



Assessing the Impact of Symbols, Light, Colour, and Sound on Player Navigation and Comprehension in Dead by Daylight: An Empirical Study

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Abstract

In the evolving landscape of digital game design, incorporating non-verbal cues such as symbols, light, colour, and sound plays a pivotal role in enhancing player navigation and comprehension. This study delves into the efficacy of these elements through an empirical investigation involving a cohort of 30 participants aged 20 to 25 who engaged in gameplay within the immersive environment of Dead by Daylight, followed by a structured evaluation via an assessment form and subsequent interviews categorized by gaming frequency. Aiming to dissect the effectiveness of various non-verbal cues in directing players and providing intuitive gameplay hints, the research mainly focused on those participants unfamiliar with Dead by Daylight. The findings illuminate a significant correlation between the use of symbols, lights, colours, and sounds and proficient navigation and hinting capabilities, with light and colour demonstrating notable effectiveness in guiding and enhancing player comprehension, respectively. Approximately 43% of participants showcased improved navigational skills attributed to these cues, with 40% reporting heightened satisfaction levels—favouring non-verbal cues over traditional textual prompts for their intuitive appeal and engagement potential. These outcomes suggest a profound impact of non-verbal communication modes on player experience, particularly in games with intricately dark environments like Dead by Daylight. This highlights the critical importance of such elements in game design to foster enhanced engagement and intuitive player interaction.

Keywords: *Game Symbols, Game Lighting, Game Colour, Game Sound, Player Guidance, Game Design*

1. Introduction

In game design, the aesthetic dimensions of a game extend far beyond their visual allure, serving crucial functional roles in facilitating player orientation and decision-making. This complexity is especially pronounced in environments where players frequently encounter ambiguity, necessitating the deployment of various guidance mechanisms to aid in navigation and comprehension. The fundamental importance of such mechanisms is highlighted in the context of game and level design, which play instrumental roles in enhancing player experiences by reducing moments of confusion and improving decision-making capabilities within the game.

Mr. Parker Hamilton compellingly addressed the utility and effectiveness of environmental composition as a navigational aid, Lead System Designer and developer of "Ghost of Tsushima" during his presentation at the Game Developers Conference on October 11, 2022. Titled "Exploration in 'Ghost of Tsushima': Letting the Island Guide You," Hamilton's discussion detailed the strategic removal of environmental elements—such as trees—to improve visibility towards objectives like enemy camps, thereby facilitating player engagement through strategic planning and exploration. Such design choices augment discoverability and encourage players to delve deeper into the game environment, unveiling elements previously shrouded in obscurity.

Motivated by Hamilton's insights and the broader discourse on guidance in gaming, this research aims to rigorously examine the impact of symbols, light, and colour alongside sound to direct and hint at players within the gameplay context. Our focal case study, the multiplayer horror game "Dead by Daylight,"

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is particularly noted for its adept use of these elements in weaving an immersive narrative that guides players through its intricacies. This study contributes significantly to the ongoing dialogue on optimal game design practices by analysing how these guidance elements influence player behaviour and understanding. Specifically, it seeks to offer actionable strategies for future game developers to bolster player engagement and immersion, addressing the initial problem of player disorientation and the critical need for effective in-game guidance mechanisms. Through this exploration, we aspire to uncover how game guidance elements resolve player confusion and enhance the gaming experience by enabling more informed and strategic decision-making.

2. Objectives

- 1) Evaluate symbols, light, colour, and sound in guiding player navigation and comprehension in *Dead by Daylight*.
- 2) Analyse the effectiveness of these elements on the player direction and hints using data from 30 participants aged 20 to 25.
- 3) Determine proficiency in navigation and hinting using symbols, light, colour, and sound, focusing on the impact of light and colours.
- 4) Advance academic knowledge by elucidating the impact of symbols, light, colour, and sound on navigation in *Dead by Daylight*, using data from 30 participants aged 20 to 25 to highlight the specific effects of light and colours.

3. Related Concepts and Theories

During this research endeavour, a meticulous examination of the scholarly literature on diverse principles and theories pertinent to utilising light, colour, and sound symbols within the gaming realm was undertaken. This extensive review served as the cornerstone of our investigative framework, delineating the parameters within which our study operates.

