

PROJECT I: WEB-BASED SERVICES

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Navigating the Amazon

PROJECT I: WEB-BASED SERVICES INTRODUCTION

The market for online shopping has experienced explosive growth over the past decade— largely pioneered by the infamous Amazon.com, which captured nearly 44% of all online sales in 2017[1]. For many, it has become a preferable alternative to retail shopping. But, however adept Amazon users may seem, we suppose that many have only become proficient in the rote activities they perform, like searching and purchasing products. When it comes to less common activities like filing complaints or navigating to less popular pages within the site, we hypothesize that Amazon's interface may experience substantial breakdowns.

Amazon is undeniably the state-of-the-art in online shopping, as evident by their dumbfounding success. The ease in which a user can visit their website, find what they're looking for (or something similar), and checkout is remarkable. This can be partially attributed to their immediately visible search bar, as well as their ability to keep users logged in and their financial information saved. In particular, the search bar allows users to travel directly to the categories of products that they're interested in, sparing them the tedious process of traversing menus and endless submenus.



Figure 1 - Amazon Landing Page

Of course finding and purchasing products is easy—it's Amazon's core business. By this logic, we suppose that it would be more difficult to file complaints or

leave poor reviews on products, since negative PR might deter other users from the site. Likewise, we suppose that making returns would be difficult as well. But above all, we're curious to see if the world's largest online retailer is really as flawless as its users may perceive it to be.

Though Amazon's search feature allows users to reach their favorite products with ease, not every page within Amazon can be reached by this search bar. Thus, we chose to investigate how intuitive it really is to navigate Amazon's hardcoded menus. We were also curious as to whether or not a separate search bar (used exclusively for navigation) would help users find the pages they were looking for with comparable efficiency to the product search bar.

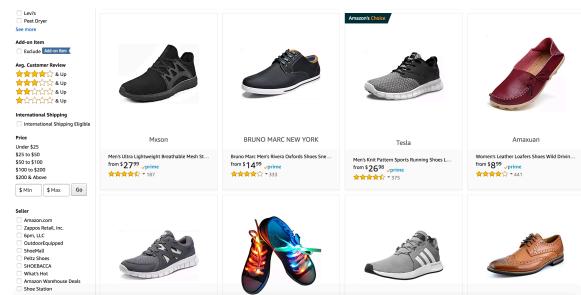


Figure 2 – Product Search Results

Additionally, when presented with such an abundance of appealing products, it can be daunting to find the best one. Users are not presented with many options for comparing products within Amazon, as wish lists and notepads seem to be some of the only options available. And they certainly don't list the prices of their competitors like other online retailers do. We suspect that this may present an unrealized inconvenience to Amazon users, so we're curious how inconvenient this process is, and whether or not a better one exists.

PROJECT I: WEB-BASED SERVICES UNDERSTANDING

The best way to gain a better understanding of any phenomena is to observe it. In our case, we conducted three explicitly outlined contextual inquiries. In order to yield results with minimal bias, we made it a priority to gather a diverse sample of participants. Unfortunately, all of our participants were students, but their backgrounds varied substantially.

Our first participant, whom we'll call Sue, is a senior undergraduate, full-time student, and also an assistant preschool teacher. Sue aspires to go to physician's assistant school and to make a career as a physician's assistant. Our second participant, henceforth referred to as Jack, is also a senior undergraduate. Jack is a full-time student studying economics and microbiology, and plans to attend medical school with hopes of becoming a medical doctor. Lastly, we had our third participant whom we'll call John. He is another senior undergraduate, aspiring to attend graduate school and earn a PhD in either forensic or clinical psychology. John hopes to become an accomplished psychologist.

We conducted each contextual inquiry at the apartment of each participant. This decision was made in unison, with the goal of assessing the participants in their natural environment as much as possible to avoid confounding our results. For our first contextual inquiry, we sat down with Sue at her kitchen table – where she claimed to do the majority of her online shopping. In fact, this was true for all of our participants, as both Jack and John lead us to their kitchen tables as well. We prompted our participants with the same tasks for the sake of consistency, but their experiences performing them varied substantially.



