Best Practices: Enhancing Narrative Communication Through Environmental Shifts

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Best Practices:
Enhancing Narrative Communication Through Environmental Shifts

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Abstract
The purpose of this research is to integrate traditional storytelling methods with environmental shifts to test the effectiveness in enhancing player immersion and narrative communication. The researcher created a custom single-player level in Fallout 4, which tasks players with investigating a case and finding out the truth of the quest’s narrative with the help of environmental shifts. The researcher collected data on the effectiveness of their researched, environmental shift best practices by observing testers’ playtests and their subsequent understanding of the story.

Keywords
Environmental Shift, Video Game, First Person Shooter (FPS), Fallout 4, Narrative, Level Design, Environmental Storytelling, Immersion, Narrative Communication, Criminal Profiling, Surrealism

1 INTRODUCTION
Storytelling, by way of the environment, is an extremely powerful form of narrative communication that is widely used as a significant impactful narrative tool. Designers often use this type of storytelling in video games, as it can effectively communicate contextual information to the player purely based on how the environment is constructed.

However, in video games, environmental storytelling has a few shortcomings. First, environmental storytelling elements are often fragmented, which can confuse players if they fail to correctly connect the fragments to construct a complete story. Furthermore, because those fragments are blended into the environment, the player may miss the pieces altogether while progressing through the game. Lastly, while environmental storytelling is better at telling static stories, it is less effective in conveying something that is constantly changing, or shifting in the environment, or when there is some deep layered context that is difficult to understand through a fixed scene.

The researcher explored various methods to enhance environmental storytelling by using “shifts.” Environmental shifts are 1.) when the player transitions between different environments or 2.) when a component of the environment changes, such as the setting. The researcher aimed to use these environmental shifts to help direct the player, facilitate connections between fragments, and add variation to scenes to maintain exploration interest and narrative depth. The researcher also utilized shifting scenes to reflect plot and emotional development.

2 TERMS DEFINED & THEORIES/RESEARCH
2.1 Storytelling [1]
As indicated by the National Storytelling Network (NSN), storytelling is an art form characterized by the dynamic interaction between the narrator and the audience [1]. It leverages both language and physical expression to craft and convey stories. This practice is inherently collaborative, with the audience's engagement directly influencing the storytelling process through verbal and non-verbal feedback. The essence of storytelling lies in its ability to construct narratives that stimulate the listener's imagination, inviting them to co-create the narrative's reality. This unique, participatory experience distinguishes storytelling as a deeply personal and imaginative process [1].

In conclusion, as highlighted by the NSN, storytelling should achieve the following goals [1]:
1. Storytelling is interactive.
2. Storytelling tells a story.
3. Storytelling stimulates the active imagination of its audience.

2.2 Environmental Storytelling
While there are numerous storytelling mediums through which designers can directly communicate information, such as text, images, dialogues, and audio, environmental
storytelling is distinguished by its unique and situational approach.

Bart Stewart (game developer and blogger) views environmental storytelling as the art of cleverly arranging in-game objects to evoke stories upon observation (i.e., Figure 1 depicts a sad story conveyed through the arrangement of objects in the scene) [3]. Rather than directly depicting events, environmental storytelling shows the consequences of past events, prompting players to deduce the story from environmental cues [3]. Jon Richter (writer) expands on Stewart’s belief, that a game designer may use the environment to tell a story, by claiming that environmental storytelling does not rely on dialogue or extensive written explanations [2].

Environmental storytelling stands out as the most indirect and elusive, yet compelling communication method. It requires player cooperation and participation, building scenes and framing stories through clues and imagination.

2.3 Environmental Shifts

Environmental Shifts (ES) encompass all types of changes occurring within a game’s environment. In other words, it is when the environment shifts dynamically or statically into another phase or form, including alterations in the environment’s decor, lighting, objects, or the entire scene. These elements usually remain static, blended into the environment or invisible, and only start shifting or showing up when an ES occurs. Based on the specific manifestations of ES, they are categorized into Static Environmental Shifts (SES) and Dynamic Environmental Shifts (DES).

2.3.1 Static Environmental Shifts (SES)

Static Environmental Shifts refer to instantaneous or short-lived, one-time static changes, transitioning from one static scene/state to another. The focus of SES is more on the contrast before and after the change, rather than the process of change itself. Typically, these shifts are larger-scale changes, affecting rooms or spaces.

