is often linked to coldness and uncertainty, while bright red is associated with danger. Therefore, in the first concept, the danger is centered in the middle of the room, whereas in the second concept, the danger originates from outside, specifically the corridor, and the room is a calm place that the player associates with safety.

6.6 Final concept art showcase

On the basis of the knowledge gained during the study, it is possible to track how certain factors have an impact on the overall perception of the visual images presented. This section is dedicated to the final comparison of the products obtained during the practical part. Figure 15 displays three concept art images of the same environment.

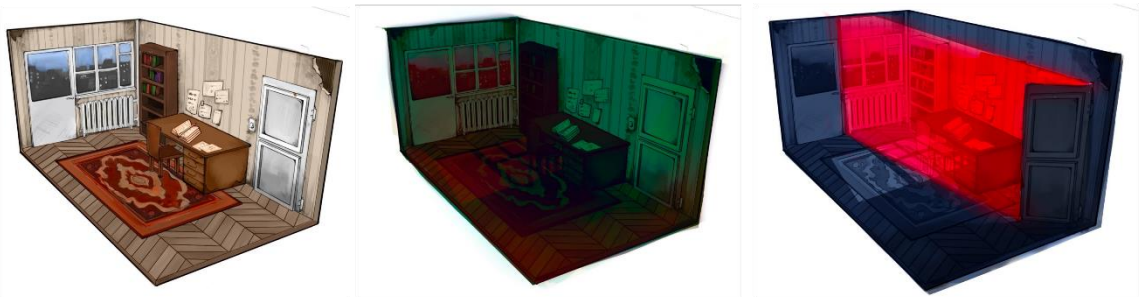


Figure 15. Final concept art comparison

The initial concept art does not feature any horror themes. It is bright enough to allow for a detailed view of all the furnishings. The color palette consists of warm,

bright shades, creating a sense of calm and routine. The second concept art depicts the same room, but with an unnatural green color dominating the design, creating an uncomfortable and unsettling feeling. The red light shining through the windows suggests an indirect threat from outside the room. The atmosphere of the scene is unsettling and evokes anxiety. The use of bright scarlet in the third concept creates a direct threat, contrasting with the muted blue and adding to the eerie contrast.

These concepts can be used to create a gradual build-up of atmosphere in a single narrative. The first option creates a sense of safety for the player. This concept art could be used at the start of the story to create suitable associations in the player. The second option, on the other hand, can be used a little later to turn a once-safe environment into an uncomfortable place with an oppressive atmosphere. This approach elicits a more obvious emotional response than placing the player in an initially hostile environment. The third option, however, can be used as a final development, presenting a clear and distinct threat to the player. This is facilitated by the approach to the use of color and light in this concept.

Alternatively, these concepts can be used as standalone environments in different genres. The first environment can be used as a safe haven. For instance, players can save their game progress or manage their inventory. The second option is suitable for psychological or survival horror sub-genres as it enhances the player's sense of fear and tension without presenting a specific threat. The third option is applicable to horror games in the action or stealth sub-genres. In action horror, it indicates the location of the enemy and in stealth horror, it warns of approaching danger.

7 CONCLUSION

In order to achieve the objective described in this thesis, theoretical research using academic resources was conducted, followed by demonstration of the knowledge gained through practical application. The theoretical study identified key features that need to be considered when creating an atmosphere in

computer horror games. The theoretical research also established a connection between the psychological and biochemical reactions of the human body in response to the feeling of fear, and ways in which the knowledge gained could be used in the field of game development, specifically in the creation of concept art.

To demonstrate acquired knowledge in practice, a game concept in the psychological horror genre was created. The concept has potential for further development. Additionally, a detailed process of creating concept art for the environment was included to demonstrate how the atmosphere changes based on various factors. The strategy developed in this process can be used in the future to create additional environments for the same game concept or for a completely new game idea. It is universal and does not rely on any specific project.

The research and the product both achieved their stated goals of identifying the factors that affect the creation of atmosphere in the development of horror computer games. This is demonstrated in the finished product of this thesis, using the provided concept art as an example. As the thesis initially focused on environmental design and its role in creating atmosphere for horror games, the topic can be further explored in the context of character creation, sound design, and level design to provide a comprehensive understanding of topics in various areas of video game development.

