

# Project Evaluation and Resolution

## Portfolio of Documentation

### INTEGRATING ENVIRONMENTAL STORYTELLING TECHNIQUES TO ENHANCE PLAYER EXPERIENCE IN 3D HORROR VIDEOGAMES

2070012

MSc Computer Games Technologies

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## Declaration

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## Abstract

This research project aims to explore the effectiveness of environmental storytelling techniques in 3D horror video games as a means of conveying the game's narrative without relying on traditional methods. The study will investigate whether players can closely interpret the game's story through these techniques while also examining how providing players with more agency and interactivity can still evoke fear, immersion, and retention, all of which contribute to the overall player experience. By evaluating players' approaches and interactions within the game environment and analysing qualitative data on their interpretation of the story, this study seeks to identify key elements of environmental storytelling that aid in conveying the narrative. The findings will contribute to the development of a refined framework for future game designers, one that prioritizes player agency, reduces the reliance on lengthy and non-interactive cutscenes that disrupt gameplay, and allows players multiple pathways to comprehend and complete the game, with their choices having meaningful consequences that shape the overall gameplay experience.

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## 1. Final Artefact Context and Framing

### 1.1 Introduction

The objective of this project is to explore the extent to which players can interpret the narrative of a 3D horror game environment solely through the implementation of environmental storytelling techniques. By providing players with increased agency and interactivity, I aim to examine whether this framework can effectively evoke fear, retention, and immersion, all of which contribute to the overall player experience.

By evaluating the player's navigation and interaction within the game environment, I will assess the players' ability to decipher and comprehend the underlying story. By relying on qualitative data analysis, I aim to identify key elements of environmental storytelling that contribute to successful narrative conveyance.

Ultimately, this research seeks to propose a refined framework for game designers, one that emphasizes player agency, reduces the reliance on non-interactive elements such as cutscenes and dialogues, and offers multiple pathways for players to understand and complete the game.

In this research project, I outlined a plan consisting of three main stages: creation, testing, and evaluation. The creation phase involved developing the artifact on paper and then in the game engine to make it playable. The testing phase included conducting a pilot study, addressing any issues based on feedback, and iterating the artifact. The evaluation phase involved conducting participant testing, collecting data, and analysing it to propose a solution to the initial problem.

In my previous research (PCODE), I argued the need to investigate player agency in 3D horror video games due to its potential impact on player engagement and immersion. Traditional storytelling methods often disrupt gameplay, leading to a loss of agency and detracting from the overall experience (PCODE, p6). By conveying the story solely through the game environment, without breaking the gameplay, players can maintain their agency. I also outlined various skills, project plans, methodologies, and evaluation schemes to lay a strong foundation for artifact development.

Initially, I faced the challenge of dealing with a broad topic that required refining and establishing connections between agency, storytelling, narrative, and experience. During



this process, I encountered flawed logic concerning the relationship between reducing agency and the role of cutscenes, as well as an overemphasis on immersion as the sole determinant of player experience. The extensive literature in these areas necessitated a need for greater specificity and relevance to my research topic (PCODE, p7). To address these issues, I delved into recent games and papers, discovering the problem of reduced player agency in horror games, which often resulted in disengagement and players becoming stuck without knowing how to proceed.

For example, in the *Outlast* (Red Barrels) games, players encounter numerous situations where they are relentlessly pursued by enemies. They have no alternative but to follow a predetermined path with no helpful clues provided. Their only option is to evade and conceal themselves, as they are entirely defenceless. If they are caught by the enemy, their character dies, leading to restarting from the last saved checkpoint. While this initially instils fear and tension in the first few attempts, it ultimately becomes repetitive and frustrating after numerous failures.

Similarly, in the recent *Resident Evil* (Capcom) games, it's evident that modern game design places a strong emphasis on environmental storytelling techniques like notes, clues, and puzzles to convey the narrative. However, within this approach, instances arise where certain elements of environmental storytelling seem detached from the primary story arc. This creates a dilemma for players who are invested in comprehending the central plot but find themselves diverted by seemingly unrelated details. This phenomenon diminishes the player's sense of agency in shaping the central narrative. A specific illustration of this occurs when players encounter supplementary background stories or secondary objectives that are not essential to the main progression. This diversionary tactic, while potentially enriching the game's world, can also contribute to a sense of lost agency, as players grapple with deciphering what's crucial to the main storyline. The interconnected nature of these games, coupled with cutscenes that drive the narrative forward, poses a challenge for game designers who must cater to both newcomers and those familiar with the franchise's prior iterations, especially when players have the option to skip cutscenes. This complex interplay between environmental storytelling and maintaining player agency underscores the intricate balance that game designers must strike to ensure a cohesive and engaging player experience.

As a solution, I explored the enhancement of environmental storytelling to combine explicit and implicit methods, allowing players to have more agency and discover the game's narrative through the environment (PCODE, p14). Furthermore, I identified key metrics for player experiences and investigated their impact on gameplay (PCODE, p17). As the module progressed, my focus gradually narrowed, placing significant emphasis on reviewing existing literature, establishing connections between environmental storytelling, agency, and player experience, and developing a prototype to test intended mechanics for the final artifact.

In the subsequent research phase (PDEDE), I fully developed the artefact, discussing its detailed requirements, the design process, verification, and the changes made. During the development process, several important insights were gained. These include the decision to design the game environment in a right-angular structure rather than a triangular one (PDEDE, p35). Additionally, a hybrid model of non-linear and branching storyline was employed, combining different environmental storytelling techniques (PDEDE, p33). Furthermore, specific game mechanics were adjusted to enhance playability, such as allowing the player to interact with clues multiple times, providing them with more time to unravel the mysteries of the game (PDEDE, p44).

Moreover, a pilot study was conducted with a single player to evaluate the effectiveness of the artifact and to plan for further testing (PDEDE, p66). The primary objectives of the pilot study were to identify any potential bugs or issues within the game, observe the player's ability to navigate and interact with the game successfully, and conduct a test interview, all of which were done to test out the software and hardware on which the subsequent testing would take place in the PEVRE module.

During the module, I faced the challenge of aligning the initial requirements with the implementation within the engine. This led to the need for continuous iteration. Some game mechanics, such as the keypad, jump scares, and branching choice endings, required adjustments due to my limited coding knowledge in those areas. To address this, I restructured the code, separating each mechanic to operate independently. This approach allowed me to effectively tackle the issue. Additionally, I encountered several bugs throughout the gameplay that needed to be addressed from their root causes. To handle this, I broke down the issues into smaller parts and analysed why they were occurring and

how to effectively resolve them without deviating too much from the original plan. This method enabled more efficient troubleshooting and ensured that each bug could be individually addressed and fine-tuned. As a result, I was able to fulfil each relevant requirement individually and exclude any that did not fit well during the actual development process.

Having finalized the artifact and prepared essential components like the GEQ, interview questions, and Google forms, the emphasis of this module will transition towards distributing the Google forms to potential participants and recruiting them. This will be followed by comprehensive testing of the artifact and data collection. This testing phase will involve engaging participants and following the evaluation process outlined in the PDEDE (Testing, Questionnaire, Interview) module. Upon completion of data collection, I will conduct a comprehensive analysis using appropriate methods to summarize the findings. This analysis aims to propose a viable framework and solution that directly addresses the research problem, which explores the players' ability to interpret the narrative of a 3D horror game environment solely through the implementation of environmental storytelling techniques. By providing players with increased agency, the impact on the overall player experience will be assessed. Through this process, I will bring the project to its conclusion.

## 1.2 Preliminary Discussion

This research centres around environmental storytelling, agency, and player experience, serving as the foundational elements of my project. The issue at hand is that certain 3D horror video games opt to restrict player agency to accentuate specific aspects of the game, such as narrative control, controlled pacing, thematic elements, cinematic sequences, and resource management. However, this approach often results in compromised player engagement, reduced replay ability, and a diminished sense of empowerment. These compromises, in turn, lead to storytelling challenges, including a lack of immersion, predictable narratives, limited emotional impact, and potential disconnection from the protagonist.

Jennings talks about Murray's impactful definition characterizes agency as "the gratifying ability to engage in purposeful actions and witness the outcomes of our choices and decisions." This concept has been debated as a fundamental feature within the experiential dimension of video games (Jennings, 2009).

Furthermore, horror games have become renowned arenas where the sense of agency often becomes compromised. The interplay between control and lack thereof within horror games gives rise to emotional qualities that are deeply intertwined with the game's programming (Kryzwinska, 2002). The manipulation of agency holds special significance in video games, where various elements like player input, hardware capabilities, narrative, and code jointly influence the degree of agency experienced.

For example, in *Outlast 2* (Red Barrels, 2017), there are chase sequences in which the player is pursued by hostile enemies. During these sequences, players have little control over the outcome, as the game dictates the path they must take and the actions they must perform, thereby restricting player agency by reducing their ability to strategize or find alternative routes, making them feel more like passive participants in the intense encounters.

Williams (2019) highlighted the significant strides made in investigating the domains of control and agency within horror games, notably through the groundbreaking work of Tanya Krzywinska (2002). Krzywinska delves into the elements that can either limit or enhance agency, examining the intricate balance between being in control and relinquishing it through specific case studies. Her exploration dissects the mechanics of control and agency,

providing players with a perception that their sway over the game world is moulded by explicit game design. This design strategy decisively shapes the dynamic between agency and control (Habel et al., 2014).

Comparisons have been established between traditional storytelling methods and the realm of horror films, with a focus on their depiction and impact on participants. Metz asserts that the feeling of being immersed in cinema originates not solely from the screen, but from the symbolic interpretation of visuals within the mind. To exemplify, let's consider a scenario in which players confront a decision involving two options, perhaps red and blue objects. If these players have seen the movie "The Matrix" (Wachowski, 1999), they might associate this choice with the red and blue pills from the film, subsequently influencing their decision-making process. Christopher et al. (2022) contend that the experience of cinematic immersion arises from the symbolic understanding of images within the mind, rather than solely from what appears on the screen.

Marak (2021) explains environmental storytelling pertains to game design components that offer a narrative context, rendering the story intimately tied to gameplay beyond the mere establishment of the game world and its backstory. As players traverse the game world's expanse, they observe the virtual environment, striving to comprehend and interpret it, effectively weaving a narrative in the process (Marak, 2021).

Calleja (2011) talks about two distinct types of scripted narrative in games: push narrative and pull narrative. The "push narrative" entails the player being exposed to information that the game creators intended to convey, with little player input. Conversely, the "pull narrative" involves narrative elements embedded within the virtual environment that the player actively seeks out. This might mean that players miss certain parts of the narrative, but it also fosters exploration and enhances agency (Calleja, 2011). In a similar vein, I've incorporated both an implicit and explicit storyline in the game. The explicit storyline can be interpreted by players through navigation and observation, akin to the 'push narrative.' Meanwhile, the implicit storyline is embedded in the environment and requires player interaction, resembling the 'pull narrative.'

Moreover, another intriguing concept integrated into my game world was Indexical storytelling. This approach, as pointed out by Fernandez-Vara (2011), constructs a game

narrative primarily through indices, deviating from traditional storytelling methods. Instead, it assembles the narrative using distinct components, emphasizing the use of evocative narrative elements. Consequently, indexical storytelling is akin to crafting a narrative puzzle, a collaborative effort between the designer and the player. While the designer establishes the narrative components and weaves them into the game world, it's up to the player to interpret these elements and fit them together. This concept refines the idea of environmental storytelling by pinpointing how story and gameplay merge based on subtle imprints within the game world. These imprints can take shape through the game's design, encompassing spatial layout or system design that empowers players to interact with the environment, thus leaving their own marks (Fernandez-Vara, 2011).

Considering these factors, it becomes crucial to architect the environment of a 3D horror game in a manner that allows players to decipher the narrative without relying on conventional means. By employing certain techniques, designers can encourage players to thoroughly explore the game's environment, fostering a deeper understanding of the story. The layout of the levels and the techniques utilized further contribute to this, ensuring that the story design remains concise and comprehensible rather than overly complex. These principles guided the creation of my artifact and will look to assess its effectiveness through testing during this module.