Examples include scene transitions, such as a player moving from location A to location B (or setting 1 to setting 2 as shown in Figure 2), or temporal shifts within the same room, signifying a change in time rather than space.

Smaller shifts might involve changes in room layout, decor, or the state of objects (changes in appearance or corporeality). These shifts can occur subtly or visibly in front of the player based on the designer’s goal for the particular storytelling moment.

2.3.2 Dynamic Environmental Shifts (DES)

Dynamic Environmental Shifts (DES) refer to highly visible environmental changes that occur over a period of time. DES primarily emphasize the process of change to attract player attention, highlight specific elements, or convey narrative significance. Unlike SES, DES typically involve smaller changes within a specific part of a static, unchanging environment.

The contrast between motion and stillness draws the player’s attention more effectively. Examples include a toy car that moves as the player nears (Figure 3), a light that pulses in a rhythmic pattern, or a ceiling that collapses. DES must occur visibly to the player, as their power lies in the observer viewing the shift itself.

To test the effectiveness of narrative communication with environmental shifts, the researcher employed several practices such as “Timing & Position,” “Anchor,” “Staged Scene,” and “Symbols & Symbolism.” These practices aim to make narrative pieces clearer to the player and thus help them understand the story.
2.4 Timing & Position

The timing of environmental shifts and when & where they occur are extremely important.

Analyzing the rhythm or frequency of environmental shifts in the game Return of the Obra Dinn reveals two key findings:

1. Environmental shifts, especially static ones, must occur in a proper frequency. Too many environmental shifts may potentially overwhelm the player. They need time to explore and comprehend each shift. Return of the Obra Dinn achieves this balanced rhythm by not overusing environmental shifts, allowing ample time for player investigation after each shift.

2. For DES, concentration at a specific point or area is crucial to clarify what is happening without overwhelming players. Multiple dynamic shifts occurring simultaneously in different locations may be distracting and hinder the player’s ability to focus, controverting the shifts’ purpose. As a result, maintaining a concentrated focus during dynamic shifts, as consistently practiced in Return of the Obra Dinn, is crucial for helping players identify key points effectively.

2.5 Anchor

For larger-scale SES, like scene transitions or extensive object changes, providing an “anchor” is essential. An anchor is an item or object in the environment that remains the same, or at the very least, can be easily recognized and identified before and after a shift. Anchors may take the form of a game object, such as a previously introduced item or asset. Ideally, anchors afford, or hint at, their intended purpose as an anchor. As a result, when multiple items within the environment or the whole scene change, the steady “anchors” help players understand that a shift is about to occur.
2.6 Staged Scenes

In general, staging a scene is “the placement and movement of objects in the frame, as well as the camera in relation to a person’s performance blocking” [5]. In other words, staging a scene involves carefully arranging both the elements in the scene and the camera’s position to visually tell a story, ensuring the audience’s attention is directed in a meaningful way.

Figure 7: Outlast 1 - A staged scene formed by the meaningful placement of props and the character [16]

This concept can also be applied to the realm of games. When characters and the camera are strategically positioned, and other elements of the scene are purposefully and meaningfully placed, they collectively create a “staged scene.” Key components of staged scenes include [6]:

1. **Props**: Props are objects which provide additional information about the story’s time and place, and sometimes about the characters involved.
2. **Location**: The background location of a staged scene offers context about the era or time, setting expectations for the social behaviors of characters.
3. **Setting**: Refers to the specific venue of an action, often revealing the emotional tone of the story and the inner states of characters, influencing the overall mood.
4. **Lighting**: Lighting is effective in reflecting tone/mood, with bright light representing intense emotional tones and dim light representing more subdued atmospheres. High-contrast lighting patterns are also commonly used to highlight specific parts of the scene.
5. **Color**: Color is a powerful tool for rendering symbolic and emotional significance, setting the tone, establishing character traits, or implying connections.

2.7 Symbols & Symbolism [19]

Symbols in environmental storytelling can be anything – a phrase, a piece of music, an image, or an object. Initially, they hold only limited and shallow meanings according to their appearance. However, once linked with certain elements, they acquire special significance related to those elements and evoke an emotional response. For instance, a magnifying glass symbolizes “search” and “exploration.”