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Figure 2. Screenshot from Silent Hill 2 (2001). Konami. Available at: <https://www.theastronauts.com/2015/03/when-two-game-designers-argue-about-silent-hill/> [Accessed 10 March 2024]

Figure 3. Screenshot from Silent Hill 2 (2001). Konami. Available at: https://www.silenthillmemories.net/sh2/plot_analysis_en.htm [Accessed 10 March 2024]

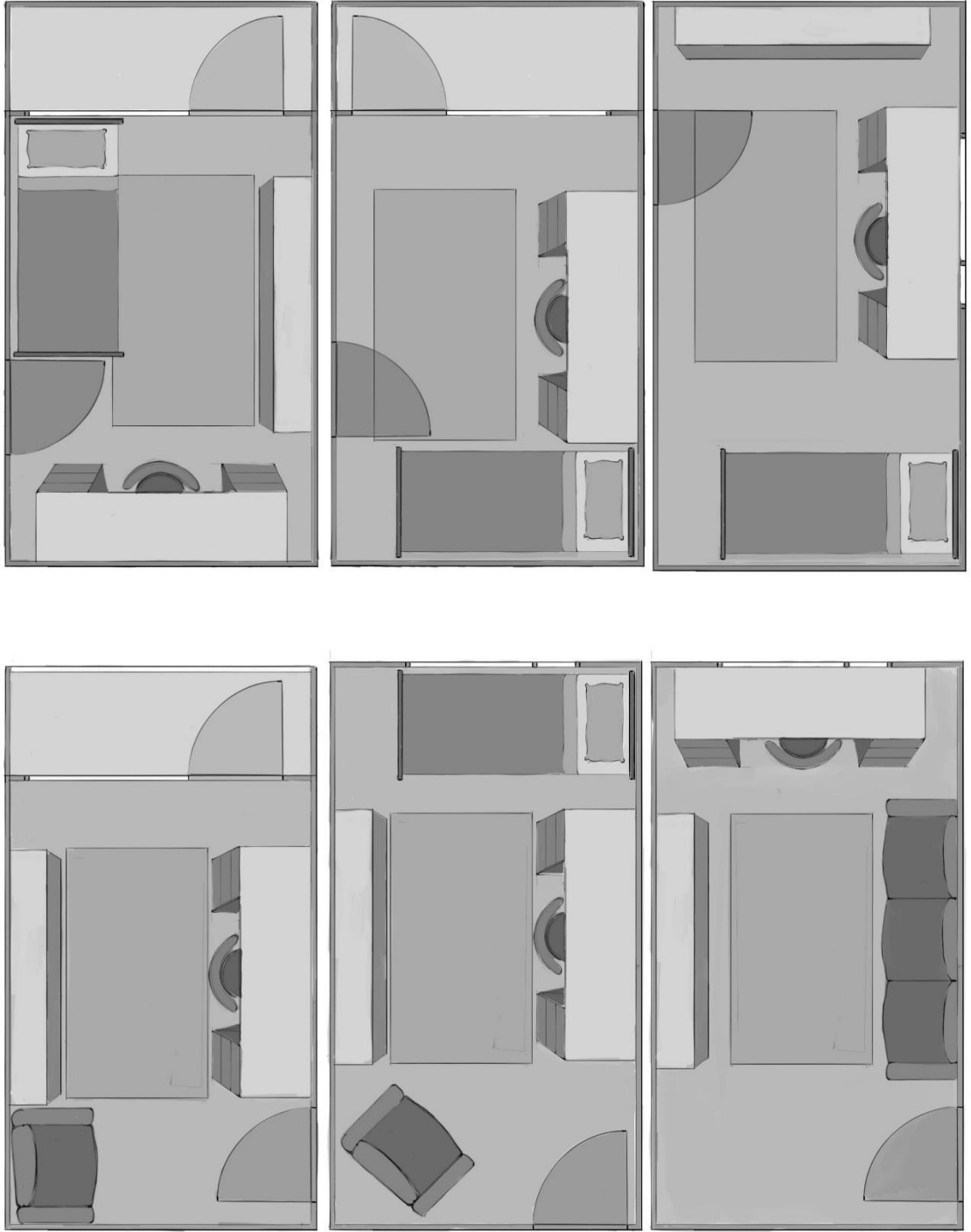
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