## 2. Research Resolution and Discussion

### 2.1 Introduction

This section will include a discussion and justification of the research study process, results analysis, and research study contributions, evaluating their alignment with the original aims and objectives, the reliability and validity of the results, and the contextualization within the research literature and prior work.

### 2.2 Verification Process

In the previous module (PDEDE), a pilot study was conducted to test out the playability of the artefact, the study methodology as well as the software and hardware capabilities. The pilot study, emphasized by Hassan et al. (2006), serves as a critical stage in a research project, allowing for the identification of potential problem areas and deficiencies in research instruments and protocols before the full study implementation. At first, I considered testing the artifact myself due to time constraints and the urgency to proceed with the main study. However, realizing that unforeseen difficulties during the main study would be highly undesirable, I opted not to skip the pilot study and proceeded diligently with its execution.

To achieve this, a fellow student was asked to be part of the pilot study and try to 'break the game' and then answer the interview questions. Simultaneously, the hardware such as the PC, mouse, keyboard, headphones and recording device along with the screen recording software were also tested. As expected, there were some bugs that were hindering the gameplay, such as the ray casting, collider physics and issues in the code.

On the other hand, all the apparatus worked as intended and the bugs that occurred in the artefact were also addressed prior to the start of the subsequent module (PEVRE).

#### 2.2.1 Recruiting the Participants

The first step to initiate the study was recruiting the appropriate participants for sampling. This would involve identifying, targeting and enlisting potential participants, followed by provision of information to potential participants and establishing their interest in the proposed study (Patel et al. 2003). The question of how many participants would be the right number emerged. Initially, I aimed for 16-20 participants, thinking it would be a reasonable number to gather sufficient data for meaningful results. However, after considering factors such as limited time, resources, and constraints, and seeking expert advice, it was determined that a sample size range of 10-50 participants would be ideal to achieve data saturation and gain rich insights for the project (Creswell, 2017). Moreover, I opted for a precise participant count of 10 due to the findings of Hennink et al. (2022). Their empirical investigations delved into saturation and recommended suitable sample sizes for similar studies. Their research unveiled that studies involving empirical data typically achieved saturation with a specific range of interviews (between 9 and 17) or focus group discussions (ranging from 4 to 8). This is particularly pertinent for my study since it entails a relatively uniform study population and clearly defined research objectives, aligning with the parameters where this sample size proves effective. Additionally, Vasileiou et al. (2018) discussed expert suggestions that studies utilizing individual interviews should limit the number of interviews up to 50 to effectively handle the analytical complexity and reach data saturation.

However, in my research project, I successfully achieved data saturation, as well as the desired depth and breadth of data, with a sample size of just 10 participants. This occurred when new information ceased arising, and the analysis began to show repetitive elements. Responses started to display uniformity, and as the analysis progressed, no new themes emerged, indicating data saturation. The alignment between the obtained insights and the research objectives confirmed the suitability of the chosen sample size. Additionally, while more potential participants were available for recruitment, I chose not to continue due to data saturation and time constraints.



To ensure ease of access, this study focused on recruiting participants exclusively from the current university student body, aged 18-34. This selection corresponds to the primary audience identified in a survey conducted by Williams (2023) as active consumers of horror games. While alternative sources could have been considered, I opted for university students due to several advantages. Their accessibility was facilitated through university email addresses, as well as their presence on platforms like Discord and WhatsApp groups. Additionally, their status as university students provided them with familiarity with the campus environment, locations, and procedures, contributing to a more informed participation. To maintain inclusivity, this research study did not consider factors such as gender or other irrelevant characteristics as the primary focus was on gathering qualitative data to delve into the individual's unique experiences, perspectives, and interpretations.

Manohar et al. (2018) discuss in their paper how investigators undergo a comprehensive process before commencing a study, outlining the expectations and strategies for participant recruitment while adhering to ethical guidelines, and obtaining approval from an ethics committee. Keeping that in mind, all documents related to my study such as the ethics review form, GEQ, consent form and participation information sheet were double checked and signed off by the ethics committee before proceeding any further.

After that, prospective participants were sent a Google Form (see Appendix A) as part of the recruitment process. The form requested contact details, faculty, course, and degree type. This was done for data collection purposes so that I could get in touch with the relevant participants with further details. Additionally, participants were asked a range of questions about their general gameplay experience and experience with horror games. This would help me determine which category the participant falls under, novice or avid gamer.

Participants with limited or no gaming experience would fall under the category of novice gamers, while those with extensive gaming background would be considered avid gamers. Given that the primary target audience for gameplay consists of avid gamers, their inclusion in the study was a logical decision. On the other hand, involving novice gamers offers a distinct perspective. Additionally, if game designers intend to appeal to novice gamers, their insights become particularly valuable. Valuable aspects include assessing accessibility, evaluating the learning curve, gauging engagement, and crucially, understanding initial impressions. This comprehensive understanding can aid designers in attracting a broader customer base, especially in narrative-driven horror games where capturing the audience's interest is pivotal.

By categorizing participants accordingly, I managed to select an equal number of individuals from both groups, ensuring a diverse range of data and perspectives for the study. After submitting the form, participants were individually notified of the study's schedule and location. The study sessions were conducted in a risk-assessed, dedicated lab located inside Eldon Building.

Initially, a challenge emerged regarding participants' reluctance to commit their time and effort to commute to Eldon building without receiving any incentive. According to Parkinson et al. (2019), rewarding individuals with incentives can motivate them to participate and put in more effort. However, they also pointed out a challenge that comes with offering rewards – some people might not take the study seriously and just do it for the sake of the incentive, which is called 'free riding'.

Since I couldn't provide incentives, I had to find other ways to encourage people to participate in my study. To overcome this obstacle, I took a proactive approach by personally reaching out to individuals who seemed interested in the study. I also gave them the freedom to choose the time and day that worked best for them to participate. Additionally, I continuously expressed gratitude to them and praised their gaming skills, letting them know that their perspective was valuable.

By adopting this approach, I successfully recruited the required number of participants within the specified timeframe.

### 2.2.2 Study Procedure

The second step involved providing the participant with a study briefing and having them read the participant information sheet (see Appendix B) before signing the consent form (see Appendix C). The participant information sheet served as a comprehensive guide with all the necessary details, while the consent form sought approval for the study's various parameters. To streamline the process, I utilized word templates from Moodle for both documents and converted them to PDF and Google form formats to facilitate easy response collection, eliminating the need for participants to manually fill out the word document. Additionally, any questions that the participant had were answered at this point.

During the third step, the participant engaged in gameplay while I monitored from the other side of the room, ready to provide technical support if needed. To capture their gameplay, I used OBS Studio software for screen recording. This was essential for later when I would analyse their gameplay. Fortunately, the participants encountered no issues or interruptions during their playthrough. After completing the gameplay session, the participants were promptly presented with the GEQ (see Appendix D) on a separate laptop to fill out with time not being a constraint. In the research conducted by IJsselsteijn and colleagues (2013), the Game Experience Questionnaire is divided into three distinct parts. The first part evaluates the player's overall gameplay experience, while the second part explores the player's psychological and behavioural involvement during the gaming session. Lastly, the third part assesses how the player felt after they concluded their gameplay. While traditionally the first two parts are filled out pre-game and the last part post-game, for the relevance of my research, I adapted and combined the questions, having participants answer them after gameplay. The questionnaire covered personal information, story interpretation, gameplay experience, and choice making aspects.

In the final step, I conducted a semi-structured interview with the participant, asking them the long-answer questions from the GEQ. This approach facilitated a more comprehensive exploration of their responses, offering additional context and clarity. This method is known as the mixed-method approach, which combines both quantitative and qualitative research methods. As described by Dawadi and others (2021), this approach integrates different assumptions and perspectives, enabling a deeper and more thorough understanding of the research issue.

It's important to acknowledge that an alternative approach could have involved me playing the game myself and having participants watch recordings of the gameplay, followed by asking them to interpret the story. However, given my specific goal of having participants physically engage with the game, I dismissed this option. Additionally, besides the sequence of gameplay followed by questionnaire and interview, I also contemplated employing the think aloud approach. This method entails participants verbally expressing their thoughts as they perform a task without interpretation or analysis, as outlined by Guss (2018).

Johnstone et al. (2006) outline its benefits like direct insight into participants' thought processes and alignment with user-centric design, as well as its drawbacks such as incoherent utterances and discomfort for some players not accustomed to speaking while gaming. Furthermore, real-world gaming experiences often involve post-game discussions for immersion. By providing the participants with sufficient time to engage with the game, they could immerse themselves and concentrate on the gameplay. They were then provided the flexibility to complete the questionnaire and the interview at their own pace, granting them the necessary time to reflect on their experience and provide thorough responses. Considering these factors, I opted for the play-then-interview approach.

Following the interview, the participant was thanked for their time, and the study concluded.

### 2.2.3 Data Collection

As stated in the Participant Information Sheet, all data collected from participants was anonymized and securely stored. Responses from the Game Testing form, Consent form, and Game Experience Questionnaire were stored in Google Drive as these forms were directly linked to the drive. For enhanced portability, gameplay screen recordings and interview audio were securely stored in an encrypted pen drive, facilitating easy transfer to my personal laptop for analysis. Furthermore, as an additional safety measure, the data was stored locally in the system as a backup.

With all the data collected and securely stored, the next step was to compile the data before the analysis could start. I began with the most challenging task of transcribing interview data from speech to text. To achieve this, I utilized a technology called "Automatic Speech Recognition" (ASR) or "Speech-to-Text" (STT), which leverages algorithms and machine learning models for converting spoken language into written text (Kothadiya et al., 2020). Specifically, I employed an online tool named 'Happyscribe,' which efficiently performed the transcription in just minutes. This approach offered two key advantages: firstly, it saved considerable time compared to manual transcription, and secondly, the transcribed text could be easily copied and pasted into a separate file for analysis.

However, there were certain challenges related to participants who were not fluent English speakers. In such cases, the ASR technology could not accurately convert some words, necessitating manual intervention. Despite this, the method still significantly expedited the transcription process, enabling me to obtain the required data in a much shorter timeframe.

#### 2.2.4 Data Analysis

During PDEDE (page 65), I thoroughly explored a variety of data analysis methods that were suitable for my study on PEVRE. These methods included content analysis, thematic analysis, phenomenology, and grounded theory. Content analysis involves sorting text into related categories to identify patterns and associations, considering both participants and context (PDEDE, p65). Grounded theory is a comparative method aiming to understand social processes and generate theories from data, analysing patterns over time (PDEDE, p65). Phenomenology explores subjective experiences, examining individuals' lived experiences and consciousness to critically examine their reality and construct meanings (PDEDE, p65). Because of the flexibility of thematic analysis, this approach facilitates identifying and exploring emerging themes, which suits the research emphasis on participants' interpretations and experiences, making it a more suitable choice compared to the other three methods.

After carefully considering the type of data I had collected and the outcomes I aimed to achieve, I made the decision to proceed with conducting a thematic analysis. According to Nowell et al. (2017), thematic analysis is a qualitative research approach that can be applied across various epistemological perspectives and research inquiries. It involves identifying, analysing, organizing, describing, and presenting themes that emerge within a dataset (Braun & Clarke, 2006).

Given that the primary goals of my research revolved around investigating the effectiveness of environmental storytelling techniques and gaining insights into players' interpretations and experiences within the game environment, thematic analysis emerged as a robust method to uncover essential components of environmental storytelling that contribute to conveying the narrative. Furthermore, scholars like Braun and Clarke (2006) and King (2004) have asserted that thematic analysis is particularly useful for examining different perspectives of research participants, highlighting both similarities and differences, and generating unforeseen insights.

While it's acknowledged that thematic analysis may have a couple of drawbacks, such as a potential lack of extensive literature compared to other methods and its inconsistent nature, it's worth noting that novice researchers like me might initially feel uncertain about conducting a rigorous thematic analysis (Nowell, 2017). However, due to its flexibility, coupled with the nature of my project, it provided a pathway for maintaining consistency while developing themes extracted from the research data. Considering these factors, I had chosen thematic analysis as the most suitable approach for conducting my data analysis.

