Assignment #2: Fitts’ Law / eBay

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Course	CS 449
Task	Assignment
Files	Assignment-2 Fitts Law Assignment.pdf
Due Date	@November 9, 2022 12:00 PM
Notes	

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▼ 1. Introduction

eBay is an e-commerce company which provides business-to-consumer and consumer-to-consumer sales through its website. This report aims to identify HCI issues resulting from violations of the Fitts’ Law, found on the product description pages on eBay.

According to Fitts’ Law, the time required for a person to move the mouse’s cursor to the target area on the user interface can be obtained by dividing the distance to the target by the size of the target (What is Fitts’ Law?, n.d.). As a result of experiments carried out by Paul Fitts, its observed that due the trade-off between the speed and accuracy of human movements, fast movements which aims small targets resulted in high error rates (What is Fitts’ Law?, n.d.).

Link of the examined website: Nintendo Game Cube DOL-001

▼ Problem #1: Unnoticeable “Share” and “Add to Watchlist” Buttons

In Figure 1, it can observed that “Share” and “Add to Watchlist” Buttons are very small and close the the corner of the page, which is a very distant location from the area which other product related information exists.

This is a issue related with Fitts’ Law since Fitts’ Law suggests to make interactive buttons larger by emphasizing that reaching to smaller buttons are harder and time-consuming (What is Fitts’ Law?, n.d.).

Figure 1: “Share” and “Add to Watchlist” Buttons

▼ Problem #2: Hard to select product properties due to dropdown menus

In Figure 2, Figure 3, Figure 4, the information about product features that are tried to communicate to the client represented in dropdown menus. As stated in the website article “What is Fitts’ Law?”, dropdown menus in appropriate length has a success on users of the system by reducing user’s travel distance with a mouse (n.d.). Whereas, in this case, since dropdown includes few options, its unnecessary to implement a dropdown menu which requires users to click to extend the menu and hover on options to select their preference. A simpler option like buttons can be utilized for this kind of interaction.

This problem in the interface also based on violation of Fitts’ Law since this kind of dropdown menu structure increases the user’s selection time.

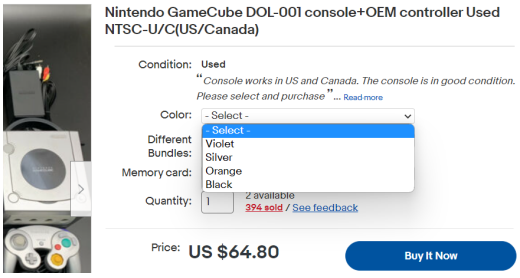

Figure 2: Product Properties Dropdown - Color

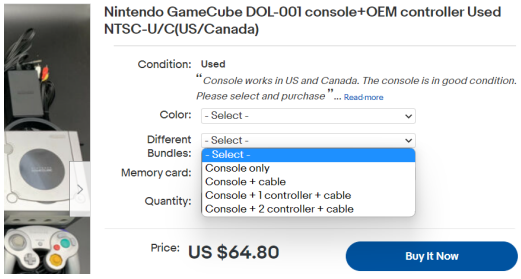

Figure 3: Product Properties Dropdown - Different Bundles

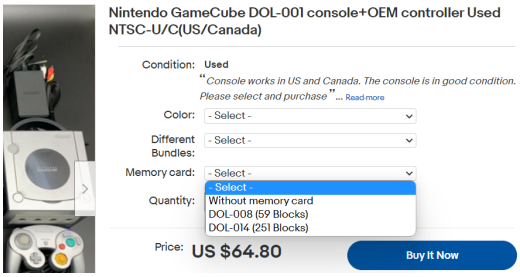

Figure 4: Product Properties Dropdown - Memory Card

▼ Problem #3: Distance between the actions related to the product and detailed product description button

As it can be observed from the page layout design in Figure 5, the product details are positioned in a distant location from the section which includes other product related details such as products condition, color, price etc.

This is an issue emerged due to the violation of Fitts' Law since Fitts' Law suggests that the user's task/attention area and the other task-related elements in the page should be placed close to each other (What is Fitts' Law?, n.d.).