Symbolism, on the other hand, is the “use of symbols to signify ideas and qualities by giving them symbolic meanings different from their literal sense [19].” In other words, symbolism involves several symbols participating in a series of activities and together symbolize deeper meanings.

Figure 8: IT - The red balloon that often comes with the terrifying clown symbolizes "fear" [17]

Most symbols are vague and abstract, especially those not established through common knowledge. Therefore, educating and reinforcing their meanings to players is essential for effective communication. For example, in the film *It*, the clown Pennywise often uses a red balloon in his attacks on children. As a result, this balloon becomes a symbol of tension and fear, even when the object is seen in isolation.

2.8 Best Practices

The researcher developed a series of best practices for creating seamless environmental shifts. These best practices, assumed to be effective, are utilized in the researcher’s artifact to enhance narrative communication in the level when using environmental shifts.

2.8.1 Timing & Position

The researcher found that timing and position matter greatly to a game’s success. The designer needs to provide sufficient time for the player to explore their surroundings. Additionally, it is necessary to ensure that the environmental shifts help players deduce what is happening in the space. The shifts should not mentally overwhelm players.

Since the designer must avoid confusion and work to guide the player, best practices for timing & position include:

- Larger-scale static environmental shifts should not occur too frequently.
• Dynamic environmental shifts should be concentrated at a specific point or area on the screen to make sure the player fully observes them.

2.8.2 Anchor
It is also crucial for the designer to provide methods or indicators (a.k.a. “Anchors”) to help players anticipate the next change, such as an upcoming larger-scale SES. After a shift, a familiar object serves as the player’s mental anchor. This anchor helps the player to avoid panic and serves as a starting point for new exploration.

The best practices regarding “Anchor” include:

• There must be an anchor for each larger-scale SES:
  o Before the shift: the anchor should indicate that a shift is about to occur. If the ES involves a time-travel mechanic, then the anchor is a “time portal.”
  o After the shift: the anchor should be recognizable to the player and imply information about the player’s surroundings. Additionally, this anchor should be a starting point for the player to explore the new scene.
  o For each anchor present before and after the environmental shift, the player should be presented with a clear view of the anchor.

2.8.3 Staged Scenes
Staged scenes are powerful tools that can be used in changing environments. With the proper rearrangement of the elements in a scene, staged scenes can bring strong narrative context to highlight a specific moment of the story, thus evoking a player’s emotions. On the other hand, the contrasting state before and after a staged scene can also convey different stages of the story.

To utilize staged scenes, the designer can put the player in front of the staged scene. This staging gives the player a sense of being an observer, allowing the player to collect further information removed from the scene. The designer can also put the player at the center of the staged scene to mimic/replace the original scene’s main character. Putting the player in the center allows the player to immerse themselves in the role of the main character – experiencing their story and emotions.

The best practices regarding “Staged Scenes” include:

• A designer can use staged scenes to create narrative beats by selling context for larger-scale shifts.
• When players discover or are put in a staged scene, they should be directly in front of or at the center of it.

2.8.4 Symbols & Symbolism
Symbols and symbolism allow for depth and freedom in conveying layered meanings/characteristics of an object, a character, or a moment. With the use of symbols and symbolism, the designer can offer clues and facilitate the player’s interactions. Through the use of clues, the designer can encourage the player to discover the connection between a symbol and its actual meaning or representation. The designer needs to reinforce the symbol’s meaning by showing the player the symbol multiple times.

The best practices regarding “Symbols & Symbolism” include:

• The designer needs to build connections between symbols and objects.
• Symbols and symbolism need to offer clues to players. In other words, they should be meaningful.
• Environmental shifts can be part of the level’s symbolism.

3 LEVEL DESIGN PROCESS/METHODOLOGY
3.1 Artifact Description
"The Still Diana" is a custom standalone level made in the single-player three-dimensional first person shooter (FPS) game, Fallout 4. Players assume the role of a detective, who must investigate the disappearance of children and faculty at a nearby school. To begin the quest, the player reads the case file and is subsequently teleported inside of the school in question. The player then carries out their investigation by exploring the environment and locating clues/evidence. The level focuses on the impact and enhancement of environmental shifts, including static and dynamic shifts, on environmental storytelling.