During the process of theme development, it became apparent that certain initial themes aligned with a sub-method of thematic analysis called template analysis. This approach entails utilizing a predefined template or coding framework to methodically organize and evaluate data (Brooks et al., 2015). Observing the generated codes, it's evident that the data has been systematically organized into themes that pertain to my research objectives in a structured manner.

Once I had collected all the data, the first step was to identify the data I had collected and what I would be analysing. In my case, I gathered qualitative, quantitative, and gameplay data, leading me to analyse three components: questionnaire responses, interview transcripts, and gameplay recordings.

As previously discussed, I utilized thematic analysis, specifically adopting inductive analysis. Employing the inductive method, data coding occurred without the imposition of predefined themes or researcher biases (Braun & Clarke, 2006). In my study, this inductive approach involved analysing participants' responses to understand their interpretations of the game's narrative, with a focus on identifying naturally emerging patterns and themes.

Conversely, the deductive approach involved researcher-guided analysis, enabling an examination of data through the lens of theoretical interests pertinent to the investigated issues (Braun & Clarke, 2006). In my case, I only employed the inductive approach, initially anchoring analysis in pre-established themes while also accommodating emergent and unexpected themes from the data for a comprehensive exploration of the interpretations (Dawadi, 2020).

The iterative and reflective process, as outlined by Braun and Clarke (2006) can be divided into 6 linear phases:

- **Familiarization with the Data:** Immersing oneself in the data to become thoroughly familiar with its content, capturing the essence of the participants' responses.
- **Generating Initial Codes:** Systematically labelling and categorizing meaningful sections of the data with descriptive codes that capture key concepts and ideas.
- **Searching for Themes:** Identifying potential themes by grouping and organizing related codes to reveal patterns and recurring topics.
- **Reviewing Themes:** Refining and reviewing identified themes to ensure they accurately reflect the data and capture the essence of participants' experiences.
- **Defining and Naming Themes:** Developing clear and concise descriptions for each theme and assigning meaningful names that capture their essence.
- **Writing the Report:** Composing a coherent narrative that presents the identified themes along with supporting quotes and analysis, providing a comprehensive understanding of the data.

## 2.3 Results Analysis

### 2.3.1 Data Immersion

Upon concluding the study and gathering and organizing all the data, the next step involved becoming acquainted with the collected information, a process known as familiarization, which entails immersing oneself in the raw data. This practice, as outlined by Pope et al. (2000), includes activities such as listening to recordings, reviewing transcripts, and studying notes to extract key concepts and recurring patterns. In my specific case, I initially focused on the questionnaire responses due to their straightforward nature, providing a more accessible understanding. I initially approached these responses in a summarized manner to gain a comprehensive overview of the data's tendencies. After establishing this overview, I proceeded to analyse the interview transcripts alongside the corresponding participant responses. Simultaneously, I made preliminary notes that would later serve as the basis for generating codes and themes. As previously mentioned, I didn't need to revisit the interview recordings since I had already transcribed them into text format. This facilitated the process of extracting specific questions from the transcriptions and then matching them with corresponding questions from the questionnaire. This step aided in identifying shared themes and subsequently tabulating the findings.

Additionally, I utilized a method called 'Non-Participant Observation,' a qualitative research approach that involves gathering primary data about certain aspects of the social context without directly engaging with participants (Williams, 2008). As mentioned earlier, I examined the gameplay recordings of participants to identify their gaming behaviours, decision-making processes, interactions in the game world, and moments of extended thought. I then connected these observations with the data from the interviews to ensure consistency between their actions and their responses.

### 2.3.2 Story Interpretation

Previously, I had outlined my strategy to employ environmental storytelling techniques within my game. This approach aims to gauge the extent to which players can decipher the narrative given the level of agency and interaction I have integrated. Subsequently, after immersing myself in the collected data, which encompassed responses from questionnaires,



transcripts of interviews, and recorded gameplay sessions. To facilitate the data analysis process, I subdivided the information into distinct categories: Story Interpretation, Gameplay Experience, Final Choice and Feedback. By closely examining and interlinking the Qual-Quan data, several categories emerged:

Categories			
Story Interpretation	Gameplay Experience	Final Choice	Feedback

*Table 2.1 Information Categories*

The next step involved generating the codes and themes. For this, I took the participant responses for each category from the questionnaire and interview, closely analysed them and generated the following codes and themes:

Category	Codes	Themes
Continued on next page...		
Story Interpretation	<ul style="list-style-type: none"> <li>- Sick patients with degenerative diseases</li> <li>- Hospital environment</li> <li>- Eerie atmosphere</li> <li>- Strange occurrences</li> <li>- Experimentation on patients</li> </ul>	Hospital Setting
	<ul style="list-style-type: none"> <li>- Patients turning into undead</li> <li>- Syringes causing transformation</li> <li>- Flesh-eating zombies</li> <li>- Epidemic/virus outbreak</li> <li>- Staff killed by zombies</li> </ul>	Transformation and Zombies

	<ul style="list-style-type: none"> <li>- Son searching for father</li> <li>- Urgent call from hospital</li> <li>- Father's worsening condition</li> <li>- Motive for protagonist's actions</li> </ul>	Family Connection
	<ul style="list-style-type: none"> <li>- Choosing between life and quality of life</li> <li>- Sacrifices for survival</li> <li>- Ethical considerations in saving others</li> </ul>	Moral Dilemma
	<ul style="list-style-type: none"> <li>- Focus on gameplay and puzzles</li> <li>- Searching for clues and keys</li> <li>- Finding puzzle pieces and solving puzzles</li> </ul>	Puzzle and Exploration
	<ul style="list-style-type: none"> <li>- Pharmaceutical company involvement</li> <li>- Serum experimentation</li> <li>- Mutant creations</li> <li>- Side effects of serum</li> <li>- Consequences of experimentation</li> </ul>	Experimental Narrative
	<ul style="list-style-type: none"> <li>- Usage of literary devices</li> <li>- Notes and documents as storytelling tools</li> <li>- Blood trails and visual cues</li> </ul>	Environmental Storytelling
	<ul style="list-style-type: none"> <li>- Confusion about the story</li> <li>- Unclear narrative elements</li> <li>- Mystery of the situation</li> </ul>	Uncertainty and Mystery

*Table 2.2 Story Interpretation Themes*

Using the insights from the participants' responses, 8 distinct codes were formulated, each summarizing detailed and specific aspects of the shared observations made by the participants. These encompassed elements like the game's surroundings, non-playable characters, hints conveyed through various cues, the dilemma of decision-making, puzzle-solving, explorative elements, the embedded narrative, the presence of danger and strategies for survival, and the inherent ambiguity surrounding the storyline.

As depicted above, the initial codes originated from the participants' feedback, capturing specific and direct observations. However, the emerged themes were structured to encompass these more specific codes, interlinking diverse codes to provide a comprehensive insight into how players understood the game's narrative. Notably, each game element was referenced by participants at least once, underscoring the thorough exploration of the game environment and the resulting agency it offered.

Whilst analysing the responses for the story interpretation section, it was observed that majority of the participants were able to decipher and piece together the narrative of the story, with a couple of them even getting close to the predefined story. For example, Participant 6 was able to even find out about the implicit experiments being conducted on the patients, which was not an obvious observation as the participant had to thoroughly go through the patient notes:

*“The protagonist has a relative in a hospital, and they call up the hospital to ask how he's doing, get his cop off the call, and he goes in to try and find them, check up on them, see if they're okay, and gets caught in this human experiment going on in the hospital.”*

Participant 6 [Interview Transcript]

Participant 7 mentions that there is a virus that is infecting the patients and turning them into people-killing zombies, which is also due to the experimentation. This observation would have come by observing the NPC behaviour:

*“And then when they come to the hospital, they discover that it's been infested by a virus, and the virus and the virus is turning some people into zombies. It's killed some other people, and they realize that it is because of some experimentation in the hospital.”*

Participant 7 [Interview Transcript]



Figure 2.1 Data Distribution of “Storytelling by Game Environment”

The data presented in the bar graph represents participants' responses to the question about how effectively they perceived the game to use the environment to tell the story, using a Likert scale ranging from 1 to 5. This data implies that a significant portion of participants believe that the game indeed used its environment effectively to convey its narrative. This alignment between participants' perceptions and the project's goal of analysing participants' interpretations of environmental storytelling demonstrates the game's success in utilizing its surroundings to engage and immerse players within the story.

As an example, Participant 8 highlighted that they were initially unaware of the walls being able to open. However, after discovering the code, they noted that everything started to fall into place.

*“Yes. I never knew the walls could open. So that was, I would say, a striking moment for me because I thought I just had to open doors, go through doors and then complete the game. But when I opened the walls, in some way, it scared me. And, I had to decode the code. It's been long I've used that clock before. So, it was a bit difficult at first for me to decode the code, but I finally found it.”*

Participant 8 [Interview Transcript]

Likewise, Participant 10 expressed surprise at the portrayal of the NPCs and the intricate integration of clues within the gameplay:

*“The depiction of patients was really surprising to me, the way they were portrayed and the way they were moving. The graphics were also really good, the way they were shown as some horrific creatures. Also, the way clues were well hidden, and yet they were easy to spot once you continued through the game. That was really captivating to me. That really seemed good to me.”*

Participant 10 [Interview Transcript]

An underlying hidden meaning was embedded within the game, subject to individual interpretation, particularly concerning the implementation of literary devices. For example, Participant 1 connected with the choice involving life and death:

*“Yeah. It's essentially exploring the choice should you save someone or increase the duration of their life at the cost of the quality of their life. So, in real life, if someone was going through a disease, should you try and save them even if it costs them that quality of life. So, if they're suffering from cancer, should you try and treat them, even though it's going to make their life a lot worse for the time they have left?”*

Participant 1 [Interview Transcript]

### 2.3.3 Gameplay Experience

This segment delves into data primarily centred on the participants' interactions with the game. This section was subsequently divided into three subcategories, each concentrating on the participants' experience, their level of engagement, and their emotional responses. Like the earlier category, the input extracted from both the questionnaire and interviews underwent analysis, leading to the formulation of the subsequent codes and themes:

Category	Codes	Themes
Continued on next page...		
Player Experience	<ul style="list-style-type: none"><li>- Confusion about the number of digits for keypad codes</li><li>- Uncertainty about the meaning of the time-related code</li></ul>	Complex Puzzle Codes
	<ul style="list-style-type: none"><li>- Running throughout the map to identify interactable objects</li><li>- Struggle in locating puzzle pieces</li></ul>	Navigation and Exploration
	<ul style="list-style-type: none"><li>- Initial challenge with controls, especially for non-gamers</li><li>- Adaptation to controls like keyboards vs. controllers</li></ul>	Interactions and Controls
	<ul style="list-style-type: none"><li>- Encountering bugs leading to frustration and almost giving up</li><li>- Difficulty spotting the interaction key</li></ul>	Bugs and Frustration

	<ul style="list-style-type: none"> <li>- Initial relaxation due to lack of scary elements</li> <li>- Increasing fear and suspense as the game progressed</li> <li>- Acknowledgment of the game's well-made structure and followability</li> <li>- Satisfaction with the game's balance between difficulty levels</li> <li>- Determination to find solutions even in the face of difficulty</li> <li>- A willingness to persist in solving puzzles and challenges</li> </ul>	Horror and Suspense Impact
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*Table 2.3 Player Experience Themes*

Through the examination of participant feedback, five distinct codes were identified, each encapsulating aspects such as the difficulties of the vault code, puzzle piece discovery, adaptation to gameplay controls, experiences of frustration, and the influence of horror and suspense.

Remarkably, regardless of the participants' varying levels of expertise, all successfully completed the game without requiring assistance or hints. They navigated the gameplay to reach its conclusion. Furthermore, the avid gamers managed to complete the game within the designated timeframe of 10-15 minutes, whereas the novice participants averaged between 20-40 minutes for completion.