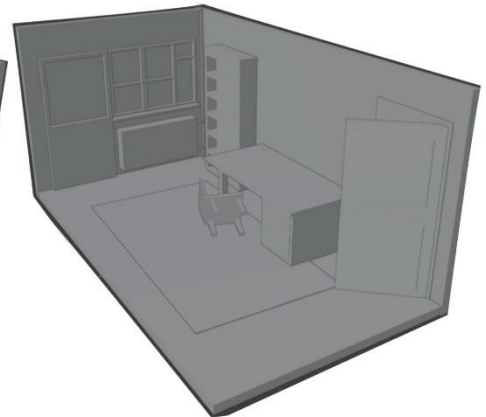
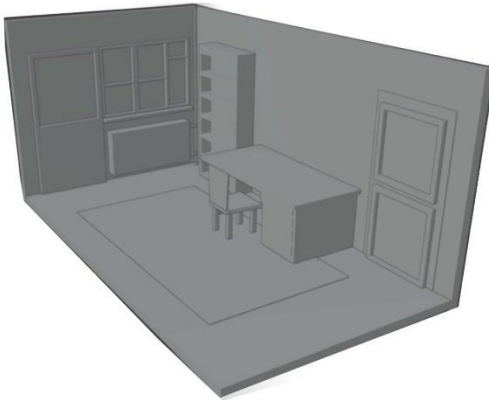
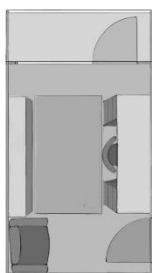
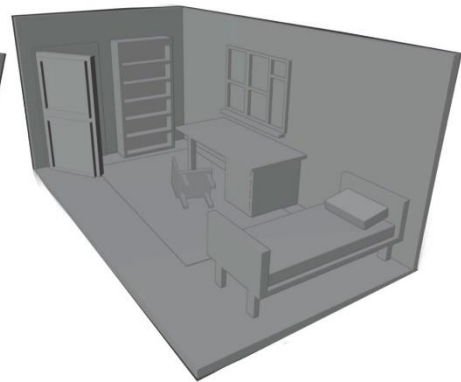
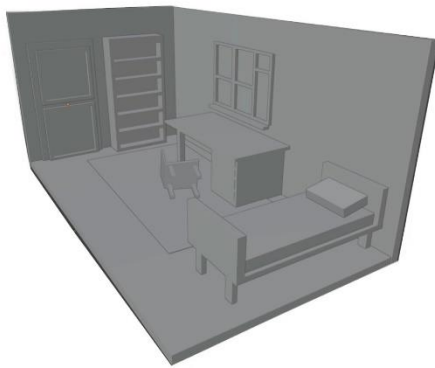
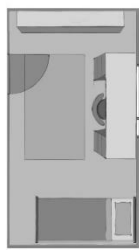