3.1 The Role of Lighting in Gameplay Immersion and Navigation

The theory surrounding light utilisation within gaming environments is multifaceted and pivotal to gameplay immersion. Lighting is a cornerstone in establishing atmospheric tones across various game genres, notably in horror and mystery games aimed at evoking suspense and tension within players. Darkened areas within game spaces are strategically employed to heighten player apprehension, encouraging imaginative engagement and emotional immersion (Prall, 2012). Conversely, in stealth-based games, lighting is instrumental in fostering stealth mechanics, delineating areas of concealment through the interplay of light and shadow. Illuminated pathways or highlighted objects, such as torches, function as navigational cues, directing players towards pivotal areas or objectives (Foundry, 2020).

Scholars such as Marples et al. (2020) assert that adequate lighting inherently facilitates human navigation instincts, offering guidance through illuminated pathways. Psychologist Yannick Joye further emphasises the allure of well-lit environments in attracting exploratory behaviour and directing player attention (Joye, 2007, p. 312). Within video games, strategic lighting placement conveys information about the game environment and steers player progression along intended pathways. Nisbet (2016) underscores the significance of visual cues in navigation, particularly among players accustomed to this guidance mode.

Moreover, the interplay of light and shadow contributes to narrative depth within games, enabling developers to craft intricate environments and accentuate critical elements. By manipulating lighting contrasts, developers can evoke mysterious atmospheres and pique player curiosity, enhancing overall gameplay immersion and engagement. Thus, using light as a navigational and narrative tool in video games underscores its indispensable role in shaping player experiences and facilitating gameplay progression.

3.2 Impact of Colour Dynamics on Player Emotions and Narrative Guidance

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Colour profoundly influences the emotional ambience of a game, exerting its impact through subtle elements like particle VFX. Warm hues like red and orange evoke excitement and vigilance, while cooler tones like blue and white induce tranquillity. The interplay of these colours, rather than individual hues alone, elicits varied emotional responses in players (Cieślak, 2023). Furthermore, colours serve as potent narrative tools, allowing players to interpret their surroundings and experience emotions solely through visual cues. As Dickmark (2015) and Bevz (2023) noted, this visual guidance directs players towards objectives and delineates their next course of action.

3.3 The Role of Audio in Player Immersion and Engagement

Audio in video games significantly enhances player immersion and engagement by evoking emotions such as fear, happiness, and anxiety, as well as conveying crucial game-related information (Halbhuber et al., 2022). Players actively seek out sound sources, orienting themselves based on auditory cues to better navigate the game environment (Jäger & Hadjakos, 2017). Footsteps, for example, serve as vital indicators of the surrounding environment, providing players with valuable contextual information to inform their decisions and actions. This use of audio cues can either align with player expectations to facilitate navigation or intentionally challenge players by complicating their path (Jäger & Hadjakos, 2017).

Moreover, high-quality sound production enhances realism and enjoyment and confers a competitive advantage, particularly in multiplayer games like first-person shooters (AOC, 2021). In such games, accurately locating and responding to sound cues, whether from non-player characters or real opponents, is crucial for survival and success in gameplay. Therefore, the auditory component of gaming serves as a fundamental aspect of player experience, influencing the game environment's atmosphere and strategic dynamics.

3.4 Cognitive Benefits of Gaming Experience.

Individuals with gaming experience exhibit disparities in fundamental cognitive abilities compared to those without such experience. Notably, they demonstrate enhanced capabilities in tracking swiftly moving objects, detecting fleeting changes in visual stimuli, and exhibiting swifter decision-making when transitioning between tasks (Boot et al., 2008). Moreover, children engaging in video gaming for extended durations, precisely three hours or more per day, display accelerated and more accurate cognitive processing than their non-gaming counterparts. Researchers posit that these discernible patterns may stem from the cognitive skills honed during gameplay, particularly concentration and memory retention, influencing decision-making processes through repeated training in gaming environments (National Institutes of Health, 2022).

4. Analysis Framework

In this study, we rigorously computed the requisite sample size using a standard formula within inferential statistics to determine the precise number of participants needed to investigate the efficacy of various guiding elements in gameplay. Specifically, the formula $n = \frac{Z^2 \times p(1-p)}{e^2}$ was employed, where n denotes the sample size, Z the Z-score representing a 95% confidence interval (fixed at 1.96), p the estimated proportion of the attribute of interest in the population (conservatively assumed to be 0.5), and e the margin of error, which was calculated to be 0.179. The choice of a 0.5 proportion reflects the absence of preliminary data and maximizes the sample size to encompass a broad spectrum of variability. A sample size of 30 participants, aged 20 to 25, was determined to optimize the balance between statistical power and practicality for our analysis of navigational aids in the game "Dead by Daylight." Applying a post-test evaluation form as the research instrument ensures a focused collection of relevant data, enabling a comparative analysis to ascertain the relative effectiveness of symbols, light, colour, and sound as navigational tools. This



methodological approach guarantees the acquisition of robust data that is pivotal for extracting reliable conclusions regarding optimal player guidance mechanisms.