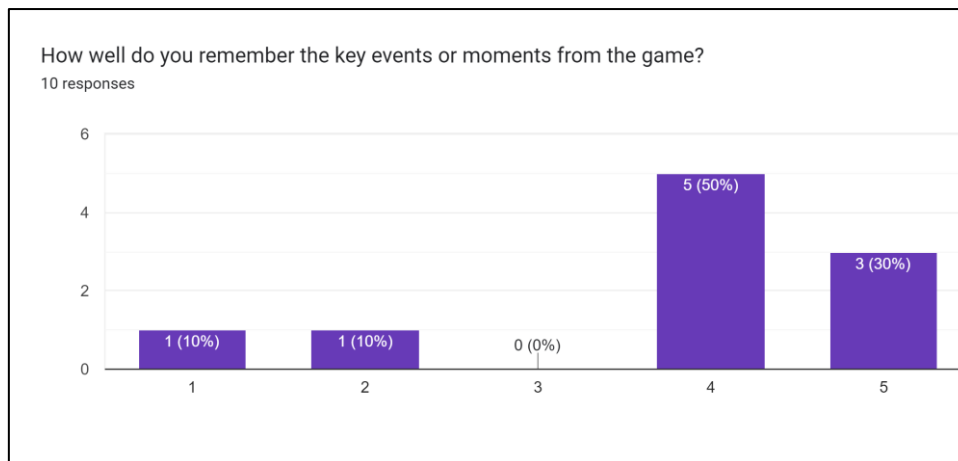


Figure 2.2 Data Distribution of “Key Gameplay Moments”

The data presented in the bar graph reflects participants' responses to the question regarding their memory of key events or moments from the game, using a Likert scale ranging from 1 to 5. This data implies that most participants had a reasonably good to strong memory of the game's key events and moments. This could signify that the game's design and storytelling were effective in creating memorable and impactful experiences for most participants, which aligns well with the project's goal of investigating participants' interpretations and experiences within the game environment.

As an illustration, Participant 8 recollected the recurring presence of clocks within the game, highlighting their significance as a clue to the code. Additionally, they noted how the clue on the wall foreshadowed the possibility of the walls opening:

*“Yes. I never knew the walls could open. So that was, I would say, a striking moment for me because I thought I just had to open doors, go through doors and then complete the game. But when I opened the walls, in some way, it scared me. And, I had to decode the code. It's been long I've used that clock before. So, it was a bit difficult at first for me to decode the code, but I finally found it.”*

Participant 8 [Interview Transcript]

Moreover, as participants proceeded to read the clue on the wall, they were met with the first jump scare, as recounted by Participant 2:



*“Actually, I am quite interested in the middle of the game. There was a part where the ghost runs through the door from one to the other. I think that scared me a little bit.”*

Participant 2 [Interview Transcript]

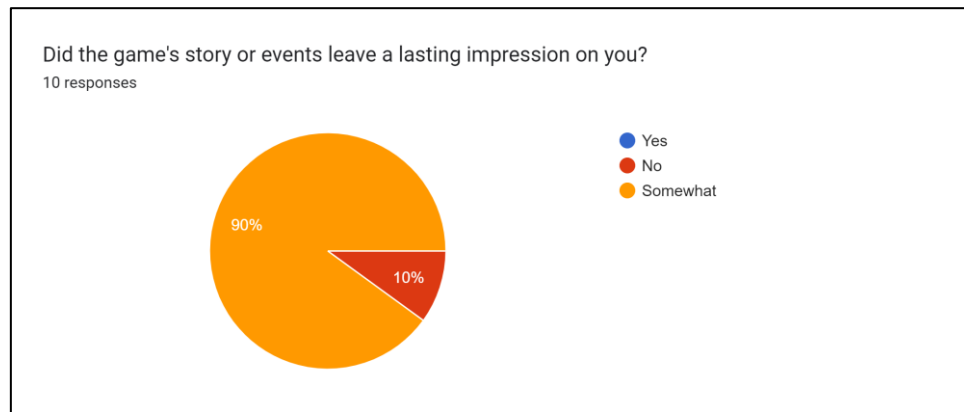


Figure 2.3 Data Distribution of “Lasting Impression of Gameplay Events”

The data from the pie chart indicates that 90% of participants responded with "somewhat" when asked whether the game's story or events left a lasting impression on them. This suggests that most participants found the game's narrative elements to have had some impact on them, although it might not have been a strong or deeply profound impression. Conversely, 10% of participants responded with "no," indicating that a small portion of participants did not feel that the game's story or events had any lasting impact on them. Notably, no participants responded with "yes," indicating a very low percentage who perceived a strong, lasting impression. In the context of the project, this data suggests that the game's narrative elements, while influencing most participants, may not have left an overwhelmingly powerful impression on the majority. This could potentially highlight areas where the game's storytelling could be further enhanced to create a more impactful and memorable experience for players.

Nevertheless, it's important to observe that several participants formed their own interpretations of the NPC behaviour; for instance, Participant 7 speculated that they were immune to attack after the second jump scare:

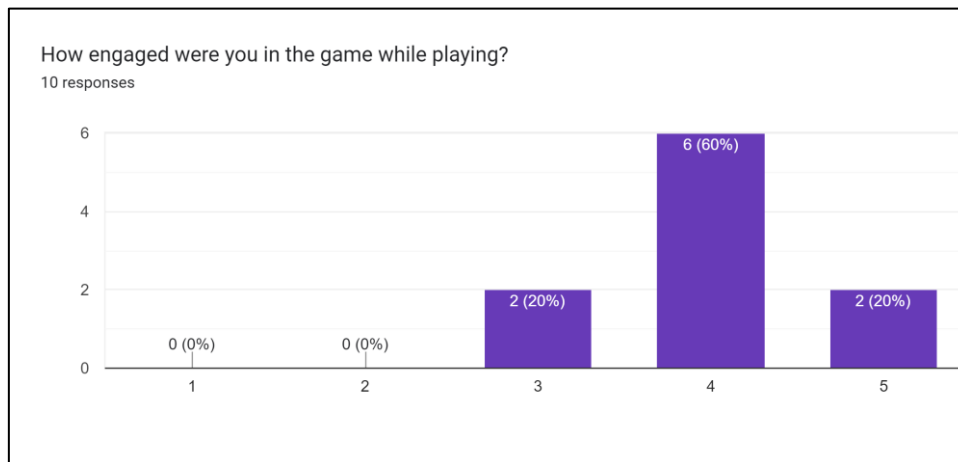
*“Yeah, I was questioning why the zombies were not attacking me or why I could not attack them because it was a time where I saw the zombie eating a nurse and I was like, I wanted to get the zombie off the nurse, but I could not. I would want to continue playing to find out why that's happening. I guess that is because the guy is immune or something like that. Maybe, I don't know.”*

Participant 7 [Interview Transcript]

Category	Codes	Themes
Engagement	<ul style="list-style-type: none"> <li>- Loss of engagement due to glitches</li> <li>- Technical issues affecting interaction and immersion</li> </ul>	Technical Issues

	<ul style="list-style-type: none"> <li>- Closing of hints or windows causing discomfort</li> </ul>	
	<ul style="list-style-type: none"> <li>- Growing curiosity leading to sustained engagement</li> <li>- Game's clues and hidden elements keeping interest intact</li> </ul>	Curiosity as Engagement Driver
	<ul style="list-style-type: none"> <li>- Disengagement due to inability to find clues</li> <li>- Doubts about continuing when progress is hindered</li> <li>- Feeling of not needing to continue if stuck</li> </ul>	Loss of Focus

*Table 2.4 Player Engagement Themes*



*Figure 2.4 Data Distribution of "Player Engagement"*

The data depicted in the bar graph represents participants' self-reported level of engagement while playing the game, using a scale of 1 to 5. This data suggests that the game successfully managed to capture the attention and involvement of most participants, as evidenced by the considerable number of responses in the upper range of the engagement scale. The lack of votes for the lowest levels of engagement implies that most participants found the gameplay to be interesting and captivating to a certain extent. The

variations in responses highlight that different individuals had distinct experiences of engagement while playing the game. Overall, the data aligns with the goal of creating an engaging gameplay experience that allows players to interact with the environment with enhanced agency.

Even though every participant could finish the game at their own pace, a few of them felt frustrated at times due to varying gameplay experience. For example, deciphering the passcode took time for Participant 5 as they had to search and input the codes repeatedly:

*“Well, I was very interested in the game, and then I started to be frustrated when I couldn't realize how to which code to put in. So that was it.”*

Participant 5 [Interview Transcript]

On the contrary, Participant 10 expressed that the clues were adeptly concealed, and the gradual progression of the game heightened their curiosity, possibly owing to their experience with video games in general:

*“Not really. Overall, the game was really interactive, as I said before, and the clues were also well hidden, yet obvious, so I didn't lose my focus in the game. If anything, I did grow more curious as I continued through the game as I played the game.”*

Participant 10 [Interview Transcript]

Categories	Codes	Themes
Continued on next page...		
Emotional Response	<ul style="list-style-type: none"> <li>- Being on edge at the beginning of the game</li> <li>- Initial uncertainty about potential threats</li> <li>- Expecting to be chased</li> </ul>	Mystery and Tension
	<ul style="list-style-type: none"> <li>- Encounter with a zombie running towards the player</li> </ul>	NPC Encounters

	<ul style="list-style-type: none"> <li>- Appearance of undead patients in the hospital</li> <li>- Zombie-like patients creating a frightful atmosphere</li> </ul>	
	<ul style="list-style-type: none"> <li>- Visual cues like documents of deceased individuals</li> <li>- Suspenseful background music and sound effects</li> <li>- Walls opening unexpectedly as a startling moment</li> </ul>	Visual and Auditory Elements
	<ul style="list-style-type: none"> <li>- Feeling of fear balanced with curiosity about the storyline</li> <li>- Curiosity-driven engagement with the game's progression</li> </ul>	Fear and Curiosity
	<ul style="list-style-type: none"> <li>- Anticipating horror elements due to the genre</li> <li>- Emotionally engaging with the horror aspects</li> </ul>	Expectations
Continued on next page...		
	<ul style="list-style-type: none"> <li>- Frustration and emotional response to challenging gameplay</li> <li>- Emotional engagement with frustration and determination</li> </ul>	Emotional Impact

Table 2.5 Emotional Response Themes

On a scale of 1 to 5, how scared or anxious did you feel during certain moments in the game?  
10 responses

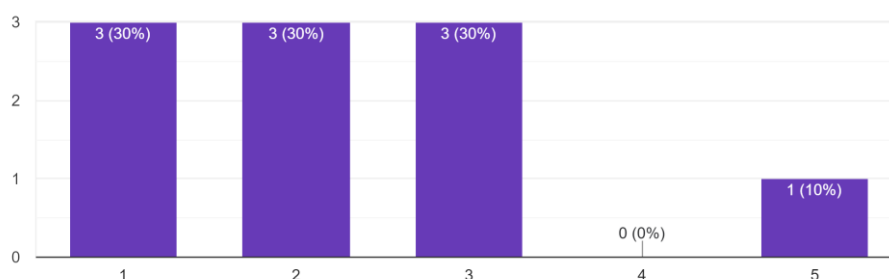


Figure 2.5 Data Distribution of “Player Emotion”

The data presented in the bar graph illustrates participants' responses regarding their level of fear or anxiety during specific moments of the game, as rated on a scale from 1 to 5. It implies that participants had varying degrees of emotional response to the game's moments designed to induce fear and anxiety. The distribution of responses suggests a somewhat even spread across the lower to moderate levels of fear or anxiety, with only one participant reporting the highest level of emotional intensity. Overall, the data indicates that while the game managed to elicit different levels of fear and anxiety among participants, it may not have consistently achieved the highest levels of emotional impact for all players. This diversity of emotional responses aligns with the complexities of horror game design, where individuals' psychological and emotional sensitivities play a role in their reactions to specific in-game scenarios.