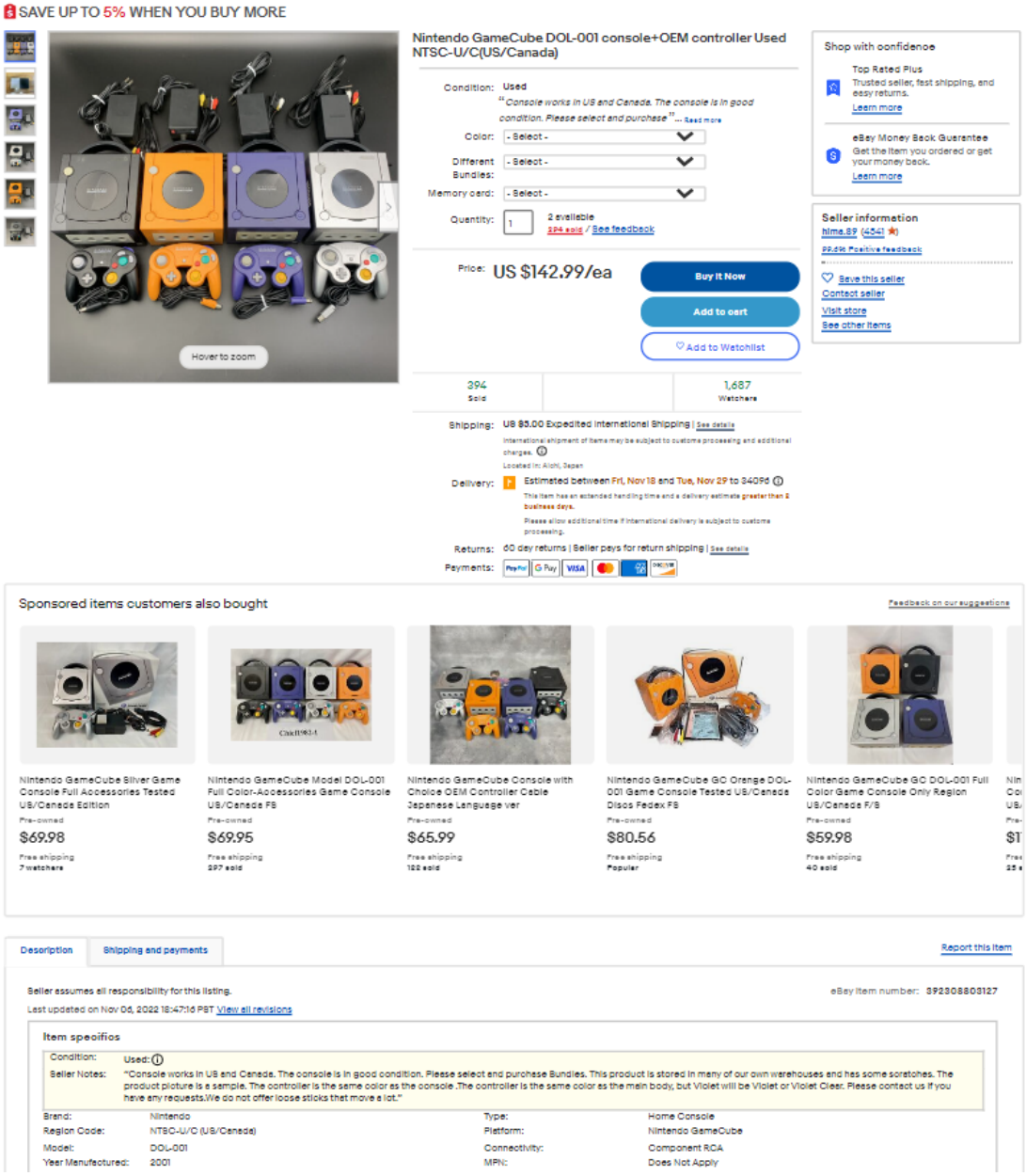

Figure 5: Page Layout

▼ Problem #4: Unnoticeable "Report this item" button

The “Report this item” button that can be seen in Figure 6, is experiencing a similar issue as Problem #1. “Report this item” button is an important button with the task of reporting inappropriate content which is essential for providing a good user experience for the systems user. Therefore, placing this button in a distant place from the main product information section and designing it as a text button with no emphasis creates problems in case of accessibility and visibility of the button.

This issue is also related with Fitts’ Law since Fitts’s Law highlights that increase in distance causes movement to take longer time and additionally as the size of the button gets smaller it becomes harder to notice and select (Fitts’s Law: The Importance of Size and Distance in UI Design, 2019). Based on this point, it can be stated that the “Report this item” button does not comply with the Fitts’ Law due to both its size and its distance from the relevant content.

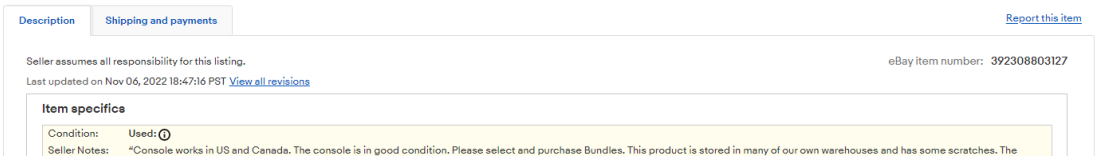

Figure 6: ”Report this item” Button

▼ 2. Analysis with Fitts’ Law

▼ Difficulty Index Formula

$$DI = log_2(D/W)$$

D = Distance between the origin and the target

W = Width of the target

▼ **NOTE:** Selecting the Origin

With the assumption of users curser will mostly located around the center of the product details section, the origin is selected as the center of the product details section, which is demonstrated in Figure 7.

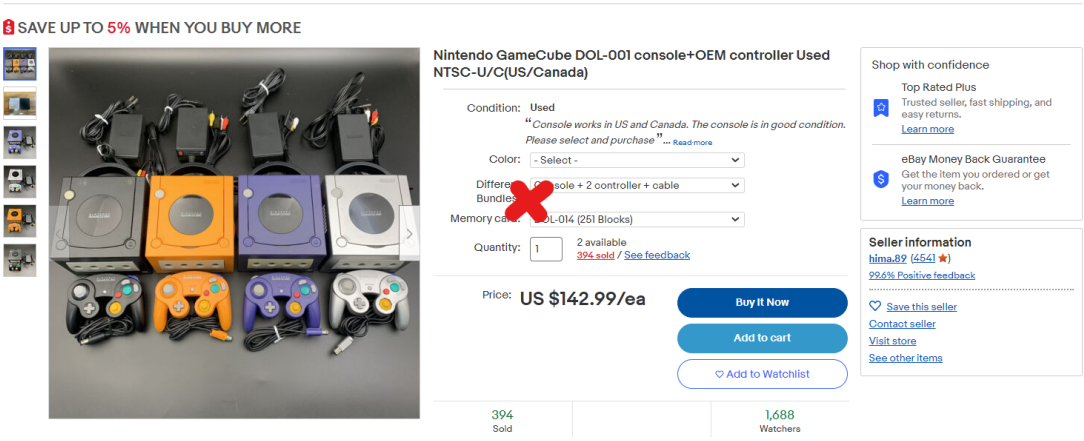

Figure 7: Product Details Section Origin

▼ Difficulty Index of Problem #1

- Share Button

  Distance calculation of Share Button to the Origin is demonstrated in Figure 8 and width calculation demonstrated in Figure 9.

