

HOW PLAYERS RECOGNIZE AND INTERPRET DIEGETIC VISUALIZATIONS – THE CASE OF FORTNITE’S SWARM VISUALIZATION

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INTRODUCTION

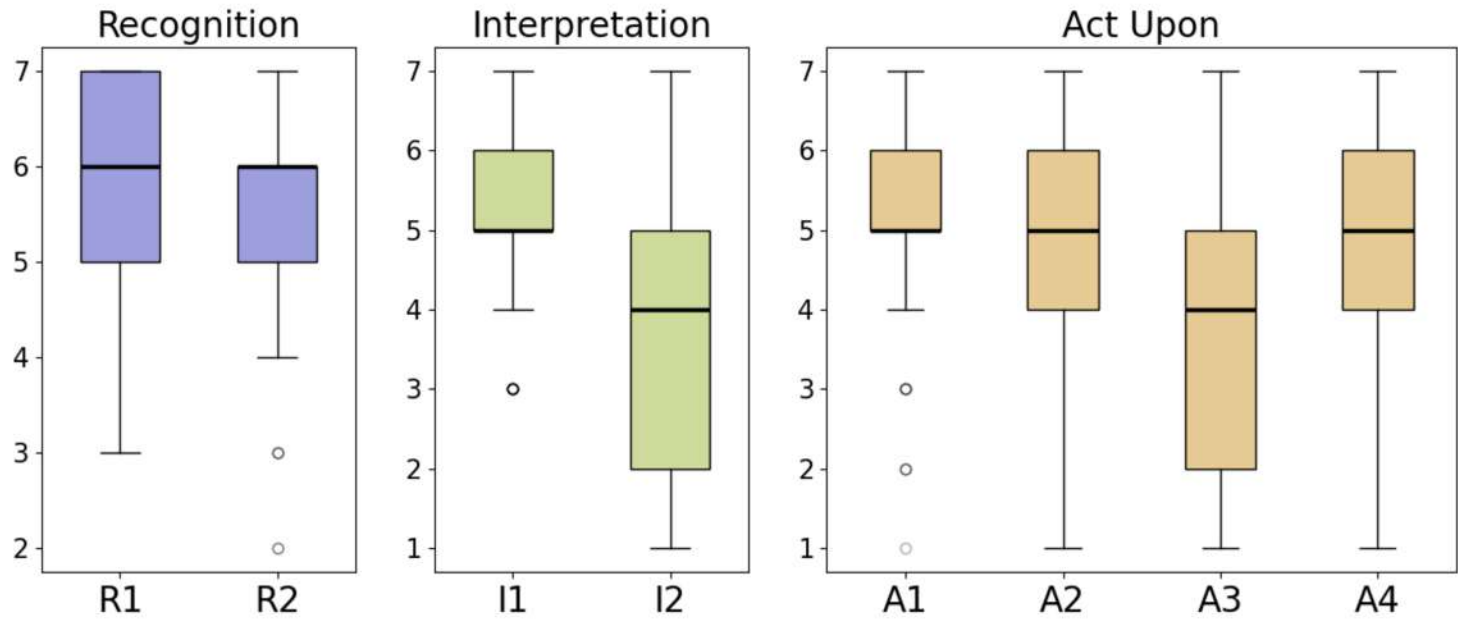
Videogames need data visualizations to help players make gameplay decisions. Due to the variety in videogames, these visualizations can hardly be standardized. While traditional, non-diegetic data visualizations (like user interfaces and heads-up displays) have been extensively researched, diegetic visualizations - where the data visualization is part of the game world, visible, and makes sense to the player characters - remain understudied. Utilizing diegetic data visualizations has been shown to increase player immersion, but it is rarely analyzed as a formal data visualization technique. To bridge this gap, this research explores environmental diegetic visualizations through a case study of 'Fortnite'. We present an online study (n=80) to examine how players recognize (RQ1), interpret (RQ2), and act upon (RQ3) in-world visual cues surrounding the swarm areas. For our study, we have chosen a limited-time event in Fortnite featuring the "Swarm" with its environmental blue smoke, gray corruption, and hives around the map (see images on top).

