

Eye Tracking Paper

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1 Introduction

Intro text goes here

2 Background

In "Find the Difference! Eye Tracking Study on Information Seeking Behavior Using an Online Game"[Józsa and Hámornik, 2011] researchers used a classic "Find the Difference!" game in conjunction with an eye tracker in order to gain insight into how people gather information in an attempt to complete a task. In the game, participants went through 4 different levels in which each half of the screen contained the same picture apart from a few differences which they were tasked with finding. These 4 levels were then repeated with different differences, making a total of 8 levels. The bottom of the screen also showed feedback telling the participant how many differences remained in the two pictures. The researchers analyzed 4 different Areas of Interest (AOIs): each of the two images separately, the distance to completion feedback at the bottom of the screen, and the entirety of the screen as a whole. They analyzed the total visit duration of the AOI representing the entire screen as a measure of the total task completion time and separated the data between the male and female participants. They found no significant differences in task completion time between genders except for during the second phase of the experiment when the 4 levels were completed. In this phase, male participants completed the task on average slower than females, possibly because the male participants were more frustrated at having to repeat the same levels than female participants were. They also examined the fixation count and duration for each side of the image separately and found that participants had no significant preference as to which side of the image they preferred to look at. Finally, analysis of the AOI for the distance to completion feedback showed that during easier tasks, participants looked at the feedback far less, and several participants barely fixated on the feedback at all. As a whole, comparing the completion times between the first and second phases of the experiment revealed that there were no significant changes time to completion. They concluded that changing the locations of the differences from one phase to the next was able to suppress the effect of learning, and familiarity with the

pictures was not enough to overcome the changing of the differences. While the genre of game used in this study significantly differs from our own, this study is relevant in that it similarly tackles the question of how people interact with UI elements while playing a video game. Particularly, the finding that level completion feedback was ignored during easier levels and completely ignored by some participants gave us insight into how we should design the UI that we test in this study. Additionally, the conclusion that levels could be reused as long as significant differences are introduced aided us in our experimental design and showed that we could use the same level space for multiple phases of our own experiment.

In "Eye Tracking in Educational Games Environment: Evaluating User Interface Design through Eye Tracking Patterns" [Mat Zain et al., 2011] researchers used an eye tracking device to evaluate fixation areas of 6 participants while they played an educational video game. Within the game there were 3 main tasks: collecting keys to access the "scholar" character, answering quiz questions, and accessing the school location. They analyzed participants eye movements by using heat maps and gaze plots. They found that participants mainly focused on the center of the screen and the top left where the quiz questions and game instructions were displayed. The authors of the paper described some common issues users encountered with the UI and gave some recommendations for how these issues should be addressed. Similar to the paper mentioned above, multiple participants in this study either ignored completely or rarely looked at the scoreboard. Additionally, the authors note that some players had difficulty figuring out where they should go within the game. They recommend that important objects or locations should be marked in some way, for example by highlighting them or making them blink. The authors also recommend ensuring that game instructions are prominently placed in the center of the screen with a contrasting background and font to ensure ease of readability by the player. These findings aided us significantly in the design of our User Interface by giving us insights into what aspects of UI will draw the attention of players the most.

In "Evaluating Educational Game via User Experience (UX) and User Interface (UI) Elements" [Zamri and Tan, 2022] researchers gathered 35 students and divided them into 5 groups to examine 10 different educational games and give each of them a score of 1 to 5 based on 10 different UI elements. These 10 elements were: connectivity, simplicity, directional, informative, interactivity, user-friendliness, comprehensiveness, continuity, personalization, and internal use. The average ratings for each element across all 10 games was between 3.1 and 4.2, and the elements of simplicity and user-friendliness were both particularly high with ratings of 4.2 and 4 respectively. The paper goes into detail describing what each element is why it is important for keeping the player interested and improving the effectiveness of the educational game. While this study did not use eye tracking and is based only on the subjective evaluations of 35 students, it still aided us in the design of our UI as it, similar to the study above, gave us valuable insights into what effective User Interface design looks like. This study was also helpful in that it examined and compared 10 games rather than just one, and this larger sample size was helpful to us as we looked

for inspiration in designing the UI for our study.

3 Method

4 Reults

5 Discussion

6 Conclusion

References

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