  $$D^2 = h^2 + w^2$$
  $$D^2 = 560^2 + 690^2$$
  $$D^2 = 789,700$$
  $$D \approx 888\ pixels$$

  $$W \approx 38\ pixels$$

  $$DI = log_2(D/W) = 1.36\ pixels$$

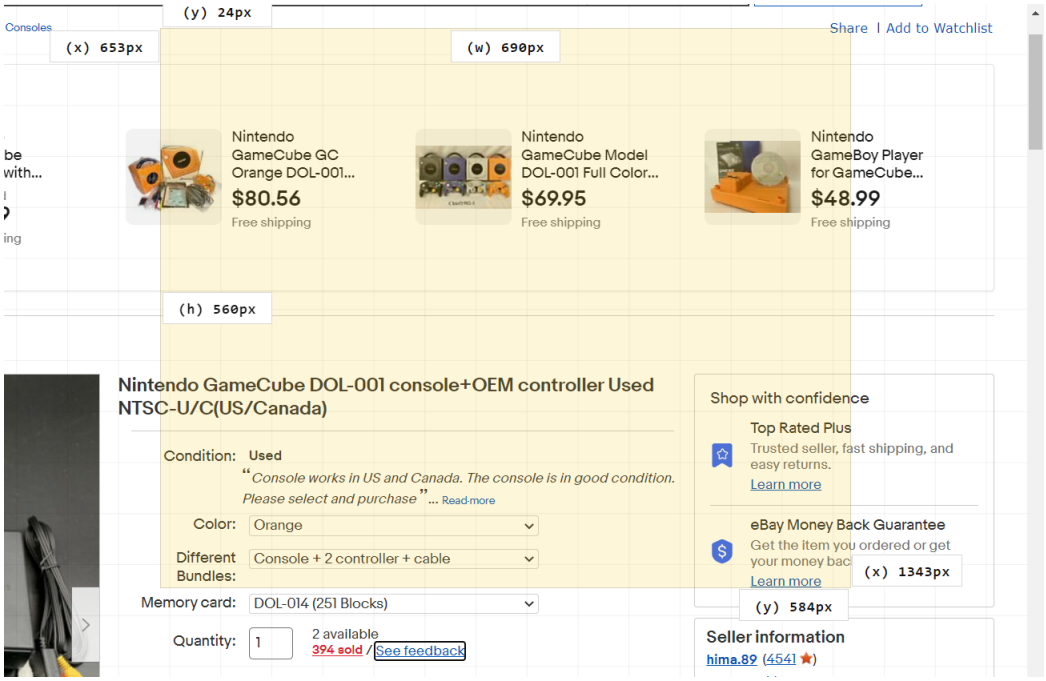

Figure 8: Share Button Distance Calculation

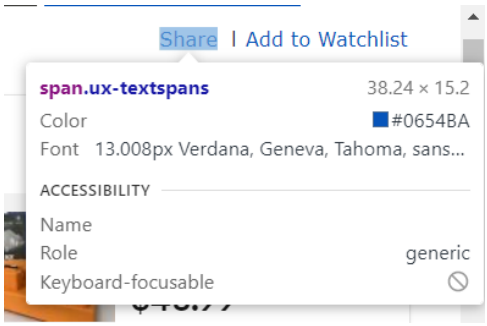

Figure 9: Share Button Width

- Add to Watchlist Button

  Distance calculation of “Add to Watchlist” Button to the Origin is demonstrated in Figure 10 and width calculation demonstrated in Figure 11.

  $$D^2 = h^2 + w^2$$
  $$D^2 = 560^2 + 700^2$$
  $$D^2 = 803,600$$
  $$D \approx 896\ pixels$$

  $$W \approx 106\ pixels$$

$$DI = log_2(D/W) = 0.92\ pixels$$

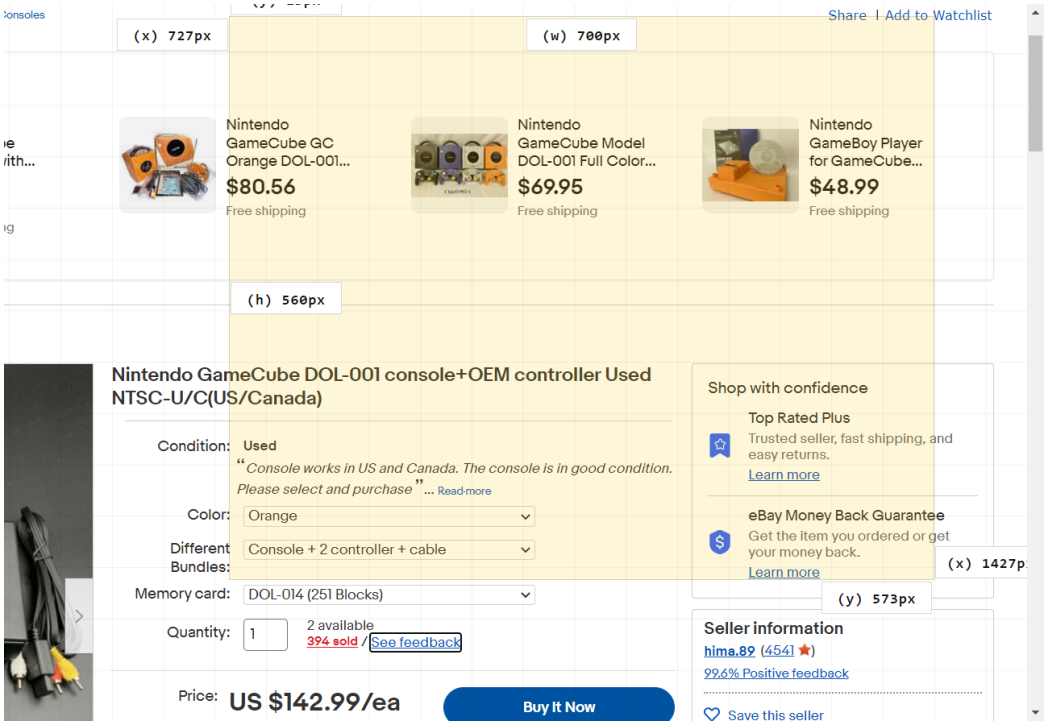

Figure 10: "Add to Watchlist" Button Distance Calculation

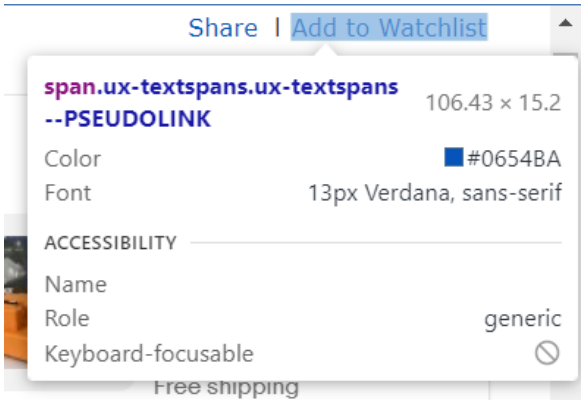

Figure 11: "Add to Watchlist" Button Width

▼ Difficulty Index of Problem #2

- Color Dropdown (Figure 12)

$$D \approx 145\ pixels$$
$$W \approx 290\ pixels$$
$$DI = log_2(D/W) = -0.3\ pixels$$