Players experience the development of the story through the shifts. The player collects storytelling pieces by profiling (mainly in the past), by encountering enemies (in the present), and by solving simple puzzles. In the end, the player compiles all the narrative pieces and uncovers the truth behind the mystery.

The level setting itself is surrealistic, as there are a lot of metaphorical elements and symbolic moments (i.e., teddy bears represent students in the school).

3.2 Overarching Narrative of Artifact
Following the advent of Synth technology, the businessperson, Dr. Wills, aimed to create the “perfect” Synths, leading to the establishment of Wills Synth Research Institute. Despite his best efforts, Wills was unable to create a Synth that could fully mimic human behavior. Subsequently, Wills decided to use human memory as a “perfect Synth’s” source of sentience. To further the research, Wills built a school above the Institute to house potential subjects. These individuals were unaware of their forced participation in the research, believing they were merely school students.

The experiment encountered problems, as “memory transferred” Synths retained unwanted memories. Diana, the young, orphaned heroine raised in this school, is unknowingly transferred to a Synth by the Research Institute. Diana accidentally regains her memories and, as a result, spearheads a revolt against Dr. Wills and the Institute. The revolution leads to the destruction of the
Institute and the end of the "perfect Synth" project, rendering the site deserted and eerie.

To enhance the narrative of the game using the discussed practices, the researcher implemented a time-travel exploration mechanic. Using this mechanic, the player can explore the school and Institute more deeply – visiting both the past and the deserted present.

### 3.3 Overall Use of Environmental Shifts – Implementation

#### 3.3.1 Static Environmental Shifts

To maintain consistent gameplay and pacing, the researcher utilized static environmental shifts (from one static environment to another instantaneously) for narrative purposes in specific segments:

- **Time-travel Mechanic**: The player collects information from the past to profile the quest's events. The player then gathers clues as to the reasons behind the school's transformation over time - forming a more comprehensive picture.

- **Show Story Development**: When the player returns to a previous scene at a later stage, those scenes may reveal changes that offer new content for exploration and help to validate the player's hypotheses about plot developments.

- **Rearranging Scenes for Staged Scenes**: Upon players obtaining new information and revisiting scenes, the new staged scenes provide fresh insights for interpretation.

#### 3.3.2 Dynamic Environmental Shifts

For certain narrative objectives, dynamic environmental shifts (visible changes that last for a moment) were employed to:

- **Attract Player Attention**: Movement captures an individual's attention through the sudden contrast between motion and stillness - something wasn’t changing/moving and now it is changing/moving. In video games, moving objects can capture a player's attention and guide them to the next point of interest.

- **Elicit Emotional Arousal**: At key moments, DES are used to create emotional climaxes, deeply engaging players and reflecting the emotional tone of the story.

- **Reflect Characters' Inner Emotional Changes**: Combining symbolism with DES allows players to experience the characters' emotional journeys. For example, jumping into a dark abyss symbolizes the character's ultimate despair or loss of soul.

### 3.4 Timing & Position – Implementation

![Figure 9: Puzzle and story-driven: each note for an event](image)

The appropriate pacing of shifts is vital for aiding player exploration and clarity. Thus, shifts are arranged as fixed phase transitions, with each shift presenting a new task or narrative fragment as shown in the image above (Figure 9). Players must collect enough information or content in each phase before transitioning. New tasks (solving puzzles, finding items, or defeating enemies) develop post-transition.

![Figure 10: Centred Toy Car for the Upcoming DES](image)

DES need to always be centered on the screen, ensuring that the player correctly focuses on the DES. For instance, after solving the “Prepare Gifts” puzzle, when the player turns around, they see a toy car appear at the center of the screen, framed by the surrounding structures to highlight the upcoming DES.

### 3.5 Anchor – Implementation

![Figure 11: Notes as portals and watches as indicators](image)

To create anchors for large-scale environmental shifts and prevent disorientation in new settings, the
researcher used objects that either hint at upcoming shifts or remain constant before and after the shift. For instance, in the game, due to players not controlling the time-travel mechanic, it was essential that the researcher signalled when a shift was about to occur. A note was used as a portal, while a pocket watch was placed before each shift as an anchor.