Participants exhibited diverse emotional reactions to the game, as some responses were shaped by the overall gameplay experience, while others were influenced by specific in-game moments. For instance, Participant 7 noted that the incorporation of sound significantly enhanced their gameplay experience:

*“Some of the sounds, especially, I think, before you open the door, scared me a bit. But then I realized, oh, I'm playing a game. But every now and again, the sounds, I think the biggest*

*thing was the sounds. Some of the visuals were scary, but I think the sound made the visuals join. It made it a more frightful experience and only the visuals would have been alone.”*

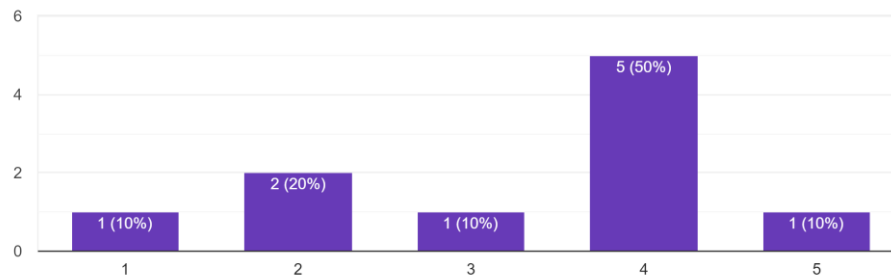
Participant 7 [Interview Transcript]

In contrast, Participant 1 didn't experience fear, likely owing to their extensive gameplay experience, and their emotional response shifted when they recognized the significance of progression over mere survival:

*“I was never scared, but I was a little bit on edge at the beginning. Because I do play a lot of games, as I realized that I'm not being attacked or anything, it became almost chill and more cognitive as I was thinking about what it meant instead of trying to survive.”*

Participant 1 [Interview Transcript]

How well do you think the game created a sense of fear or suspense?  
10 responses



*Figure 2.6 Data Distribution of “Game Mood”*

The data from the bar graph indicates that participants' responses to the question about the game's ability to create a sense of fear or suspense were diverse. It implies that the game generally succeeded in creating a substantial sense of fear or suspense among the participants. However, it's worth noting that a small portion of participants did not perceive the fear or suspense to the same extent as the majority. This variety in responses could be attributed to individual differences in tolerance for horror elements and personal interpretations of the game's atmosphere. The majority's positive response aligns with the project's aim to design a horror-based environment that effectively evokes fear and suspense in players.

#### 2.3.4 Making the Choice

The culmination of the game presented participants with a pivotal moment: choosing which syringe to administer to the father. These syringes were color-coded, with one being red and the other blue. The ensuing participant responses led to the emergence of the subsequent codes and themes:

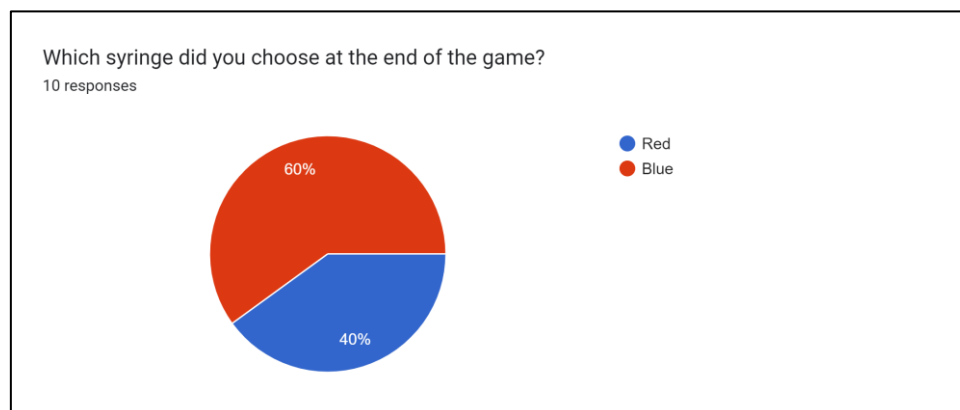
Category	Codes	Themes
Continued on next page...		
Final Choice	<ul style="list-style-type: none"> <li>- Choosing based on colour symbolism (red as bad, blue as good)</li> <li>- Perception of red as danger and blue as safer</li> </ul>	Colour Association



	<ul style="list-style-type: none"> <li>- Bright colours associated with positive outcomes</li> <li>- Dark colours associated with negative outcomes</li> </ul>	
	<ul style="list-style-type: none"> <li>- Randomly choosing a syringe without specific thought</li> <li>- Lack of clear decision-making process</li> </ul>	Random Selection
	<ul style="list-style-type: none"> <li>- Choosing the first syringe seen or clicked</li> <li>- Immediate selection due to frustration</li> </ul>	First Choice
	<ul style="list-style-type: none"> <li>- Difficulty with the interactive button affecting choice</li> <li>- Choosing based on convenience due to button challenge</li> </ul>	Interactive Button Challenge

*Table 2.6 Final Choice Themes*

From the provided table, it is evident that the decision-making process was influenced by four key factors. These factors included linking a specific colour to a particular outcome, such as red representing death and blue representing life; making a random choice without prior significance; selecting the syringe that was interacted with first; or opting for convenience due to the interactive button bug.



*Figure 2.7 Data Distribution of “Final Choice”*

The data from the pie chart reveals that participant choices at the end of the game were almost evenly split between the two options: 60% of participants chose the blue syringe, while 40% chose the red syringe. This outcome suggests a relatively balanced distribution of choices, indicating that participants were not heavily biased toward one syringe option over

the other. In the context of the project, this data underscores the effectiveness of presenting players with a genuine decision-making scenario, where neither choice dominates in terms of selection. This aligns with the research objective of understanding how players interact with and interpret narrative choices in the game, fostering a sense of agency and immersion within the gameplay experience.

Participants had different reasons for making the choice they did, with some using colour symbolism as an association, some choosing it due to a supposed hint in an earlier clue, or someone making a choice out of a whim. As an illustration, Participant 9 connected the colour red with danger and consequently opted for the blue syringe:

*"I chose the blue one. It's because red somewhat indicates danger. So, I thought I should go with the blue one."*

Participant 9 [Interview Transcript]

Participant 4 selected the red syringe, prompted by a reference to it in a clue encountered earlier in the game:

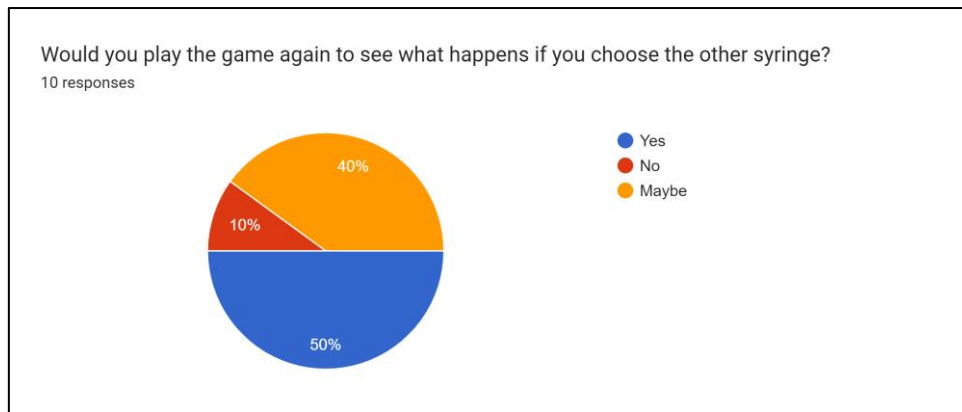
*"I chose the red because when I played the game, I don't know what it said, but I remember it had a test. It had to tell me some information about red. I remember that so I chose red."*

Participant 4 [Interview Transcript]

Interestingly, Participant 7 opted for the initial syringe they encountered, attributing this choice to their frustration at that point in the gameplay:

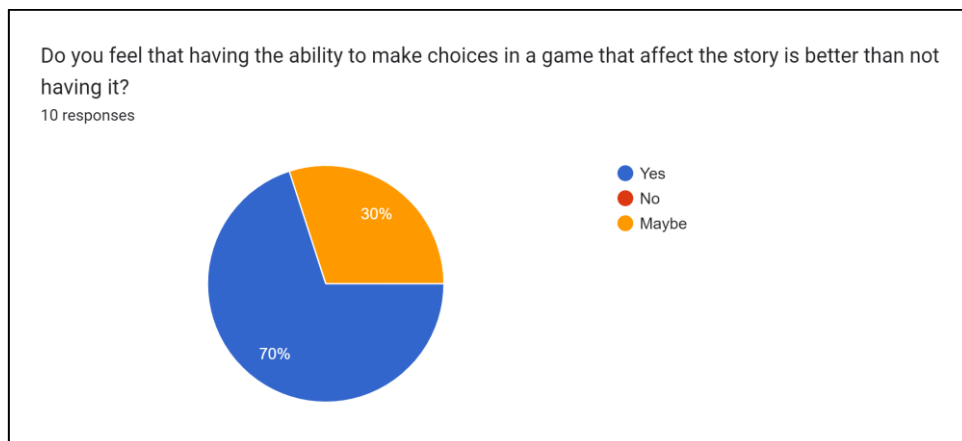
*"I picked the red syringe because it was the first one that I saw. Immediately I opened it because I had been frustrated for so long. The first thing I just saw, I just picked."*

Participant 7 [Interview Transcript]



*Figure 2.8 Data Distribution of "Gameplay Retention"*

The data presented in the pie chart shows that a considerable portion of the participants, 50%, express a clear intention to replay the game in order to explore the alternate outcomes resulting from choosing the other syringe. Furthermore, 40% of the participants are open to the possibility of replaying the game, while only 10% indicate that they wouldn't consider replaying. This data underscores the game's potential for replayability and the participants' curiosity to explore different narrative paths.



*Figure 2.9 Data Distribution of "Gameplay Choice"*

The data from the pie chart indicates that a significant majority of participants, 70%, believe that having the ability to make choices in a game that impact the story is preferable compared to not having that option. Additionally, 30% of participants express uncertainty about their preference, while none of them voted against the idea. This data suggests a strong inclination among players for interactive storytelling elements that grant them the agency to shape the narrative according to their choices.

### 2.3.5 General Feedback

As I approached the conclusion of the questionnaire, I included a segment to gather feedback from participants regarding potential improvements or additions to the game. This input was particularly crucial as I intended to showcase this game as a refined addition to my portfolio. While I could have maintained the feedback responses separately, I chose to enhance the coherence by summarizing them through thematic analysis, similar to my previous data handling approach. I compiled and organized recurring codes from the feedback, categorizing them under relevant themes. This systematic process provided me with a clear and distinct view of areas requiring improvement. With this in mind, I've presented the corresponding findings in the table below:

Category	Codes	Themes
Continued on next page...		
Feedback	<ul style="list-style-type: none"> <li>- Suggestion to add more surprise and fear elements</li> <li>- Introduction of time limits for added tension</li> </ul>	Surprise and Time Limit Elements
	<ul style="list-style-type: none"> <li>- Lack of hints in certain areas increasing suspense but causing frustration</li> <li>- Balancing suspense and frustration</li> <li>- Difficulty in spotting interactive elements and keys</li> </ul>	Hints and Frustration

	<ul style="list-style-type: none"> <li>- Bugs causing interaction glitches (e.g., "E" randomly appearing)</li> <li>- Issues with opening documents using the "E" key</li> </ul>	Bug-Related Issues
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Table 2.7 Feedback Themes

Although the gameplay experience was generally seamless, a couple of persistent bugs remained within the game due to specific limitations such as time constraints and a lack of expertise in that domain, as previously discussed in the PDEDE module. These two notable problems, namely the interactive prompt and the interaction key, could potentially have affected the participants' gameplay experience.

Participant 9 recalls a moment when they couldn't pick up the key because the interactive UI didn't appear:

*"When I was not able to pick up the key specifically, I tried to pick up the key, but it did not show up on the screen. And yeah, that was the time."*

Participant 9 [Interview Transcript]

Similarly, Participant 3 encountered the interaction key issue:

*"Well, I mean, that little bug where the interactions don't tell you properly."*

Participant 3 [Interview Transcript]

The results indicate that there is a need for further refinement of the artifact to enhance its presentation as a portfolio piece. However, in terms of its testing purpose, the artifact effectively fulfilled its role, as all participants were able to complete the game and contribute valuable data for the research.