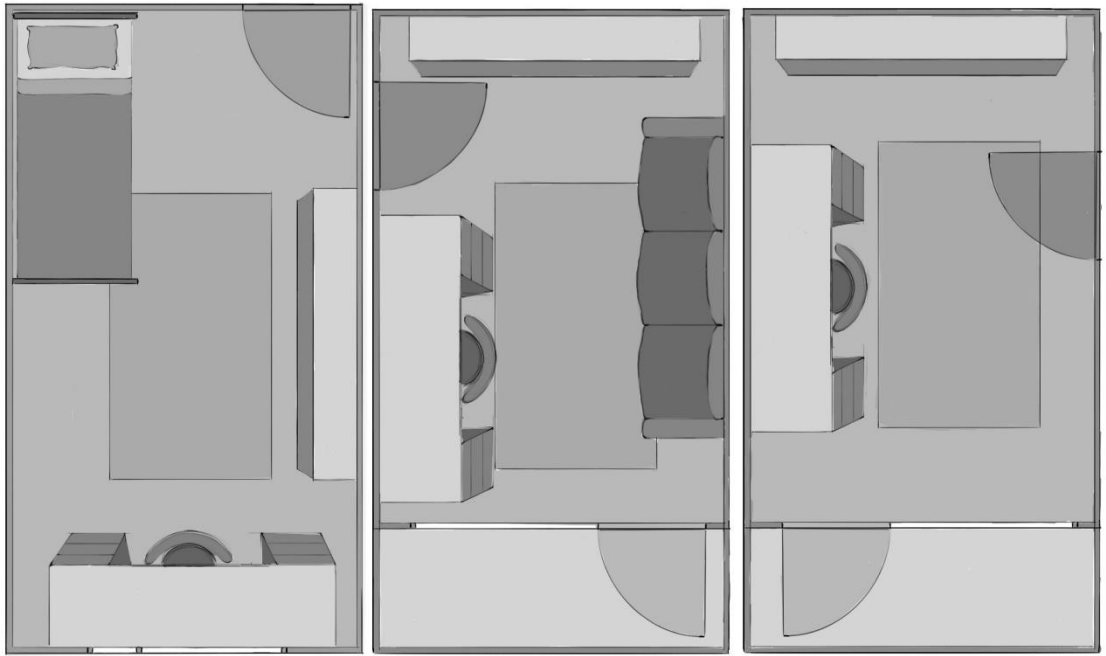
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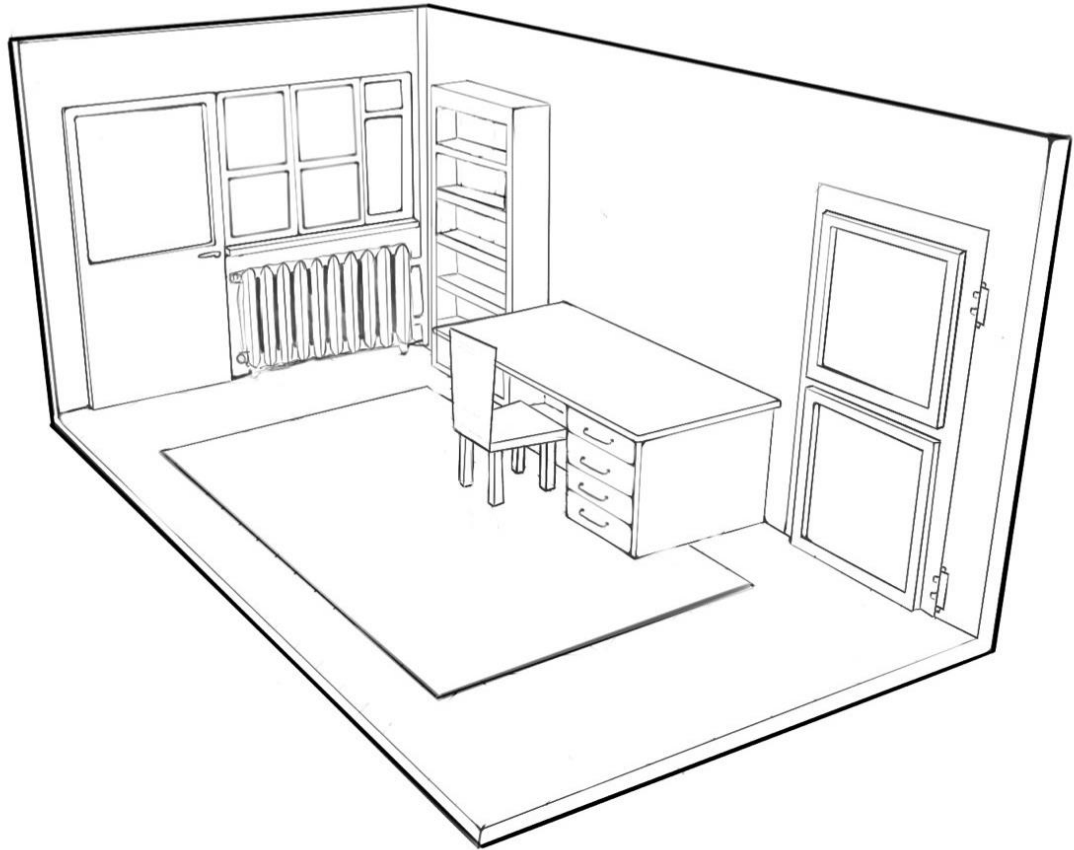
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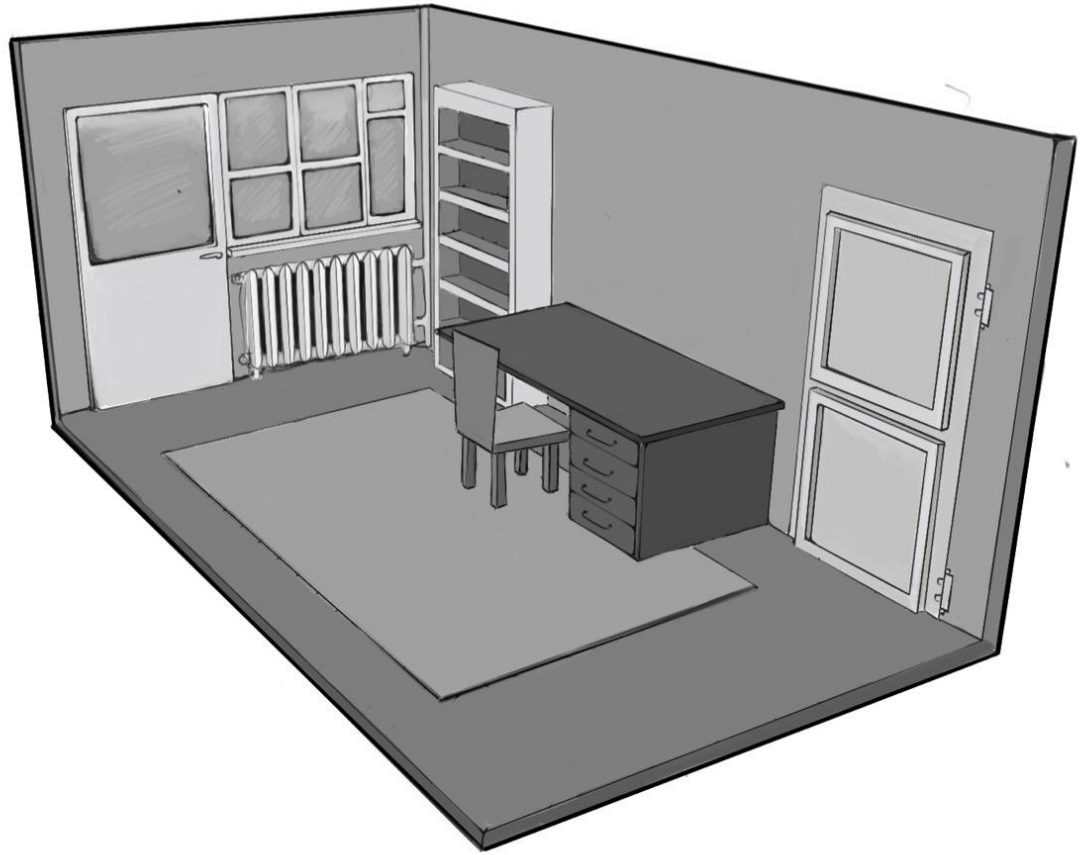
APPENDICES