This investigation rigorously evaluates player satisfaction with the implementation of symbols, lights, colours. It sounds like a navigational tool in gaming environments, utilizing a mixed-methods research framework that combines quantitative and qualitative methodologies. After gameplay, the research employs a satisfaction survey to quantify participants' contentment with these sensory elements, statistically assessing their impact on user experience. Participants are categorized into two distinct cohorts based on their gaming experience: Group A, comprising frequent gamers who engage in gaming for a period ranging between 7 to 30 days per month, and Group B, encompassing occasional or non-gamers who game for less than seven days per month or not at all.

The research method is dual-pronged: quantitative data is gathered from the surveys, while qualitative insights are derived from structured interviews with two randomly selected participants from each group to ensure a diversity of gaming experience. This comprehensive approach measures the effectiveness of the sensory elements used and explores how these elements enhance the user experience within "Dead by Daylight". The study delves into the relationship between players' gaming backgrounds and their interpretive responses to in-game cues by capturing a broad spectrum of gaming proficiencies. The research thus offers a substantive contribution to the scholarly conversation regarding interactive design and player engagement, highlighting how sensory cues can be optimized to improve navigational aids and hint systems in gaming.

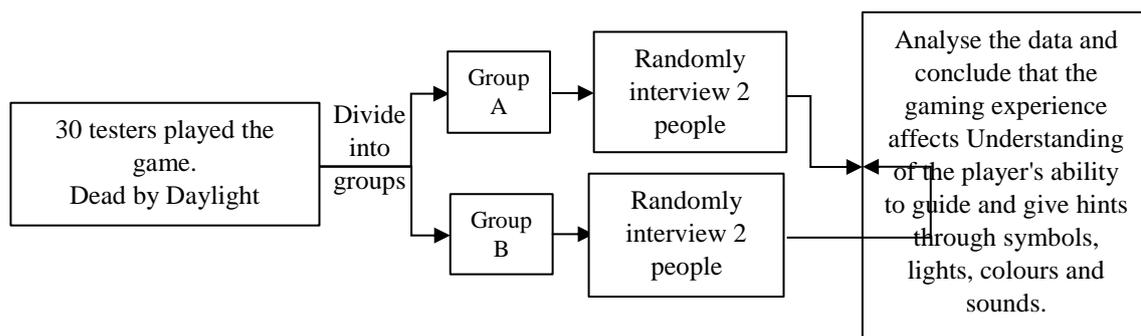


Figure 1: Research Framework

In essence, the research delineates a structured examination of player interaction with sensory guidance mechanisms—symbols, lights, colours, and sounds—within "Dead by Daylight" and their amplification of the user experience. The study systematically evaluates the application and perceptual efficacy of these elements, providing insight into their role in augmenting navigational ease and cognitive clarity for players. The research integrates quantitative feedback with qualitative narratives to ensure a comprehensive analysis of how sensory cues affect user engagement and satisfaction within "Dead by Daylight." the framework quantifies the effectiveness of sensory cues. It contextualizes their value in enhancing engagement and satisfaction.

5. Results and Discussion

After conducting tests with 30 participants unfamiliar with Dead by Daylight, the outcomes yielded valuable insights.

5.1 Effectiveness of Light in Guiding Players and Enhancing Gaming Experience

The assessment of light's efficacy in guiding and hinting to players yielded insightful findings. Among the test subjects, 43% perceived the light's performance as very good, with an additional 27% rating it as satisfactory. Moreover, 17% deemed it excellent, while 13% found its performance average.

Regarding the level of understanding facilitated by the light, 37% of participants demonstrated an excellent understanding of its role in providing hints or directions within the game. An additional 23% rated

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their understanding as satisfactory, while another 23% found it excellent. Only a minimal 3% perceived the light's guidance as inferior.