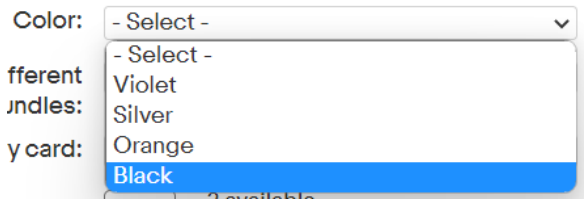

Figure 12: Color Dropdown

- Different Bundles Dropdown (Figure 13)

$$D \approx 145\ pixels$$
$$W \approx 290\ pixels$$
$$DI = log_2(D/W) = -0.3\ pixels$$

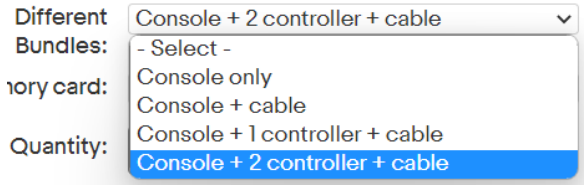

Figure 13: Different Bundles Dropdown

- Memory Card Dropdown (Figure 14)

$$D \approx 120\ pixels$$
$$W \approx 290\ pixels$$
$$DI = log_2(D/W) = -0.38\ pixels$$

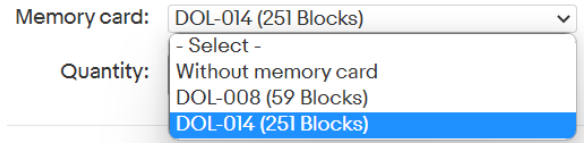

Figure 14: Memory Card Dropdown

▼ Difficulty Index of Problem #3

Distance calculation of Product Description Button to the Origin is demonstrated in Figure 15 and width calculation demonstrated in Figure 16.

$$D^2 = h^2 + w^2$$
$$D^2 = 1110^2 + 675^2$$
$$D^2 = 1,687,725$$
$$D \approx 1299\ pixels$$