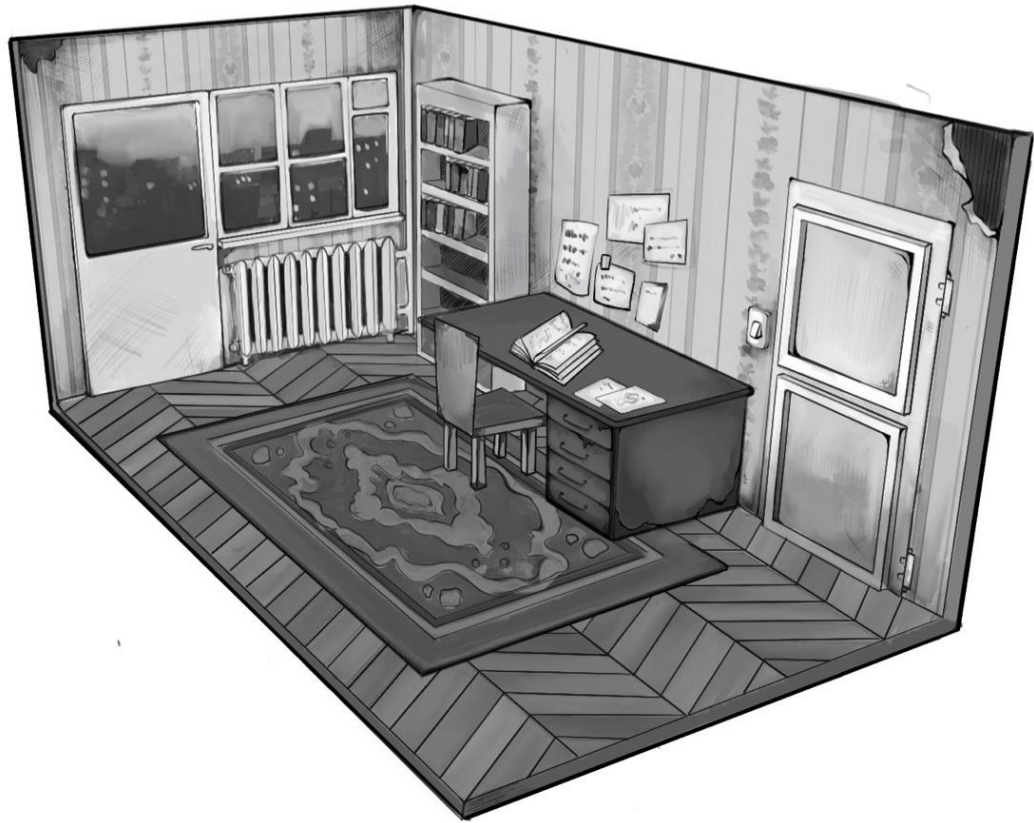
Room layouts 1



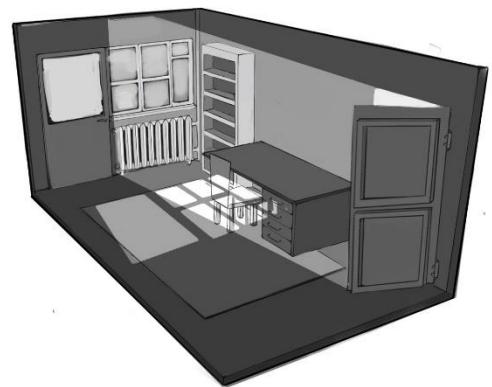
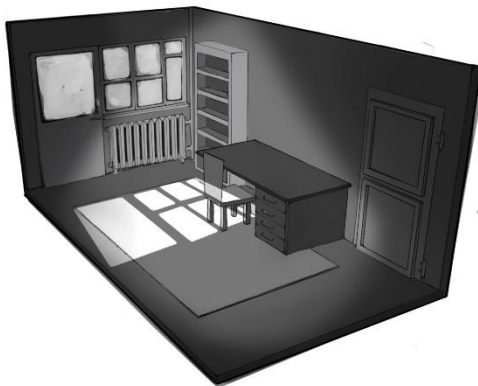
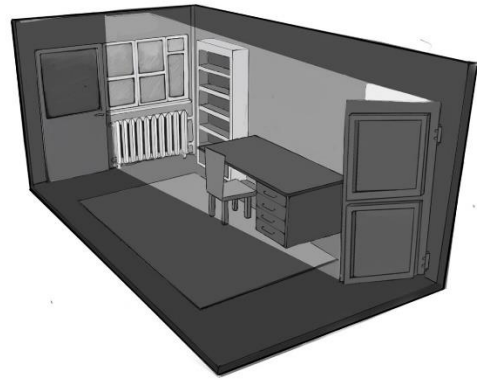
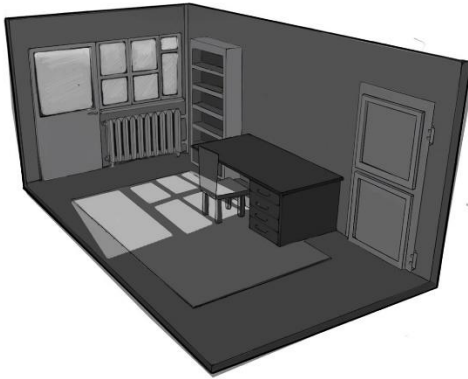
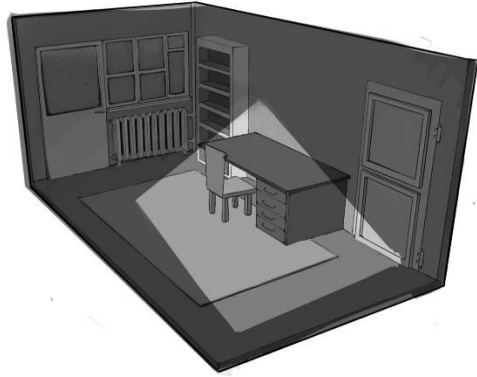
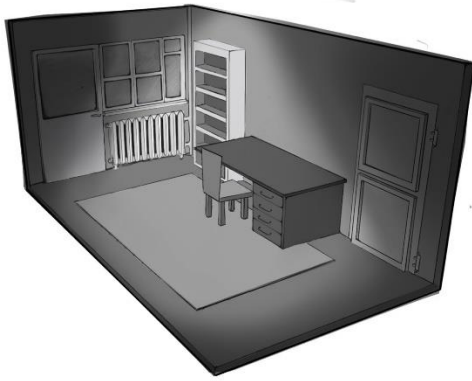








Tonal thumbnails



Colored thumbnails