METHODS

We designed an online survey and deployed it on discussion forums on Reddit and on Fortnite-related Discord servers. Additionally, we used Prolific to recruit participants. Participants' age ranged from 19 to 63 years with a mean age of 28 ($SD = 7.9$). In terms of gender, 47 participants self-identified as men, 32 as women, and 1 preferred not to disclose their gender. The survey contained a mix of rating questions (7-point Likert scale with 1 being 'Strongly Disagree' and 7 being 'Strongly Agree') and open-ended questions, which were related to our research questions. We performed a content analysis on the open-ended questions.

ID	Question
R1	I feel like the swarm areas were easily recognizable
R2	I noticed that the swarm areas changed over time
I1	It was easy to tell the impact that the swarm areas had on gameplay
I2	I felt the need to use external sources to keep track of the swarm areas
A1	The swarm areas influenced my gameplay decisions
A2	I purposefully visited the swarm areas
A3	I tried to stay away from swarm areas
A4	I kept track of swarm areas to have an advantage in the game

THE TABLE ON THE LEFT SHOWS THE RATING QUESTIONS, WHILE THE FIGURE ON THE RIGHT SHOWS THE ANSWERS AS BOXPLOTS. THE TABLES BELOW SHOW THE OPEN-ENDED QUESTIONS AND THE RESULTS FROM THE QUALITATIVE CONTENT ANALYSIS. #P REPRESENTS THE NUMBER OF PARTICIPANTS WHO REPORTED A CERTAIN TOPIC. IN TOTAL, 68 PARTICIPANTS PROVIDED QUALITATIVE FEEDBACK.



Open Ended Questions		
How did you recognize the swarm areas when you entered them?	Did the swarm on the map effect your gameplay decisions?	What information did you derive from swarm areas on the map?



CODE	DESCRIPTION	#P
DIEGETIC VISUAL INDICATORS	Statements about recognizing the swarm areas through their diegetic visual indicators.	34
NON-DIEGETIC VISUAL INDICATORS	Statements about recognizing the swarm areas through their non-diegetic visual indicators.	9
AUDIO INDICATORS	Statements about recognizing the swarm areas through audio cues.	22
POSITIONING	Statements about participants changing their positioning based on the information they derived from the swarm areas.	21
ENEMY DENSITY	Statements about participants deriving enemy density information from the swarm areas.	17
LOOT TABLE	Statements about deriving information about unique loot from the swarm areas.	9
STORY AND QUESTS	Statements about deriving story elements and objectives of story quests from the swarm areas.	11
NO CHANGE	Statements expressing no change to the gameplay.	10
ATTRACTED	Statements expressing an intention to go towards the swarm areas.	10
AVOIDANT	Statements expressing an intention to avoid the swarm areas.	11
SITUATIONAL	Statements about going to and avoiding the swarm areas depending on the game state.	30

RESULTS

Our key findings are as follows:

- RQ1: The swarm areas were easy to recognize, particularly through their diegetic indicators - gray hives, blue smoke, and local map destruction - while the non-diegetic interface elements played a smaller role. The saliency of the visual in-game representation could be a factor here, as it might render the additional interface elements less relevant.
- RQ2: The visualization of the swarm influenced participants' positioning in-game as they interpreted the swarm areas as zones of high enemy density and superior loot opportunities. However, mixed reliance on external sources to track these areas suggests varying information-foraging behaviors among players.
- RQ3: While the swarm visualization heavily influenced player decision-making when it came to moving towards or away from the swarm areas, the answers are more nuanced than expected. Players tended to move towards or away from the swarm areas based on dynamic factors such as match stage, current loot, and perceived risk.

CONCLUSION AND FUTURE WORK

Our study provides an initial exploration of one use case, showing that players can make good use of such visual indicators. However, more research is needed to study such representations more systematically, using a broader range of methods such as through the inclusion of telemetry and observation, to gain richer insights into how players engage with diegetic visualizations. This, in turn, will help to better understand their design space and to formulate actionable design guidelines.