$$W \approx 115\ pixels$$

$$DI = log_2(D/W) = 11.3\ pixels$$

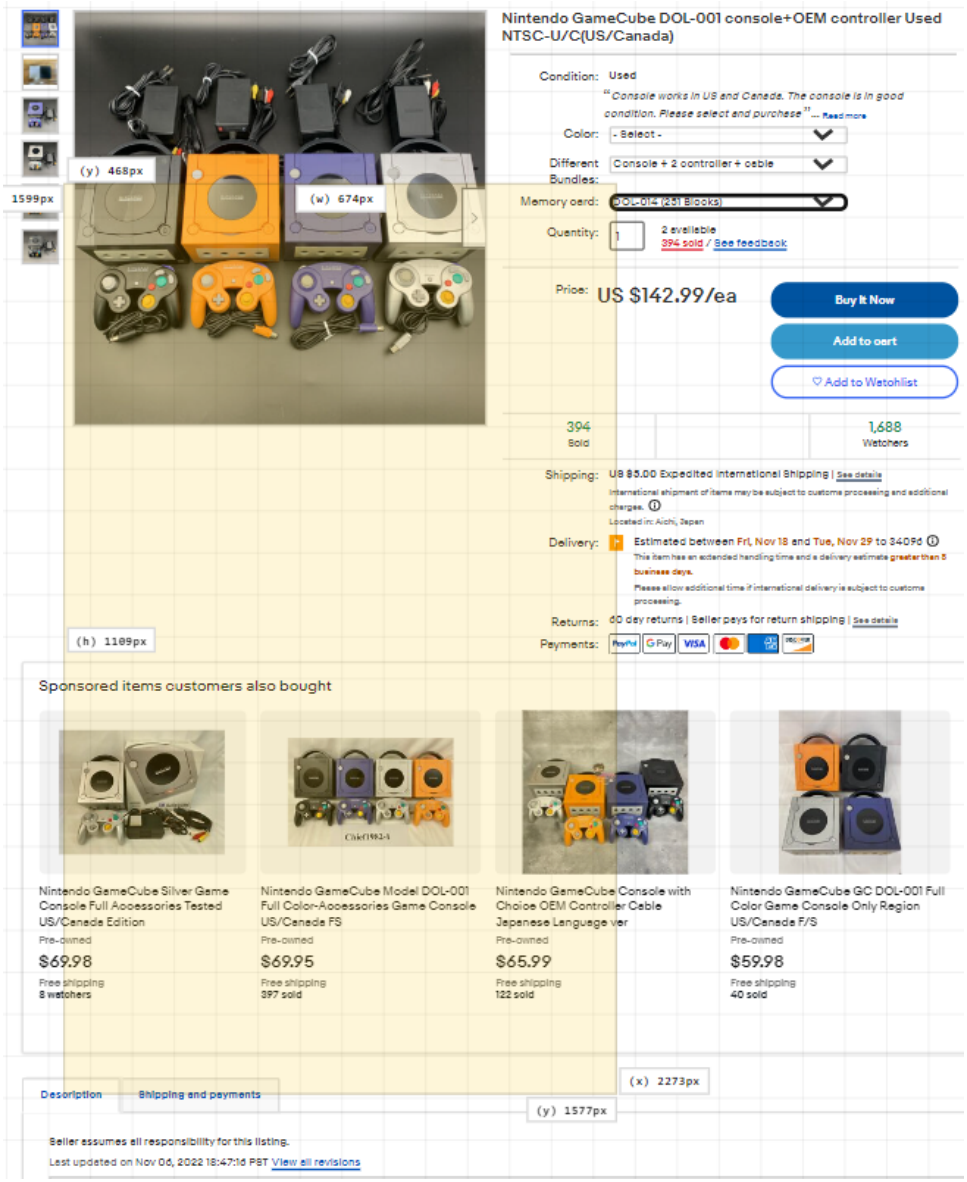

Figure 15: Product Description Button Distance Calculation

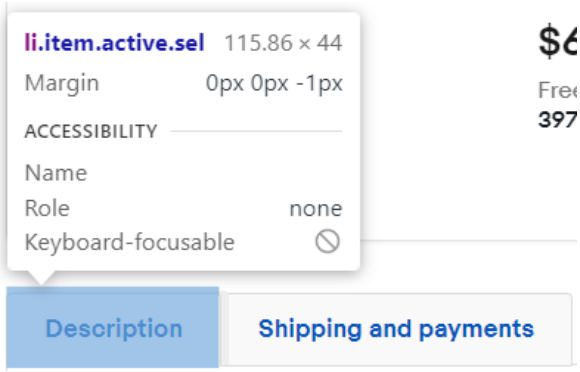

Figure 16: Product Description Button Width

▼ Difficulty Index of Problem #4

Distance calculation of Report Button to the Origin is demonstrated in Figure 17 and width calculation demonstrated in Figure 18.

$$D^2 = h^2 + w^2$$
$$D^2 = 1295^2 + 260^2$$
$$D^2 = 1,744,625$$
$$D \approx 1320\ pixels$$

$$W \approx 100\ pixels$$

$$DI = log_2(D/W) = 1.12\ pixels$$

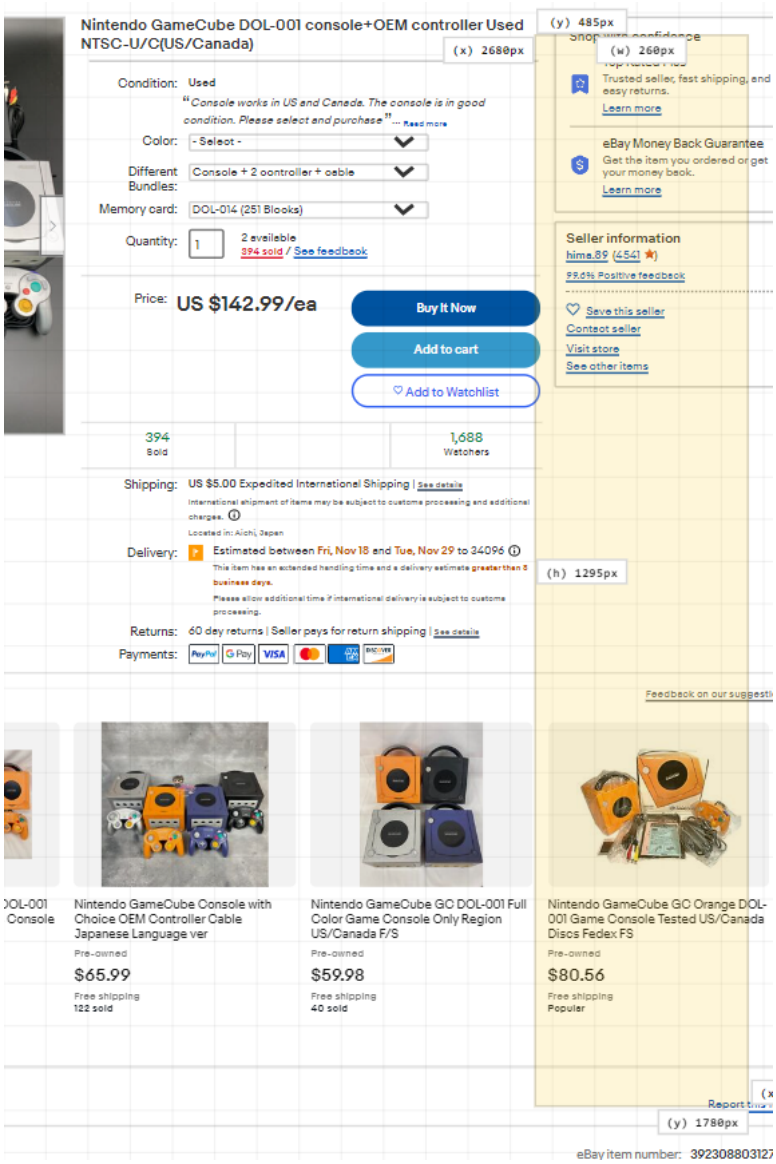

Figure 17: Report Button Distance Calculation

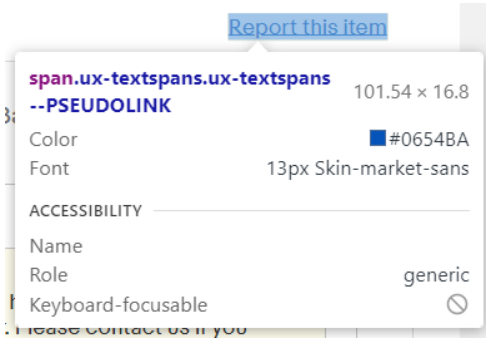

Figure 18: Report Button Width

▼ 3. Proposed Solution

Axure Link: https://ikpgfr.axshare.com

▼ **NOTE:** Selecting the Origin of the New Design

With the assumption of users curser will mostly located around the center of the product details section, the origin is selected as the center of the product details section, which is demonstrated in Figure 19.