Moreover, keeping certain objects or environmental elements consistent before and after shifts allowed players to begin their investigation smoothly and to quickly form initial logical connections. This strategy involved 1) keeping some objects unchanged in a changed scene, and 2) keeping the environment itself consistent when many objects within this environment change. For example, while in the level’s dorm, the player shifts from the present to the past. The furniture setup changes, but the room's environment (wallpaper, structure, lighting) remains the same. This consistency provides a psychological anchor to mitigate panic and confusion by giving the player enough context (in this case, that they are in the dorm but at a different time).

3.6 Staged Scenes – Implementation

Aligned with the narrative curve and storytelling rhythm, staged scenes are set up at climatic points, richly composed of elements like props, characters, environment, background, and lighting. These scenes are designed to provide climactic moments and enhance the narrative, potentially evoking emotional responses.

Figure 12: Familiar environment as an anchor [9]

Moreover, keeping certain objects or environmental elements consistent before and after shifts allowed players to begin their investigation smoothly and to quickly form initial logical connections. This strategy involved 1) keeping some objects unchanged in a changed scene, and 2) keeping the environment itself consistent when many objects within this environment change. For example, while in the level’s dorm, the player shifts from the present to the past. The furniture setup changes, but the room's environment (wallpaper, structure, lighting) remains the same. This consistency provides a psychological anchor to mitigate panic and confusion by giving the player enough context (in this case, that they are in the dorm but at a different time).

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Figure 13: Implies the new student is popular among the original students [9]

For example, in the cafeteria scene, after the player watches a new student's introduction and prepares to talk to her, they find that teddy bears (symbols of different students), who were previously sitting on chairs, are now surrounding the player. This staged scene implies the new student’s popularity, the original students’ curiosity about this new student, and how she's surrounded by others for conversation and interaction.
In another example, as players enter the underground lab and pass through a corridor lined with observation rooms on the left, they notice that each room has a Synth living in it. The rooms, variably set up as bedrooms, kitchens, stages, art studios, toy rooms, and libraries, hint that Synths are being trained in specific disciplines and in different skills. This moment relies solely on environmental storytelling, or staged scenes in this case, to inform the player about the Synths’ hobbies and interests.

3.7 Symbols & Symbolism – Implementation

In “The Still Diana,” symbolism is extensively used. Teddy bears are the main symbolic entities. Each bear, distinguishable by unique attributes like glasses, hats, and various props, represents a specific character. The bears help to relay the actions of the quest’s characters, without the characters being physically present.

Additionally, the enemy Synths’ appearances evolve with the storyline. Initially, they are nondescript, damaged robots, which aligns with the desolate school setting. The Synths imply the passage of time. Since Diana’s rebellion, the Synths have been long since abandoned. As the plot unfolds, Synths take on more human-like forms. The more human-like Synths appear to be the students living in this school. This change not only corresponds with the current stage of the story but also reveals more about why these Synths are aggressively attacking, their true identities, and what happened to the people who previously lived here.
In the finale (Figures 19, 20, 21), Diana is starting to mentally break down because she realizes she is a Synth. Everything Diana has known is not real. The finale employs symbolism to show Diana’s mental journey from idyllic fantasy to shattered dreams, awakening, and eventual demise.

The teddy bears, facing away from the player, represent Diana’s longing for friends (Figure 19). The bears’ ever-decreasing numbers symbolize her fading memories. The impassable walls show that Diana cannot reach those memories.

The reappearance of a familiar classroom with warm lights and bears illustrates her ultimate desire (Figure 20). In contrast, the room’s transformation to an observation room signifies her reality as a Synth.

Finally (Figure 21), the falling skeleton and the player’s jump into a dark abyss, followed by a gradually blurring screen, symbolize the ultimate dissolution of her psyche and memories. This sequence of symbolism heightens the narrative and emotional climax, drawing the tragic story to a profound and memorable close.

### 4 RESULTS & DATA ANALYSIS

#### 4.1 Survey Process

The researcher recruited 20 participants to playtest the thesis artifact level. The playtesting sessions were held on the testers’ laptops. Once the playtesters finished playing the level, the researcher asked them to complete a post-playtest survey. The playtesting took about 40 – 70 minutes with the Qualtrics XM survey taking about 15 – 30 minutes. The survey contained 17 sections, including both qualitative and quantitative questions.