Using light for navigation and in-game hints significantly enhanced the gaming experience for participants. Notably, 40% reported a substantial increase in their experience, while 27% found it satisfactory. Furthermore, 20% rated their experience as excellent, with 10% indicating a moderate increase and 3% expressing a poor increase.

Considering the light's compatibility with the game's overall style, 40% of testers perceived it as a perfect match. 23% found the match satisfactory, while 17% considered it excellent. Similarly, 17% rated the match average, highlighting its alignment with the game's aesthetic and design principles.

Aspect Evaluated	Excellent (%)	Very Good (%)	Satisfactory (%)	Average (%)	Poor (%)
Perceived Performance of Light	17	43	27	13	0
Understanding of Light's Role Hints/Directions	23	37	23	13	3
Enhancement of Gaming Experience	20	40	27	10	3
Compatibility with Game's Style	20	40	23	17	0

Table 1: Effectiveness of Light in Guiding Players and Enhancing Gaming Experience

Upon examining the juxtaposition of responses from groups A and B, it is manifest that participants within Group A manifested a pronounced appreciation for the utility of illumination in augmenting their interactive experience, with a substantial quotient reporting its effectiveness as either commendable or exemplary. This cohort particularly extolled the illumination's proficiency in furnishing unambiguous navigation and augmenting the game's aesthetic appeal. In contrast, the discourse from Group B elucidated a more discerning comprehension, wherein specific individuals acknowledged the beneficial aspects of illumination for navigation yet delineated potential enhancements regarding luminosity and its synergistic effect with game constituents in dimly lit scenarios. This dichotomy accentuates the necessity for a calibrated approach in illumination design to cater to players' varied perceptions and experiences.



Figure 2: Using light to indicate the location of an objective in the game

5.2. Effectiveness of Colours in Guiding Players and Enhancing Gaming Experience

The efficacy of colours in guiding and providing hints to players was evaluated, revealing that 43% of testers perceived the performance of colours as very good, with 37% rating it as satisfactory. Additionally, 13% considered it excellent, while 7% found it average. Regarding player understanding, 47% reported satisfactory comprehension of colours as hints or directions, with 30% rating it very good. Moreover, 17% acknowledged an average level of understanding, while 7% recognised colours in the game as providing excellent hints or directions.

Furthermore, using colours for navigation or hints contributed to a more engaging gaming experience, as 47% of testers reported a terrific increase in a very good level of their gaming experience. Additionally, 27% found the experience satisfactory, while 20% deemed it excellent. However, 3% experienced an average increase, and 3% reported a poor enhancement in their gaming experience.

The compatibility of colours with the game's overall style was also assessed, with 37% of testers viewing colours as very good in alignment with the game's style. Similarly, 37% considered it excellent, while 17% found it satisfactory. Moreover, 10% rated its compatibility with the game's overall style average.

Aspect Evaluated	Excellent (%)	Very Good (%)	Satisfactory (%)	Average (%)	Poor (%)
Perceived Performance of Colour	13	43	37	7	0
Understanding of Colour's Role Hints/Directions	7	30	47	17	0
Enhancement of Gaming Experience	20	47	27	3	3
Compatibility with Game's Style	37	37	17	10	0

Table 2: Effectiveness of Colour in Guiding Players and Enhancing Gaming Experience



Within the discourse on chromatic utilization, participants from Group A predominantly lauded the role of hues in facilitating navigation and hinting, denoting a pivotal enhancement to their interactive escapade. They recognized chromatics' strategic deployment to captivate attention and demarcate disparate game elements. Conversely, the critique from Group B conveyed a scrutinized perspective on the dependency on chromatics for guidance, highlighting episodes where chromatic signals were either overly subtle or amalgamated into the backdrop, precipitating sporadic disorientation. This comparative analysis underscores the imperative of chromatic contrast and saturation in optimizing guidance and engagement for players.



Figure 3: Using light to indicate the location of an objective in the game

5.3 Effectiveness of Sound in Guiding Players and Enhancing Gaming Experience

The assessment of sound's efficacy in guiding and hinting to players revealed that 43% of testers perceived the performance as very good, 27% as satisfactory, 23% as excellent, and 7% as average. Concerning the creation of player understanding, 47% understood colours as hints or directions very well, 27% found them satisfactory, and 17% perceived average understanding. Moreover, 7% believed they comprehended the sounds excellent, with 3% reporting poor understanding.