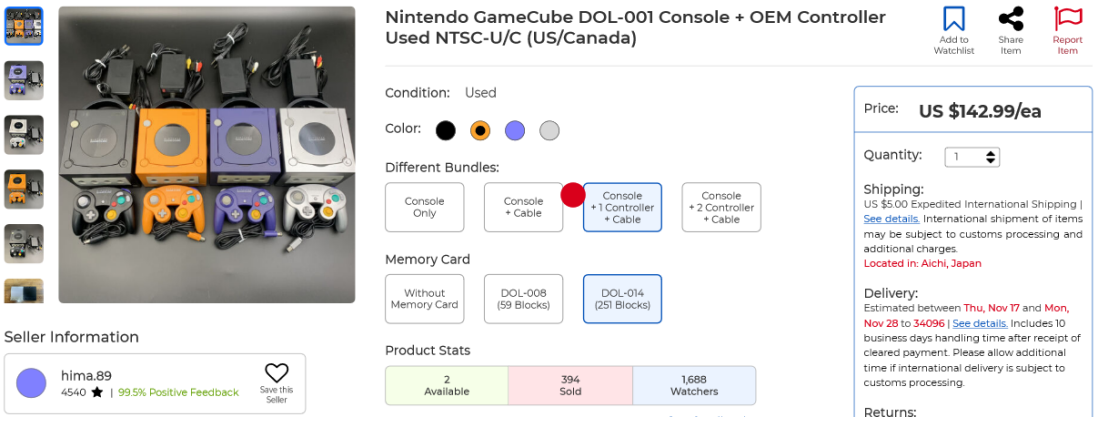

Figure 19: New Design Origin

▼ **<u>Solution of Problem #1: Unnoticeable “Share” and “Add to Watchlist” Buttons</u>**

This issue solved by relocating “Share” and “Add to Watchlist” Buttons next to the product header, which is a place closer to the origin of the product details section. In addition to that, expanding the size of the buttons and turning them into “icon button” format increase their noticeability. The finished design can be observed in Figure 20.

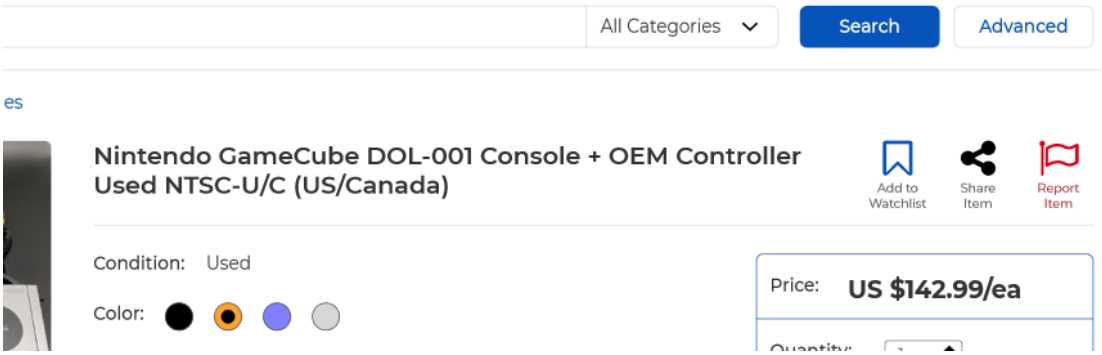

Figure 20: Redesigned “Share” and “Add to Watchlist” Buttons

- “<u>Add to Watchlist” Button DI</u>

  To calculate the new DI, distance is found from Figure 21, and width of the new button is found from Figure 22. In this way, new DI of the page becomes 0.92 pixels, previously it was 0.92 pixels. Even there was no

significant change in the DI value, the new design is conforming with the Fitts's Law in a better way, since users time to reach to the button is decreased due to the increased noticeability of the button.

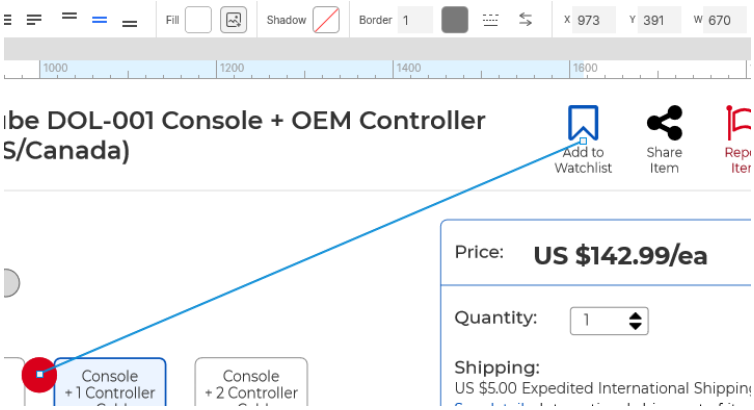

Figure 21: New Add to Watchlist Button Distance

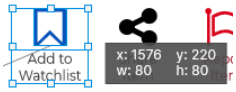

Figure 22: New Add to Watchlist Button Width

- Share Button DI

  To calculate the new DI, distance is found from Figure 23, and width of the new button is found from Figure 24. In this way, new DI of the page becomes 0.97 pixels, previously it was 1.36 pixels.

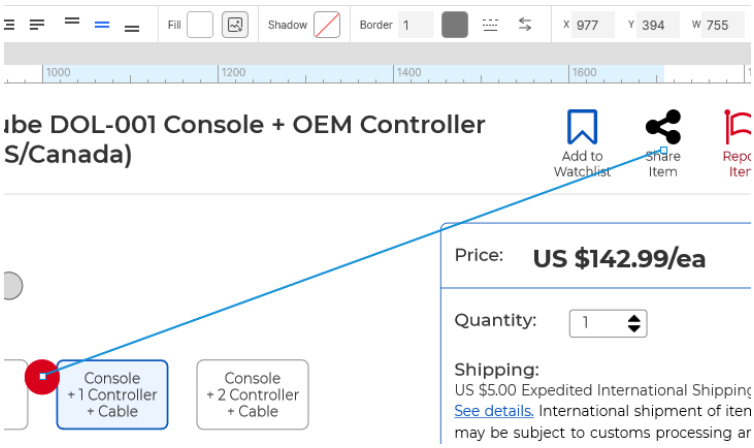

Figure 23: New Share Button Distance

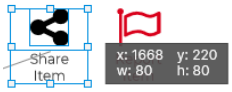

Figure 24: Share Button Width

▼ Solution of Problem #2: Hard to select product properties due to dropdown menus

The issue solved by utilizing buttons to represent different features of the product, instead of using dropdowns in order to reduce the time required for users to achieve their goals. Since dropdown selection requires user to click

to the dropdown to display options and hover to select their preference, which is a two step action. Button styled design assists users to achieve their goal in just one click. The finished design can be seen in Figure 25.