The goal of the survey was to gather the playtesters’ impressions of the experience and their overall interpretation of the narrative.
4.2 Results for Timing & Position

To test the efficacy of the best practices related to "Timing & Position," the survey assessed the overall frequency of environmental shifts and checked whether players noticed an upcoming DES was about to occur (Figure 23). When asked about the frequency of the environmental shifts in the level, 16 testers (80%) felt that the shifts were generally frequent. This result could theoretically be interpreted as a negative indicator of the ES timing in the level, suggesting a generally poor experience. However, upon examining the testers’ overall experience (see Section 4.6: Environmental Shifts – Overall Experience), the researcher received overwhelmingly positive feedback.

After further analysis and reflection, it appears that the problem stems from two main issues: 1.) "Timing" relates more to large-scale static ES, and the question itself is too broad and does not accurately reflect this specific type of ES, and 2.) the essence of "Timing" focuses on reducing feelings of being lost and confused. If the level contains many ES (both large-scale and small-scale), but the player can easily follow them, then the frequency alone may not accurately indicate the extent of player confusion.

Figure 22: “How infrequent or frequent did you find the environmental changes throughout the level to be?” Survey Results [18]

As mentioned in section 2.8.2, there are two ways an anchor can be used. The first way is to use physical anchor objects to help players anticipate the next step (in this case, a static time shift).

The researcher employed a note and a watch to serve as anchors in the level. The note acts as a portal, or a trigger, to start the next shift, with the watch nearby serving as the indicator of this time shift. The significance of the watch lies in differentiating the portal notes from other normal notes, which only provide narrative information. The playtesters were then asked what would happen after picking up the note.

Most of the playtesters understood that another time shift was about to occur. However, many playtesters did not recognize the watch as an indicator of a time shift. Upon analysis, the researcher believes that this issue stems from the fact that players teleport to another timeline immediately after reading the note, which did not leave them enough time to observe the environment before teleporting. This issue arose because notes were usually the primary objective in the level, prompting players to rush to check them first.

Some responses include [9]:
- “Leading me to the truth/danger.”
- “Getting older each time, my guess is time passing.”
- “Humanity leaving fully.”
- “Being just out-of-reach helped the player feel like they had an active role in uncovering the story.”

4.3 Results for Anchor

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Some responses include [9]:
- “I thought only the dean bear had the pocket watch.”
- “I noticed it, but I didn't understand what it meant.”
The second way of using "Anchors" is to use familiar objects or environments to help players confirm spatial information and reduce panic. The researcher tested whether players could easily recognize information about their surroundings by presenting images of the same space before and after a time travel event (Figure 25).

Only 15 playtesters (75%) recognized that it was the same location, but at different times. This percentage also applies to other time shift situations. According to explanations from the testers, the potential causes of this issue include:

1. The player had no opportunity to familiarize themselves with the space beforehand, which can be particularly challenging if it is the player’s first time visiting a new space before teleporting to a different time.
2. Large-scale static environmental shifts (SES) usually require a more unique structure as an identifier.
3. If too many objects within the environment change, the space becomes less familiar to the player.

Some responses include:
- “The lab was still visually very clean.”
- “I have not traversed through the lab that often, so I am less familiar.”
- “Combat space make me in a hurry.”

For “Staged Scene,” the researcher tested both the players’ understanding and the expressive efficiency of staged scenes. The researcher showed testers several images of the staged scenes and asked them to describe the depicted scenarios and their meanings. For example, the image (Figure 26) depicts a situation in which a character named Evelyn arrives at the school and other students are very interested in this newcomer. Most of the testers interpreted the scene correctly, and some of them even gained deep insights through speculation. This result indicates that players were actively participating in co-creating different realities.

Some responses include:
- “A newcomer is being introduced to the school, and everyone is crowding the new student.”
- “All the other turned children welcoming the next victim. Shows her capture.”
- “Diana still had her unique identity, rather than the other Synth-programmed children.”

The researcher presented testers with a series of images featuring teddy bears and asked them what each bear symbolized. For example, the image (Figure 27) shows a birthday party that Diana prepared for Evelyn. Most testers correctly identified the meaning of the scene, with 17 testers (85%) feeling very confident about their understanding. However, some playtesters had a problem identifying bears accurately. The potential reasons for this result lay in the fact that 1.) the teddy bears in the scene were generally too small for players to
quickly recognize, and 2.) the props that came with the teddy bears were not unique enough to leave a strong impression on the player.