## 2.4 Research Study Contributions

To assess the impact of enhanced agency and interactivity on the player experience within a 3D horror game environment through the lens of environmental storytelling, an analysis was conducted on the qualitative and quantitative data gathered from the 10 participants. This comprehensive examination resulted in the identification of 29 distinct themes, which not only aligned with the research objectives but also offered valuable insights and avenues for further exploration within this domain. Furthermore, it addressed the research inquiry, which focused on whether game designers can generate equivalent player experiences in 3D horror games by incorporating greater agency and interactivity through environmental storytelling.

The initial data category pertained to "story interpretation", which constituted a significant portion of the study. This segment delved into the extent to which players could discern both explicit and implicit narratives within a 3D horror environment, relying solely on the environmental cues. This category generated nine distinct themes, a consequence of the participants' varying interpretations that shared commonalities while also exhibiting subtle differences.

Notably, most participants could piece together fragments of the predetermined narrative and synthesize their own interpretations that closely paralleled the established storyline. Intriguingly, despite differences in individual gameplay experiences, each participant demonstrated the capacity to comprehend the unfolding events in the game. They accomplished this by deducing the atmosphere of the environment through audio and lighting cues, comprehending the setting through NPC behaviours and level design, and uncovering the underlying narrative through interactive elements and observational hints. These combined insights ultimately influenced their final choices, which in turn impacted the game's outcome.

The themes and codes distilled from the dataset underscore the successful interpretation of diverse story elements by the participants within the game environment. This alignment with the research objectives underscores the efficacy of the game's narrative and environmental storytelling strategies, successfully conveying intended story interpretations and immersing players in a meaningful manner.

The subsequent data category, named "gameplay experience," included three subcategories: "player experience," "engagement," and "emotional response." These subcategories collectively aimed to capture the participants' perception of the overall gameplay experience, particularly in the context of enhanced agency and interactivity. This segment yielded a total of 14 distinct codes, reflecting a variety of responses from participants.

In contrast to the conventional expectation that experienced gamers would navigate the game efficiently while novices might struggle, the observations portrayed a different pattern. It became evident that experienced players exhibited a high level of comfort with the game controls, enabling them to smoothly progress through the game and solve puzzles with ease. On the other hand, novice players, while taking more time to adapt to the gameplay and controls, demonstrated a notable proficiency in delving into the game's narrative and interpreting it in greater detail.

This observation implies that both categories of players can manifest unique variations in their gameplay experiences. Experienced gamers, who are more accustomed to the gaming environment, tend to engage themselves more vigorously in gameplay activities. This ties in with the objective of providing experienced players with increased agency and opportunities for exploration within the horror game environment. On the other hand, novice gamers may adopt a more deliberate and cautious approach to gameplay. However, with the incorporation of appropriate storytelling elements, they too can effectively decode and engage with the narrative.

The last category, referred to as the "final choice," involved participants selecting a syringe that would ultimately dictate the outcome of the game's ending. This category yielded four distinct themes. Notably, the data gathered for this segment revealed a nearly equal distribution of choices among the participants. While the motivating factors behind each participant's choice varied, the inclusion of this decision-making element, where players had the agency to influence the game's conclusion, contributed significantly to the overall gaming experience.

Furthermore, it was observed that this feature enhanced the replayability of the game. Many participants expressed a willingness to replay the game to witness alternate endings, driven by the curiosity of exploring different narrative outcomes based on their choices. This finding underscores the positive impact of providing players with the autonomy to shape the game's conclusion, fostering a sense of agency and engagement that extends beyond a single playthrough.

#### 2.4.1 Refined Framework

Based on the above discussion, its apparent which elements contributed positively to storytelling and player experience, as well as areas that require enhancement.

Consequently, I've devised the following framework for prospective game designers interested in crafting horror games that grant players greater agency through environmental storytelling while maintaining the desired player experience, in contrast to conventional horror game design.

This framework provides guidance on how to balance player agency with effective environmental storytelling to achieve a unique horror gaming experience.

Category	Strategy	Rationale
Environmental Storytelling	1) Maintaining a clear differentiation between various environmental cues, with an emphasis on subtlety while ensuring their visibility, particularly since horror elements often dwell in darkness.	1) In a horror game, environmental cues play a crucial role in creating tension and fear. By maintaining a distinction between different types of cues, designers ensure that players can effectively interpret these cues to make decisions. Subtlety is important as it adds to the suspense, but these cues should also stand out enough for players to notice



		<p>them. This approach enhances the player's ability to engage with the environment and interpret the story effectively.</p>
	<p>2) Providing specific elements like interactive clues and textual prompts with the functionality to be revisited multiple times instead of being a one-time prompt.</p>	<p>2) Allowing interactive elements, like clues and text prompts, to be revisited multiple times serves two purposes. Firstly, it accommodates players who may have missed these elements during their initial exploration, ensuring that they don't miss critical parts of the story. Secondly, it caters to players who prefer a more thorough and immersive experience. They can revisit these elements at their own pace, contributing to a deeper understanding of the narrative.</p>
	<p>3) Allowing environments to dynamically evolve in response to player interactions and choices, fostering a sense of player</p>	<p>3) By enabling the game environment to evolve based on player interactions and choices, designers enhance player agency and</p>

	agency in shaping the narrative progression.	immersion. This dynamic aspect of the game world makes players feel responsible for the unfolding narrative. It also increases replayability, as players may want to explore different choices and their consequences.
Level Design	<p>1) The level can be structured in a linear fashion, divided into separate enclosures within the environment. Each portion becomes playable once players have explored and collected the necessary items or unlockable, granting access to the next area.</p> <p>2) The eerie, shadowy areas within a horror environment can serve a dual purpose. They can be hotspots for jump scares while also housing vital collectibles essential for gameplay</p>	<p>1) Horror games often rely on tension and suspense, which can be amplified by segmenting the level. This approach allows for controlled pacing, ensuring that players don't rush through the experience. By unlocking new areas based on player progress, designers can create a sense of achievement and anticipation, enhancing the overall immersion.</p> <p>2) Darkness is a classic element of horror, as it heightens fear by limiting visibility. By strategically placing jump scares and important items in these dark spaces, designers can</p>

	<p>progression. This design ensures that players thoroughly explore and memorize every part of the map.</p>	<p>encourage players to confront their fears and explore thoroughly. This also ensures that players engage with all aspects of the game environment, preventing them from missing critical elements of the narrative.</p>
	<p>3) When it comes to set dressing and prop placement, the emphasis should be on purpose and narrative cohesion. Every element should contribute meaningfully to the overarching story rather than adding excessive distractions. Striking this balance is crucial for maintaining the immersive horror experience.</p>	<p>3) In a horror game, every detail should contribute to the overall atmosphere and story. Purposeful set dressing ensures that the environment feels coherent and immersive. It also prevents unnecessary distractions, allowing players to focus on the narrative and their surroundings. This balance is essential for maintaining tension and player engagement throughout the game.</p>

*Table 2.8 Framework*

## 2.5 Summary

In this section, I explored the research study process, scrutinized the results analysis, and assessed the contributions of the study, considering the following elements:

- **Validation Process:** Covered topics such as the pilot study and its outcomes, participant recruitment, the study's methodology, data collection, and data analysis.
- **Results Examination:** Focused on aspects like data immersion and conducted thematic analysis concerning story interpretation, gameplay experience, decision-making, and general feedback.
- **Research Study Impact:** Explored the overarching findings of the study and presented an enhanced framework for the design of 3D horror games.

### 3. Project Context

#### 3.1 Conclusion

In summary, this project embarked on a comprehensive investigation into the fusion of heightened agency and interactivity within the framework of environmental storytelling in 3D horror games. This yielded specific insights from the results during the creation of the artefact and the subsequent study.

The project's objectives generated the following findings:

- Players demonstrated a remarkable ability to decipher the narrative elements present in the game environment when presented with the environmental cues and opportunities for independent exploration and interaction. Importantly, this held true regardless of their prior gaming experience.
- Additionally, despite variations in game completion times among participants, each player successfully reached the game's conclusion without encountering any major obstacles. This observation underscores the game's user-friendly design, adaptive controls, and seamless progression.
- Finally, when it came to player experience, the analysis encompassed emotional responses, retention rates, and immersion levels. Emotional reactions were diverse, particularly concerning fear. However, the presence of a choice mechanism within the game contributed to higher retention rates. Furthermore, immersion levels were assessed, with most participants demonstrating a deep engagement with the game's narrative, indicative of their heightened focus during gameplay.
- Drawing upon the results and data obtained, a comprehensive framework was crafted to provide guidance for enhancing environmental storytelling and level design in the realm of 3D horror games. This framework is intended to serve as a valuable resource for future designers aspiring to create compelling experiences within the realm of 3D horror gaming.

In conclusion, this project has illuminated the potential of enhanced agency and interactivity in the context of environmental storytelling for 3D horror games. These insights collectively contribute to a richer understanding of this innovative approach to game design.

### 3.1.1 Future Work

The provided table outlines potential directions for future research aimed at achieving a more comprehensive grasp of environmental storytelling within 3D horror games. This exploration includes investigating how increased player agency influences story interpretation and subsequently impacts the gaming experience. To achieve this, further investigation could involve expanded user testing with a larger participant pool, the incorporation of diverse environment versions, and the utilization of monitoring tools to assess and quantify player emotions.

Area of Work	Context and Complexity
<b>Expanding Audience Scope</b> Utilising a larger and diverse participant pool to enhance data validity	This approach will provide a more comprehensive understanding of player experiences across various demographics, enriching the findings and interpretations.
<b>Incorporating Physiological Measures</b> Incorporate physiological measurements such as heart rate monitors to assess participants' emotional responses more objectively.	This could provide designers with a deeper understanding of how different aspects of the game trigger emotions in players, helping them to precisely identify when and how each emotion is evoked.
Continued on next page...	
<b>Enhancing Environmental Storytelling</b> Create a dynamic environment that responds to player input and AI, adapting based on choices and decisions made.	This advancement could lead to a more immersive and personalized player experience, aligning with the evolving expectations of modern interactive storytelling, and could test player agency better.
<b>Comparative Analysis of Storytelling Formats</b> Conduct tests on multiple versions of the same environment, one with interactive elements and the other resembling a	This comparative study will enable a deeper exploration of how different storytelling formats impact player engagement and interpretation, contributing to a broader narrative understanding.

cinematic experience with dialogues and fixed narrative.	
<b>Long-term Player Experience Study</b> Engage participants over an extended period to explore how the game's narrative resonates and evolves with repeated playthroughs.	This longitudinal study could uncover insights into the long-term impact of environmental storytelling on player interpretation and could potentially test retention practically.

*Table 3.1 Future Work*

Overall, this study has generated a variety of potential avenues for subsequent exploration and continuous investigation into the realms of environmental storytelling in horror games and the influence of heightened player agency on the gaming experience. Key avenues for future endeavours include conducting more extensive and extended testing phases encompassing a wider demographic audience, creating distinct environment versions that convey the narrative through diverse environmental storytelling techniques, employing methods to quantitatively assess player emotional responses at specific moments of the game, and using AI advancements to elevate storytelling in horror games, aligning with evolving industry trends.

## 3.2 Reflective Evaluation

### 3.2.1 Self-Reflection

This project was divided into 3 modules which encompassed 3 stages of the project process.

**PCODE:** This module encompassed the initial stages of contextualization and project planning. It involved a detailed exploration and examination of the research question, which revolved around the impact of environmental storytelling techniques on story interpretation in 3D horror games, particularly when combined with enhanced agency, and how this influence cascaded throughout the overall player experience.