Previous DI's of the dropdown calculated with respect to the point where user clicks to open the dropdown menu options. In the new design, since selecting product properties turned into button selection format, the new DI's of "Color", "Different Bundles", and "Memory Card" dropdowns can be accepted as 0 pixel, due to the direct clicking action made on to the button. Previous DI's of these dropdown are respectively -0.3, -0.3, -0.38 pixels.

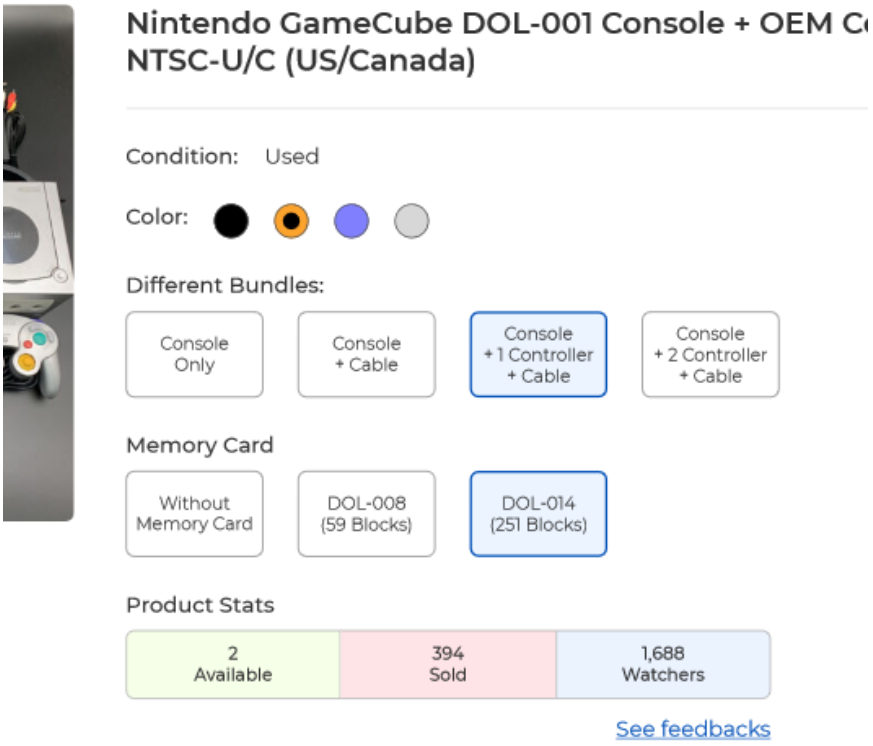

Figure 25: Redesigned Product Properties Section

▼ **Solution of Problem #3: Distance between the actions related to the product and detailed product description button**

The distance between the main product details section and product description button reduced by re-organizing the page layout and displaying product related information in more compact forms. The finished design can be seen in Figure 26.

To calculate the new DI, distance is found from Figure 27, and width of the new button is found from Figure 28. In this way, new DI of the page becomes 0.72 pixels, previously it was 11.3 pixels.