Some responses include:

- “Evelyn and Diana celebrating birthday.”
- “Lily and Diana.”
- “Lily & Evelyn.”

![Figure 28: Survey Question: “What does this sequence symbolize?”](image)

Regarding symbolism, the researcher tested players’ understanding of symbolic moments by displaying a series of sequences with strong symbolic meanings. For example, the sequence in Figure 28 symbolizes the fading of Diana’s last vestiges of human consciousness and her mental journey from a beautiful illusion back to harsh reality. Most testers (18 testers, 90%) got the meaning of the scene correct.

Furthermore, because of the abstract and open-ended nature of symbolism, this sequence even sparked playtesters’ imaginations – but this still matches the goals of “Symbolism.” The playtesters interpreted the scene somewhat differently by providing extra details not expected by the researcher. Although not explicitly part of the level’s original narrative, these interpretations perfectly align with the purposes of symbolism – 1.) to stimulate player interaction and imagination, 2.) invite players to fill in the gaps of the story, and 3.) validate and refine their understanding based on the details provided in the level.

Some responses include:

- “Diana has been transformed into a Synth and is contained in a showroom.”
- “Snapping back to reality from a memory.”
- “All for the purpose of studying how we react, as well as teaching us lessons before we’re prepared to enter the real world.”
- “The whole school is The Truman Show.”

### 4.6 Environmental Shifts – Overall Experience

Subsequently, the researcher asked playtesters about their overall environmental shift experience to gauge the positive and negative impacts of these shifts on a player’s narrative comprehension.

![Figure 29: Survey Question: “How effective do you think the environmental changes were at enhancing storytelling?”](image)

Nineteen testers (95%) believed that environmental shifts were noticeably effective in enhancing the narrative experience.

However, one tester found the environmental changes to be ineffective. According to this tester’s explanation, the researcher found that they were not a fan of story-based games or levels. Consequently, the tester skipped most of the narrative parts of the level, leading to a failure to comprehend the story and resulting in biased responses.

![Figure 30: Survey Question: “How enjoyable did you find the exploration experience to be?”](image)

Eighteen testers (90%) agreed that the exploration experience with environmental shifts was noticeably enjoyable.

The same single tester (5%), who has an issue with narrative games, predictably found that the experience was not enjoyable at all.

![Figure 31: Survey Question: “How often did you feel lost in the level?”](image)
Only 3 testers (15%) argued that they often found themselves lost in the level.

Nine testers (45%) felt sometimes lost in the level, which is acceptable since the level intentionally includes moments designed to confuse the player.

However, these results also highlight the need for designers to provide timely confirmatory details after sections with intentional confusion. These details help players resolve their confusion without letting the confusion persist throughout the entire level, which could be counterproductive.

5 CONCLUSIONS

Based on the testers’ results and explanations, the researcher conducted a thorough analysis and formulated reasons for the outcomes. From this analysis, several conclusions were generated regarding the use of environmental shifts to aid narrative communication in levels:

1. Environmental shifts can help convey deeper meanings and create creative and memorable experiences in ways not achievable through other methods.
2. Integrating techniques such as symbolism and staged scenes can enhance ES’ effectiveness. However, emphasis should be placed on an ES’s frequency and clarity.
3. Symbols must be striking enough to immediately attract attention and leave a strong impression on players.
4. Accurately conveying the mood of events significantly aids in the player’s comprehension of the story, even when details are not perfectly understood (i.e., the names of the characters were interpreted wrongly, but the mood and what happened were conveyed correctly).
5. Embracing the open-ended essence of implicit storytelling can engage the player’s imagination, as long as the player grasps the core narrative.

In future studies, the researcher recommends that individuals investigating “time-space warping”, “changing environments and layouts”, or “dynamic level design” consider the following points:

1. If the artifact is narrative-focused and requires extensive text reading, players who are not fans of narrative may find it difficult to engage with the level.
2. In Fallout 4 Creation Kit, duplicating levels can create optimization issues throughout development, especially if the levels are large.
3. Including differing gameplay experiences between shifts is beneficial (helps to add interest and variety), but do not sacrifice quality for quantity. For example, if the combat sequence is poorly executed—such as having a low frame rate—it could backfire and negatively impact the overall player experience.

6 REFERENCES

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