Using sounds for navigation or hints significantly enhances the gaming experience, as reported by 37% of testers who found their experience excellent, 33% satisfactory, and 30% very good. Regarding compatibility with the game's overall style, 43% perceived lighting as very good, 30% as excellent, 20% as satisfactory, and 7% as average.

Aspect Evaluated	Excellent (%)	Very Good (%)	Satisfactory (%)	Average (%)	Poor (%)
Perceived Performance of Colour	23	43	27	7	0
Understanding of Colour's Role Hints/Directions	7	47	27	17	3



Enhancement of Gaming Experience	37	30	33	0	0
Compatibility with Game's Style	30	43	20	7	0

Table 3: Effectiveness of Sound in Guiding Players and Enhancing Gaming Experience

The analysis of auditory guidance's effectiveness revealed a pronounced dichotomy between the perceptions of groups A and B. Testimonials from Group A underscored a profound valuation of auditory cues, attributing them a substantial role in enriching immersion and dispensing unequivocal directional guidance. Their narratives were characterized by an enhanced spatial awareness engendered through sound. Contrastingly, Group B, albeit acknowledging the functionality of sound, articulated ambivalent sentiments concerning its consistency and the sporadic challenge of differentiating pertinent cues from the game's environmental acoustics. This disparity accentuates the nuanced challenge in auditory design: to mediate between realism and the exigencies of player accessibility and lucidity.

5.4 Satisfaction Levels with Symbolic Guidance in Gaming

The satisfaction level concerning using light symbols to guide players or provide hints was scrutinised. Findings revealed that 37% of testers expressed very good, while 30% deemed using light symbols for navigation excellent, 27% found it satisfactory, and 7% found it at the average level. Satisfaction with implementing coloured symbols for guiding or hinting to players was also assessed. Results indicated that 43% of participants were delighted and rated as very good, with 33% rating using colour symbols as excellent. Additionally, 17% reported satisfaction, and 7% found it average.

Furthermore, the satisfaction level associated with incorporating sound symbols for guiding or hinting to players was examined. Notably, 50% of testers expressed very good with using sound symbols, while 33% rated it as excellent. Additionally, 13% found audio cues satisfactory, and 3% deemed it average. Overall satisfaction with using colour, light, and sound symbols in the game was investigated. Results indicated that 40% of testers were very good, 37% found using symbols effective as excellent, 17% reported satisfaction, and 7% found it average.

Aspect Evaluated	Excellent (%)	Very Good (%)	Satisfactory (%)	Average (%)	Poor (%)
Satisfaction Levels with Light Symbolic Guidance in Gaming	30	37	27	7	0
Satisfaction Levels with Colour Symbolic Guidance in Gaming	33	43	17	7	0
Satisfaction Levels with Sound Symbolic Guidance in Gaming	33	50	13	3	0
Overall Satisfaction Levels with Light, Colour and Sound Symbolic Guidance in Gaming	37	40	17	7	0

Table 4: Effectiveness of Symbolics in Guiding Players and Enhancing Gaming Experience



The evaluation of satisfaction stemming from symbolic guidance in gaming disclosed a conspicuous divergence between the responses of groups A and B. Group A exhibited elevated satisfaction levels, with participants extolling the intuitive application of symbols for navigation and hinting. They valued the immediacy and perspicuity that symbols injected into the gaming experience. In juxtaposition, the feedback from Group B was more restrained, with individuals expressing contentment yet also delineating instances of befuddlement when symbols were either insufficiently explicated or bore an excessive resemblance to one another. This variance highlights the essential consideration for game designers to ensure symbol distinctiveness and clarity, guaranteeing that symbols are instantaneously recognizable and disparate across varied gaming scenarios.



Figure 4: Using lights, colours, and sounds to warn players of the killer's presence.

5.5 Participant Insights on the Effectiveness and Challenges of Symbol Utilization in Gaming

During interviews conducted to comprehend the utilisation of symbols, light, colour, and sound for player navigation and hinting in gaming, insights were gleaned from 4 representatives among the 30 participants. In Group A, Interviewee 1 emphasised the preference for these elements over UI text, citing their immediate comprehension without needing individual message reading, enhancing situational awareness and cognitive processing. Moreover, symbols' visual appeal and simplicity for hints and warnings were underscored. Interviewee 2 echoed this sentiment, highlighting the visual clarity and immersive quality facilitated by symbols, lights, colours, and sounds, enhancing gameplay coherence amidst multiple concurrent events.