Furthermore, during this phase, a preliminary prototype was created to serve as a foundational demonstration of the core functionalities that the final artifact would possess. This initial stage laid the fundamental groundwork for the entire project, especially considering the broad scope of the research problem at its inception. Engaging in discussions surrounding the concepts of agency and environmental storytelling within the contemporary gaming landscape allowed for the gradual refinement of the research focus, a process that was notably advanced at the outset of the subsequent module.

**PDEDE:** During this module, the emphasis transitioned towards the design and development of the artifact, accompanied by justification of each developmental phase. Building upon the foundational work of testing the artifact's core functionalities during the PCODE module, I proceeded to create the entire artifact, ensuring it aligned seamlessly with the project's requirements and objectives for subsequent testing.

Simultaneously, a pilot study was executed to not only identify any existing bugs and minor glitches within the artifact but also to check the efficacy of the study procedures. As anticipated, the study uncovered several issues within the artifact, thus setting the stage for a thorough iteration process in the next module.



**PEVRE:** The final module encompassed the refinement of the artifact, participant recruitment, the execution of the study, the comprehensive collection of data, in-depth data analysis, a rigorous thematic analysis, and the generation of results aimed at addressing the project's initial research objectives. This phase was not without its challenges, particularly in terms of participant recruitment and data acquisition. Nonetheless, it significantly contributed to my learning experience, providing invaluable insights into these processes and equipping me with knowledge on how to navigate such issues in future.

Furthermore, as a culmination of the study, I formulated a framework tailored for aspiring game designers. This framework serves as a guiding tool for the design of 3D horror games, encapsulating the key elements discussed throughout the project. Additionally, I outlined several avenues for potential future work, highlighting areas where further research and development could yield valuable insights and advancements in the field.

In summary, the project conducted across these modules has significantly advanced my skills in adhering to a structured methodology for project completion, offering valuable insights into the processes of research practice. Moreover, it has sharpened my critical thinking capabilities and fostered an appreciation for the iterative process, emphasizing the importance of feedback and continual improvement, both within the academic realm and the professional landscape.

### 3.2.2 Learning Plan

Throughout the PCODE and PDEDE modules, I formulated and examined learning plans encompassing a blend of both soft and hard skills tailored to my project and personal growth. As the PEVRE module unfolded, my attention leaned more towards the project due to time limitations. I formulated a consolidated learning plan to include all aspects and draw lessons from any past mistakes.

As depicted below, I segmented the module into three distinctive stages, outlining my actions, the designated timeline, and how they contributed to both my personal and professional development.

Phase	Activities	Timeline	Implications
Continued on next page...			

Preparatory Phase	<ul style="list-style-type: none"> <li>- Apply feedback from the previous module to implement improvements in the artefact.</li> <li>- Execute a pilot study on the finalized artefact.</li> <li>- Write Section 1 of the report.</li> <li>- Distribute the Google forms to potential participants and proceed with recruiting the chosen individuals.</li> </ul>	June	<ul style="list-style-type: none"> <li>- Learnt the importance of continuous and consistent iterative development and how feedback continues to be a catalyst for improvement.</li> <li>- Further strengthened problem solving skills as it gave me valuable insight and the challenge of conducting a full fletched study beforehand.</li> <li>- Was able to test out my skill of effective communication and coordination and research which included participant recruitment, selection and organisation.</li> </ul>
Testing Phase	<ul style="list-style-type: none"> <li>- Perform testing of the artefact.</li> <li>- Gather and organize all collected data for the analysis phase.</li> <li>- Initiate the writing of Section 2.</li> </ul>	July	<ul style="list-style-type: none"> <li>- Learnt the entire process of real-time testing and honed my attention to detail and troubleshooting skills in the process.</li> <li>- Gained understanding of data management, storage, accessibility and organisation.</li> </ul>
Continued on next page...			

Writing Phase	<ul style="list-style-type: none"> <li>- Analyse the qualitative and quantitative data, along with interview transcripts and gameplay recordings.</li> <li>- Execute thematic analysis.</li> <li>- Finish writing Sections 2 and 3 of the report.</li> <li>- Conclude the project.</li> </ul>	August	<ul style="list-style-type: none"> <li>- Developed my skill on data management and attention to detail by summarizing and compiling the data.</li> <li>- Enhanced research skills by identify themes, subtexts and codes in my dataset, which in turn fine-tuned interpretation skill.</li> <li>- Came up with an effective framework and solution that addresses my research question.</li> <li>- Enhanced design and execution skill by compiling my report according to the appropriate academic standard</li> </ul>
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*Table 3.2 Learning Plan*

Throughout the learning plan, I ensured that each phase was closely aligned with my research goals of investigating the impact of enhanced agency and interactivity on narrative interpretation in a 3D horror game. During the preparatory phase, I focused on completing my artefact, initiating the writing process, and distributing forms to potential participants. However, I encountered challenges related to participant recruitment, with slow and limited responses necessitating personal outreach efforts. This situation could have been mitigated if I had distributed the forms during the preceding module while the term was ongoing. This proactive approach would have enabled me to secure participants in advance and subsequently engage them effectively when the study commenced.

In the testing phase, my attention transitioned towards engaging participants to evaluate the artifact, gathering and organizing collected data, and maintaining progress in the report writing. A significant challenge in this phase was ensuring participants' availability for the study and effectively managing schedules. To address this issue, I provided participants with the freedom to choose their preferred time slots, adapting my schedule accordingly. Reflecting on this, the challenge might have been averted by providing participants with

incentives to encourage proactive participation, potentially enhancing their motivation to take part in the study.

In the final phase, encompassing the writing process, I engaged in data analysis, conducted thematic analysis, and brought the report to a conclusion. During this stage, time emerged as an obstacle due to personal and professional commitments. Balancing these commitments, while striving to ensure a comprehensive report that aligns with the significance of my master's endeavour, posed a challenge. Maintaining the consistent quality, I had upheld throughout the year became crucial. Overcoming this challenge involved implementing continuous feedback and putting in effort to produce a robust report. In retrospect, the constraint could have been mitigated if I had distributed my writing efforts more evenly from the outset, rather than postponing it until the final stages due to procrastination, something which I strive to reduce as time passes.

By closely adhering to this learning plan and adapting it where necessary, I demonstrated a thorough understanding of the issues that can impact a project's progress and outcomes, ensuring the project was effectively executed and its objectives were achieved.

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## 5. Appendices

### Appendix A – Game Testing Form

Personal Information
<p>Name *</p> <p>Your answer _____</p>
<p>Age *</p> <p>Your answer _____</p>
<p>Email *</p> <p>Your answer _____</p>
<p>Faculty/Department *</p> <p>Your answer _____</p>
<p>Course *</p> <p>Your answer _____</p>
<p>Type of Study *</p> <p><input type="radio"/> Undergraduate</p> <p><input type="radio"/> Postgraduate</p> <p><input type="radio"/> PhD</p> <p><input type="radio"/> Other: _____</p>



### General Video Gaming Experience

Have you played video games before? \*

☐ Yes

☐ No

If yes, which ones are your favourite?

Your answer

Would you consider yourself an expert, intermediate, or beginner gamer? \*

☐ Beginner

☐ Intermediate

☐ Expert

What is your preferred genre/s of video games (e.g. action, adventure RPG, etc.)? \*

Your answer

How long have you been playing video games? \*

Your answer

How do you usually play video games (e.g. console PC, mobile, handheld)? \*

☐ Console

☐ PC

☐ Mobile

☐ Handheld

☐ Other:

How often do you play video games? \*

Your answer

How knowledgeable are you about video game terminology and technology (e.g. frame rate, sandbox, modding, esports etc.)? \*

1 2 3 4 5

Not at all knowledgeable

☐

☐

☐

☐

☐

Very knowledgeable

### Horror Video Game Experience

Have you played horror video games before? \*

☐ Yes

☐ No

If yes, provide the names of some horror games you have played.

Your answer

What aspects of horror games do you find appealing? (Atmosphere, Story, Jump scares, Puzzles, Exploration, etc.) \*

Your answer

On a scale of 1 to 5, how interested are you in playing horror games? \*

1      2      3      4      5

Not interested at all   ☐   ☐   ☐   ☐   ☐   Very interested

Would you be interested in participating in a 30-40 min. research study involving playing a 3D horror video game, answering a questionnaire and giving an interview? \*

☐ Yes

☐ No

## Appendix B – Participant Information Sheet


Participant Information Sheet

QuestionsResponsesSettings

Participant Information Sheet

Form description

Image title

UNIVERSITY OF PORTSMOUTH

Title of Project

INTEGRATING ENVIRONMENTAL STORYTELLING TECHNIQUES TO ENHANCE PLAYER EXPERIENCE IN 3D HORROR VIDEOGAMES

Name and Contact Details of Researcher

Vikalp Gaur - up2070012@myport.ac.uk

Name and Contact Details of Supervisor

Matthew Higgins - matthew.higgins@port.ac.uk

1. Invitation

I would like to invite you to take part in my research study. Joining the study is entirely up to you, before you decide I/we would like you to understand why the research is being done and what it would involve for you. I will go through this information sheet with you, to help you decide whether you would like to take part and answer any questions you may have. I would suggest this should take about 5 minutes. Please feel free to talk to others about the study if you wish. Do ask if anything is unclear. As a researcher, I would like to introduce myself and my role in this study. My name is Vikalp Gaur, and I am a student/researcher pursuing Masters in Computer Games Technologies at the University of Portsmouth. The purpose of my study is to test out my artefact, and I will be conducting this study as part of my coursework/thesis, under the supervision of Matthew Higgins.

2. Study Summary

This study is concerned with environmental storytelling in 3D horror video games which is important to investigate the effects of increased agency and interactivity on the overall player experience. I am seeking participants who should be between the age of 18-34 and a current student at the University of Portsmouth. Participation in the research would require you to attend it in a lab and take approximately 30-45 minutes of your time.

3. What is the purpose of the study?

The main purpose of my study is to gain insights into the effectiveness of environmental storytelling techniques in 3D horror video games. This study is conducted as part of my academic project to obtain my Master's degree. The techniques used in this study involve observing participants play the game and interpreting the story of the game space solely through the environmental storytelling techniques. The techniques used in the game space will provide the participants with enhanced agency and interactivity, which will allow me to determine if these elements still evoke fear, immersion, and retention in the players. To carry out the study, I will be recruiting 15-20 participants who have an interest in horror video games. The participants will be asked to complete a pre-game questionnaire to test their knowledge of video games in general. They will then play the game, and their way of playing and interpreting the story of the game space will be collected. After the game, participants will be asked to take part in a semi-structured interview to provide in-depth feedback on their gameplay experience. The participation in the study will take approximately 1 hour and will be conducted in a controlled environment. The study will take place in a comfortable and quiet location that is convenient for the participants to travel to such as a lab. The results of the study will be collected, analyzed and summarized to provide a framework for game designers to use better environmental storytelling techniques in 3D horror games to increase player experience.

4. Why have I been invited?

You have been invited to participate in this study because you have been identified as a potential participant who fits the criteria I am looking for.

5. Do I have to take part?

No, taking part in this research is entirely voluntary. It is up to you to decide if you want to volunteer for the study. I will describe the study in this information sheet. If you agree to take part, I will then ask you to sign the attached consent form, dated 12-05-23, version number, 1.0.

6. What will happen to me if I take part?

If you choose to take part in this study, you will be asked to complete a pre-game questionnaire to test your knowledge of videogames in general, followed by a gameplay session of approximately 15 minutes where you will play a 3D horror video game and interpret the story through the environmental storytelling techniques implemented in the game space. After the gameplay session, you will participate in a post-game, semi-structured interview that will take approximately 10 minutes to collect in-depth feedback of your gameplay experience. Once that is done, your role in the study will conclude and you can leave then.

7. Expenses and payments

I regret to inform you that I am unable to offer any payment or reimbursement for your participation in this study. Your participation is entirely voluntary, and I appreciate any time and effort you are willing to contribute to our research.

8. Anything else I will have to do?

You will be asked to follow the instructions given during the pre-game questionnaire and gameplay session. Additionally, you will be asked to avoid discussing the gameplay experience with others until the study has been completed. There are no other specific restrictions that you will need to follow.