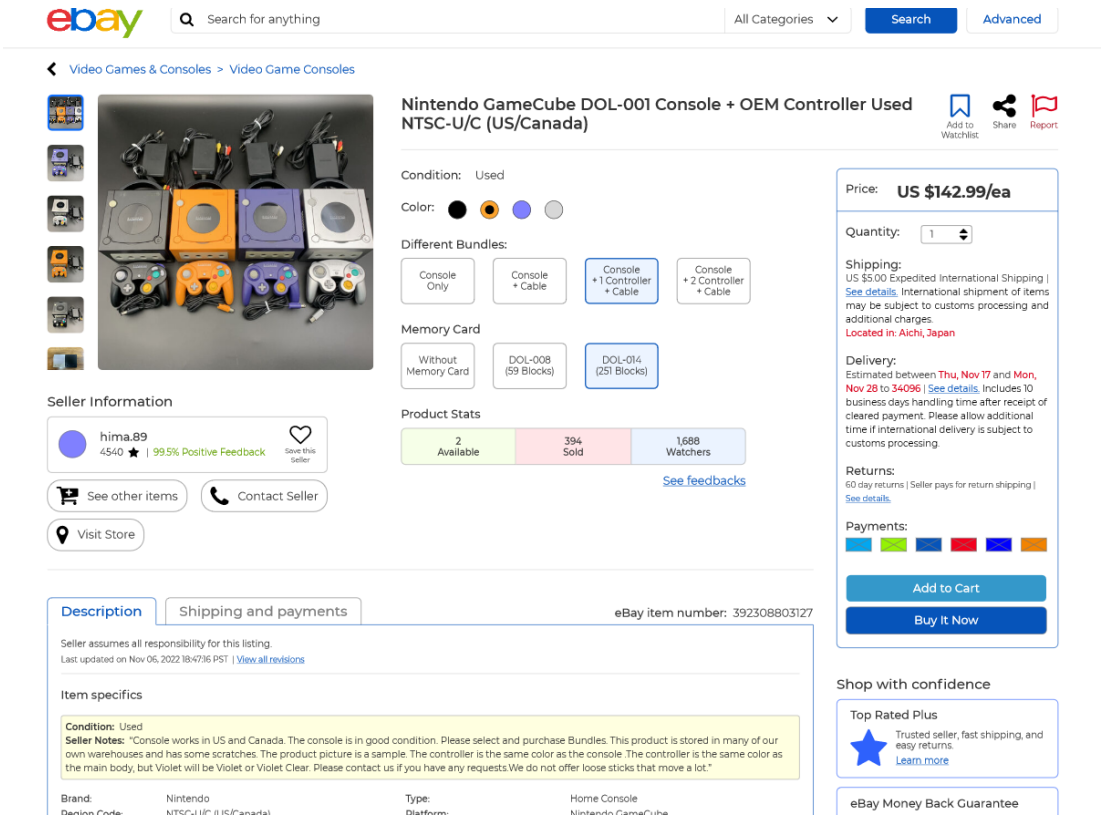

Figure 26: Re-organized Page Layout

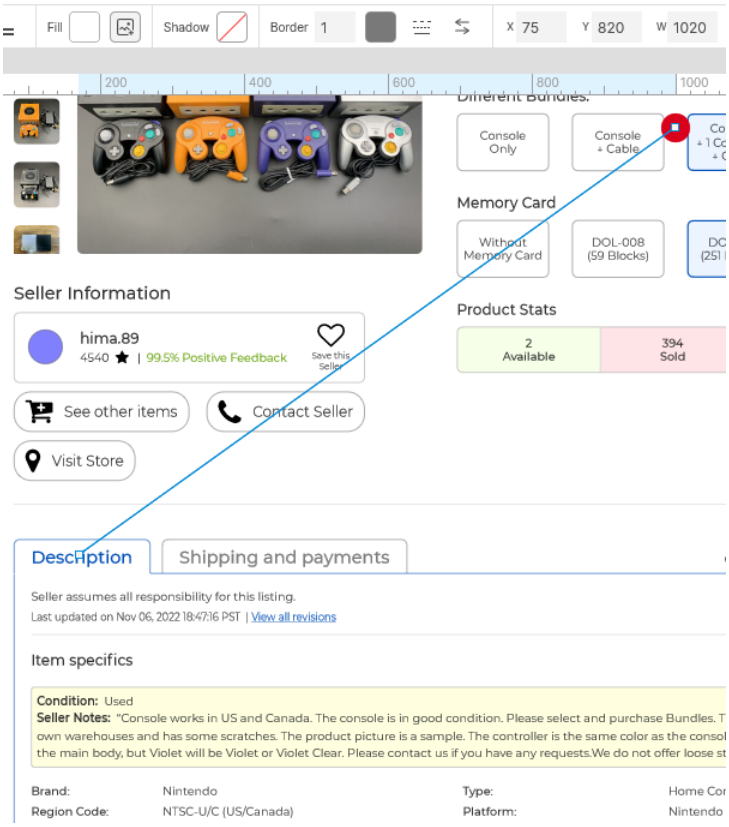

Figure 27: Redesigned Page Layout

Figure 28: New Description Button Width

▼ Solution of Problem #4: Unnoticeable “Report this item” button

This issue solved by relocating “Report this item” Button next to the product header, which is a place closer to the origin of the product details section. In addition to that, the size of the buttons increased and turned into “icon button” format to enhance its noticeability. The finished design can be observed in Figure 29.

To calculate the new DI, distance is found from Figure 30, and width of the new button is found from Figure 31. In this way, new DI of the page becomes 1.02 pixels, previously it was 1.12 pixels.

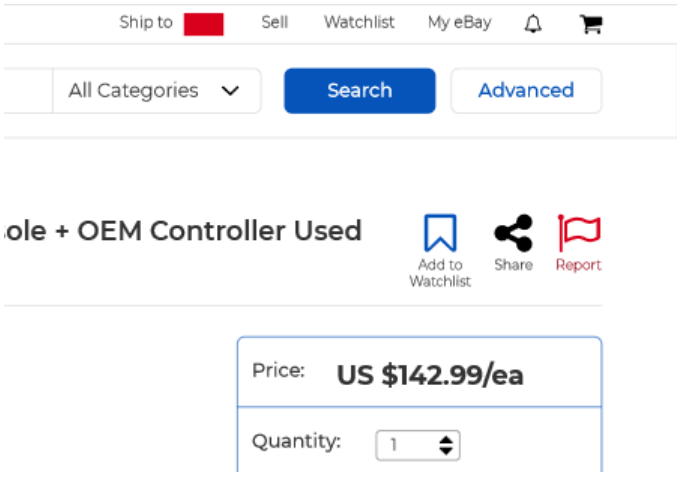

Figure 29: Redesigned Report Button

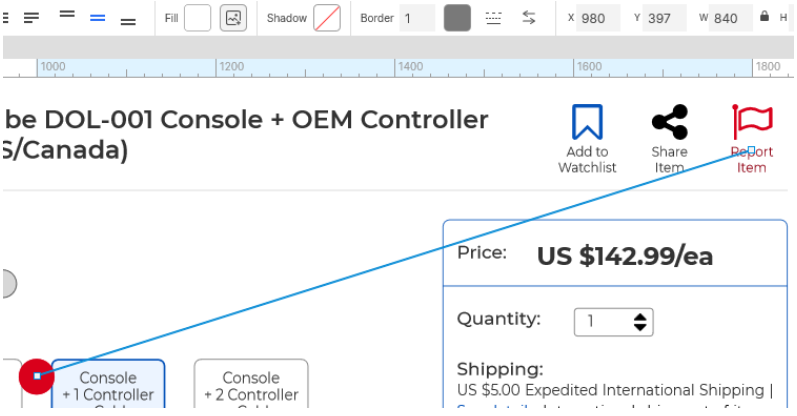

Figure 30: New “Report Item” Button Distance

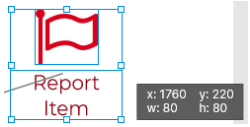

Figure 31: New “Report Item” Button Width

▼ 4. References

- *Fitts's Law: The Importance of Size and Distance in UI Design*. (2019, June 5). The Interaction Design Foundation. https://www.interaction-design.org/literature/article/fitts-s-law-the-importance-of-size-and-distance-in-ui-design
- *What is Fitts' Law?* (n.d.). The Interaction Design Foundation. https://www.interaction-design.org/literature/topics/fitts-law