Conversely, in Group B, Interviewee 1, despite limited gaming exposure, acknowledged the effectiveness of symbols in conveying game information, albeit with some instances requiring additional time for understanding. However, Interviewee 2 noted challenges in dark areas where certain symbols, colours, or bright lights may be indiscernible, resulting in comprehension delays.

5.6 Discussion



The research delves into the efficacy of symbols, light, colour, and sound in guiding and hinting to players within gaming environments. Findings indicate proficient navigation and hinting performance among participants, with light emerging as a potent guiding cue, particularly in dark gaming landscapes. This aligns with literature emphasising the role of light in creating atmosphere and directing player attention (Dickmark & Beviz). *Dead by Daylight* strategically employs lighting to delineate activity areas and missions, enhancing player orientation and immersion (Foundry, 2020).

Moreover, colours play a crucial role in facilitating player agility and comprehension. Participants readily discerned colour differences, aiding in a swift understanding of the surrounding environment (Marples et al., 2020). This aligns with research highlighting how bright areas attract attention and guide exploratory behaviour by Marples et al. (2020). The effective integration of distinctive colours assists players in perceiving and understanding game objectives effortlessly.

Similarly, audio cues effectively guide players, especially in games with dark environments. The research underscores players' propensity to locate sound sources and adjust their direction accordingly, contributing to decision-making processes (Halbhuber et al.; Jäger & Hadjakos). This highlights the significance of audio as a recognisable guiding symbol, enhancing player engagement and direction.

The high satisfaction levels observed among participants underscore the effectiveness of symbols, lights, colours, and sounds in guiding and hinting. This is consistent with research suggesting that experienced gamers exhibit enhanced cognitive abilities, including faster object tracking and decision-making (Boot et al.; NIDA). Furthermore, the immediate understanding of symbols by participants with prior gaming experience reinforces the practical applicability of these guiding mechanisms (Boot et al., 2008).

However, it is imperative to acknowledge the limitations of this study. The primary limitation arises from the research's reliance on a single game, *Dead by Daylight*, as the base case study, which may need to provide more variability to conclusively determine whether the guidance elements examined can universally enhance player experience across different gaming platforms. While the findings offer valuable insights into applying sensory cues as guidance mechanisms, their generalizability to other gaming environments remains constrained. Consequently, these findings serve as a foundational theory supporting the concept that guidance elements can enhance player experience. Nevertheless, their efficacy is most demonstrably proven in games with gameplay experiences similar to *Dead by Daylight*'s. Further research incorporating a broader spectrum of games is essential to validate the universal applicability of these guiding mechanisms.

5. Conclusion

In conclusion, this study elucidates the indispensable role played by symbols, light, colour, and sound in guiding and hinting to players within gaming environments. The observed proficiency in navigation and hinting performance among participants underscores the efficacy of these elements, significantly enhancing player engagement and comprehension. Player orientation improves by strategically incorporating lighting, colour differentiation, and audio cues, and the overall gaming experience becomes more immersive.

The high levels of satisfaction reported by participants further affirm the effectiveness of these guiding mechanisms, indicating their potential for broad application in game design. Future research endeavours should explore the intricate interplay between these guiding elements and player behaviour, advancing our comprehension of effective game design methodologies. Such endeavours contribute meaningfully to the ongoing discourse on optimising player engagement and immersion in gaming environments.

In terms of further research suggestions, it is proposed that future studies consider designing and developing games specifically for experimental purposes. These games should incorporate various elements in alignment with the research objectives. However, it is imperative to note that utilising a different type of game may yield more accurate results, as the specific characteristics of *Dead by Daylight* may have influenced the outcomes. Additionally, future investigations could focus on studying individual guiding elements in isolation, such as utilising light solely for player guidance and hints. This approach allows for a more precise examination of each element's effectiveness, avoiding potential confounding factors arising from their combined use.



Moreover, studies have demonstrated that colour usage significantly aids player guidance and hinting, presenting high compatibility with various game formats and contributing to heightened player experiences. Conversely, implementing sound presents a more complex challenge, necessitating consideration of both game type and desired player emotions. Certain games may not benefit from sound cues for navigation and hinting, potentially leading to player confusion. Therefore, future research on sound utilisation should carefully select game types conducive to leveraging sound for guidance and hinting purposes, ultimately enhancing player understanding and experience.

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