Tr

Tr

Tr

Tr

Tr

Tr

#### 9. What data will be collected and / or measurements taken?

In this study, data will be collected through gameplay recordings and post-game semi-structured interviews. The gameplay recordings will be used to analyze participants' way of playing and interpreting the story of the game space through the environmental storytelling techniques implanted in the game. The post-game semi-structured interviews will collect in-depth feedback from the participants regarding their gameplay experience. No specialized equipment or sensors will be used in this study. The data collected will not be emotionally distressing or intrusive in any way. There are no safety implications associated with this study. The study procedures are not likely to reveal any incidental findings that might have significance for the health or wellbeing of the participant. If any such situation arises, the participant will be informed, and appropriate steps will be taken to ensure their safety and wellbeing.

#### 10. What are the possible disadvantages, burdens and risks of taking part?

As this study does not involve any risks or negative outcomes, there are no disadvantages, burdens or risks associated with participating. Therefore, participants do not need to worry about any potential emotional distress, accidental disclosure of personal information, pain or discomfort, or any other negative outcomes. There are also no safety procedures, medical screenings, or first-aid provisions needed for this study. Participants can rest assured that their participation will not have any adverse effects on their health or wellbeing.

#### 11. What are the possible advantages or benefits of taking part?

As there are no direct benefits to the participant for taking part in this study, it is important to note that you will not receive any personal benefits or compensation for your participation. However, society may benefit from the results of this research by gaining a better understanding of the topic being studied. Your participation will contribute to the advancement of knowledge in this field, and potentially lead to improvements in related services or policies.

#### 12. Will my data be kept confidential?

Yes, your data will be kept confidential. We will take appropriate measures to ensure that your personal information is kept secure and confidential, in accordance with data protection laws. All data collected during the study will be kept strictly confidential and will only be accessible to the research team. Any published results will not include any information that could identify you. Your name and any identifying information will be kept separate from any data collected during the study and will be stored securely.

#### Untitled title

"Anonymous data, which does not identify you, will be publicly shared at the end of the project and made open access. A CC-BY license will be applied to this publicly shared data. This will allow anyone else (including researchers, businesses, governments, charities, and the general public) to use the anonymized data for any purpose that they wish, providing they credit the University and research team as the original creators. No restrictions will be placed on this shared anonymized data limiting its reuse to only non-commercial ventures."

"The raw data, which would identify you, will not be passed to anyone outside the study team without your express written permission. The exception to this will be any regulatory authority which has the legal right to access the data for the purposes of conducting an audit or enquiry, in exceptional cases. These agencies treat your personal data in confidence."

"The raw data will be retained for a minimum of 10 years. When it is no longer required, the data will be disposed of securely (e.g. electronic media and paper records / images) destroyed."

#### Title

The Creative and Cultural Industries School of the University of Portsmouth wishes to process your personal data (that is, collect, use, store and destroy data that identifies you) as part of the Environmental Storytelling project. If you have any queries about this, please contact my supervisor or if you have any general queries about how your data will be processed, please contact the University's Data Protection Officer, Samantha Hill, using any of the following contact details:

Samantha Hill, 023 9284 3642 or [information-matters@port.ac.uk](mailto:information-matters@port.ac.uk)  
University House, Winston Churchill Avenue, Portsmouth, Hampshire, PO1 2UR UK

We ask for your consent to process the data we ask for in the study, so that we can conduct the research as described in the participant information sheet.

Your personal data will be held securely on an encrypted and secure drive. Although you have the right to request a copy of the personal data we hold about you, to restrict the use of your personal data, to be forgotten, to data portability, and to withdraw your consent for the use of your data, it is possible that we may not be able to fully comply with those rights where your data has been used for the research and / or has been anonymized. For more information on your rights in general, please see the information on the following link:

<https://www.port.ac.uk/about-us/structure-and-governance/legal/data-protection-and-gdpr/requesting-your-data>

You also have the right to lodge a complaint about the use of your personal data to initially the University (email [information-matters@port.ac.uk](mailto:information-matters@port.ac.uk)) and then, if you are unhappy with our response, to the Information Commissioner's Office (ICO) – for more information please see <https://ico.org.uk/your-data-matters/raising-concerns/>.

#### 13. What will happen if I don't want to carry on with the study?

As a volunteer you can stop any participation of playing or interview at any time or withdraw from the study at any time before the day of experiment, without giving a reason if you do not wish to. If you do withdraw from a study after some data have been collected, you will be asked if you are content for the data collected thus far to be retained and included in the study. If you prefer, the data collected can be destroyed and not included in the study. Once the research has been completed, and the data analyzed, it will not be possible for you to withdraw your data from the study.

#### 14. What if there is a problem?

If you have a query, concern or complaint about any aspect of this study, in the first instance you should contact the researcher(s) if appropriate. If the researcher is a student, there will also be an academic member of staff listed as the supervisor whom you can contact. If there is a complaint and there is a supervisor listed, please contact the Supervisor with details of the complaint.

If your concern or complaint is not resolved by the researcher or their supervisor, you should contact the Head of Department:

The Head of Department xxx xxx  
Department / School of ..., 023 9284 xxxxx  
University of Portsmouth xxxxx.xxx@port.ac.uk  
xxxx xxxxx  
Portsmouth PO1 XXX  
If the complaint remains unresolved, please contact:  
The University Complaints Officer 023 9284 3642 [complaintsadvise@port.ac.uk](mailto:complaintsadvise@port.ac.uk)

#### 15. Who is funding the research?

This research is not being funded by an entity and is part of my Master's project.


## Appendix C – Consent Form

### Consent Form

up2070012@myport.ac.uk [Switch accounts](#)

Not shared

\* indicates required question



UNIVERSITY OF  
PORTSMOUTH

**Title of Project**  
INTEGRATING ENVIRONMENTAL STORYTELLING TECHNIQUES TO ENHANCE PLAYER  
EXPERIENCE IN 3D HORROR VIDEOGAMES

**Name and Contact Details of Researcher**  
Vikalp Gaur - up2070012@myport.ac.uk

**Name and Contact Details of Supervisor**  
Matthew Higgins - matthew.higgins@port.ac.uk

**University Data Protection Officer**  
  
Samantha Hill, 023 9284 3642 or information-matters@port.ac.uk

I confirm that I have read and understood the information sheet for the above  
study. I have had the opportunity to consider the information, ask questions and  
have had these answered satisfactorily. \*

☐ Yes  
☐ No

I understand that my participation is voluntary and that I am free to withdraw at  
any time without giving any reason. \*

☐ Yes  
☐ No

I understand that data collected during this study will be processed in  
accordance with data protection law as explained in the Participant Information  
Sheet. \*

☐ Yes  
☐ No

I agree to take part in the above study. \*

☐ Yes  
☐ No

**Name of Participant \***

Your answer

**Date \***

Date  
dd-mm-yyyy

**Name of Researcher \***

Your answer

**Date \***

Date  
dd-mm-yyyy

**Signature \***

Your answer

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## Consent Form

up2070012@port.ac.uk [Switch accounts](#)  
🔒 Not shared

\* Indicates required question

### Procedures Entailing Some Risk to the Person or Privacy of the Participant

I consent for photographs/video of me to be taken during the experiment for use \*  
in scientific presentations and publications (with my identity obscured).

- ☐ Yes  
☐ No

I consent for photographs/video of me to be taken during the experiment for use \*  
by the study team only (my image will not be shown to others / and will be  
destroyed after the data has been analyzed).

- ☐ Yes  
☐ No

I consent for my interview to be audio / video recorded. The recording will be \*  
transcribed and analyzed for the purposes of the research.

- ☐ Yes  
☐ No

I consent to verbatim quotes being used in publications; I will not be named but I \*  
understand that there is a risk that I could be identified.

- ☐ Yes  
☐ No

I understand that participation will not include any particularly demanding, \*  
painful, invasive or potentially embarrassing procedures.

- ☐ Yes  
☐ No

### Wider Use of Data, Tissue, DNA

Data will also be made available to other researchers as part of our open data policy.

I agree to the data I contribute being retained for any future research that has \*  
been given a favorable opinion by a Research Ethics Committee.

- ☐ Yes  
☐ No

I understand that the information collected about me will be used to support \*  
other research in the future and may be shared anonymously with other  
researchers.

- ☐ Yes  
☐ No

I understand that to maximize the re-use and societal benefit of this research, \*  
anonymous data (which does not identify me) will be publicly shared at the end  
of the project and made open access under a CC-BY license. I understand that  
this means anyone else (including researchers, businesses, governments,  
charities, and the public) will be allowed to use this anonymized data for any  
purpose that they wish (including commercial purposes), providing that they  
credit the University and research team as the original creators.

- ☐ Yes  
☐ No

### Limitations to Confidentiality

I understand that whatever I say in the interview is confidential unless I tell the \*  
researcher that I or someone else is in immediate danger of serious harm, or the  
researcher sees or is told about something that is likely to cause serious harm.  
If that happens, the researcher will raise this with me during the interview and  
tell me about what could happen if I continue to talk about it and explore how I  
would prefer to deal with the situation. The researcher will encourage me to  
seek support from to help me make the situation safer. If the researcher feels  
unsafe that I will go and get support, they will talk to me about what they need to  
do and what might happen next. In an extreme case where a child is at serious  
risk, and I choose not to seek help/advice the researcher has a duty to disclose  
this to the relevant agencies.

- ☐ Yes  
☐ No

I understand that should I disclose any concerns regarding my own, or others' \*  
professional practice during the interview, the researcher might be duty bound  
to refer the matter to relevant agencies.

- ☐ Yes  
☐ No

I understand that should I disclose possible criminal offences that have not been \*  
investigated or prosecuted, during the interview, the researcher may report the  
matter(s) to relevant agencies.

- ☐ Yes  
☐ No

I agree to be named as a participant and referred to accordingly. \*

- ☐ Yes  
☐ No

### Incidental Findings

I understand that the tests / investigations are designed for the purposes of the \*  
research, and I will not receive any personal results relating to my health or well-  
being.

- ☐ Yes  
☐ No

I understand that the tests / investigations are designed for the purposes of the \*  
research but in the event of the results indicating any concerns about my health  
or well-being, I agree to this information being passed on to the NHS.

- ☐ Yes  
☐ No

### Signature \*

Your answer

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## Appendix D – Game Experience Questionnaire

Game Experience Questionnaire

up2070012@myport.ac.uk [Switch accounts](#)

Not shared

\* Indicates required question

Participant Information

Name \*

Your answer

Age \*

Your answer

Email \*

Your answer

Faculty/Department \*

Your answer

Course \*

Your answer

Type of Study \*

☐ Undergraduate

☐ Postgraduate

☐ PhD

☐ Other:

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## Game Experience Questionnaire

up2070012@myport.ac.uk [Switch accounts](#)

Not shared

\* Indicates required question

### Gameplay Experience

How well do you remember the key events or moments from the game? \*

12345

Hardly remember anything

Remember everything vividly

Did the game's story or events leave a lasting impression on you? \*

 Yes

No

Somewhat

How engaged were you in the game while playing? \*

12345

Not at all

Fully engaged

Were there any difficulties in the game or any parts that seemed frustrating? \*

Your answer

On a scale of 1 to 5, how scared or anxious did you feel during certain moments in the game? \*

12345

Not scared at all

Extremely scared

Were there any specific moments or elements in the game that frightened you? \*

Your answer

How well do you think the game created a sense of fear or suspense? \*

12345

Not well at all

Very well

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## Game Experience Questionnaire

up2070012@myport.ac.uk

Switch accounts

Not shared

\* Indicates required question

### Making the Choice

Which syringe did you choose at the end of the game? \*

☐

 Red

☐

 Blue

Why did you make this choice? Was there a specific reason behind it (e.g. emotional response, cultural association, symbolic meaning etc.)? \*

Your answer

Would you play the game again to see what happens if you choose the other syringe? \*

☐

 Yes

☐

 No

☐

 Maybe

☐

 Yes

☐

 No

☐

 Maybe

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## Appendix E – Interview Transcript

Attached separately.