Figure 3 – Participant and observer Jason Arora

The contextual inquiries produced many insights with regard to the user-interface of amazon.com. The first task was fairly trivial for each participant. We requested the participants to search for a product and proceed the one of their choice up until the last step of checkout. Each participant found the search bar within a matter of seconds and began their search for the clothing item that they desired. Each participant then needed to narrow down their search. This was where we noticed the first breakdown.

Sue wanted to filter her search results by size, since she was looking for jeans and is quite tall. She often has trouble finding items in her specific size, so this query was of significant importance to her. Although there were many filter options available, size was not one of them, and she was forced to visit an individual item's page before seeing if it was available in her size. Since this task seemed so common when searching for clothes, we expected this process to be more efficient and straightforward on Amazon.

John also had issues while searching through results. He searched for his item (hats, in this case) via the search bar just as Sue had done. His priority was aesthetics, what looked "coolest." Once presented with

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Understanding

the hundreds of hats that amazon had to offer, he then scrolled to find the items that piqued his interest most. Each time he found an item that was worthy of his attention, he would open a new tab in his browser for that item's webpage. This eventually lead to clicking through several tabs of items in order to compare and contrast them until he narrowed his search down to the one he liked best. At one point he had 5 amazon.com tabs running on his browser!



Figure 4 – Participant "John" starts his product search

The breakdown was clearly in the product navigation. While the participants could easily and successfully find countless options for their desired purchases, finding the most relevant items and comparing them was clearly a shortcoming of these users' experiences.

Part of navigating through these options for a purchase is looking at the user ratings. On amazon.com, a product can be rated from one to five stars, with five stars being optimal. Each of our participants relied heavily on the ratings of products when deciding which ones to purchase. This is indicative of a culture between consumers and amazon users to provide consistent and reliable feedback when using the site. Interestingly, while each participant depended on these ratings from other amazon users, none of them had ever left a review or rating of their own. The trust-culture is important

to practically all amazon users, but entirely depends on the small portion who do rate and review their purchases.



Figure 5 – Cultural Model

This lead to another breakdown that we identified, which occurred when we asked each participant to file a complaint about one of their past purchases. Sue scrolled to the very bottom of the home page and clicked the tiny help link that she found there. From there, she clicked through over 15 pages before discovering how to leave her complaint. In this timespan, she revisited the same few pages multiple times, still unable to find the page that she actually wanted to visit. Sue resigned to finding a number for which she could call and leave a complaint, as opposed to leaving a complaint online. Jack and John also found extensive difficulty in leaving a complaint on a past purchase. After clicking the "Help" link, both these participants seemed confused as to which link to click. As a quick workaround, we found it fascinating that Jack and John both used the same workaround: they opened a new tab in their browser and Google searched "how to file a complaint on Amazon." Using the step-by-step instructions that their searches produced, they were able to complete the task. Jack flipped back and forth between his amazon tab and the Google instructions, while John split his screen to read the instructions while concurrently navigating the site. Both methods seemed fairly inefficient.

PROJECT I: WEB-BASED SERVICES IDEATION



Figure 4 – Affinity Diagram

During our first brainstorming session, we produced an expansive affinity diagram to help outline our priorities. We analyzed the diagram and chose two problem areas that arose most often: efficiently navigating between products, and navigating the non-shopping portion of amazon.com. We then brainstormed a variety of proposals to resolve these problems.

The first problem was efficiently comparing products. One proposal to resolve this issue was an in-page tab feature. It would allow the user to store tabs of the products they wanted to compare, so they could easily switch back and forth without leaving the page. This was inspired by our contextual inquiry with John and his use of several browser tabs when shopping.

Our next idea to solve this problem was a "compare" button for each item in the search results page. Clicking this button would populate a new section of the page, where users could then easily click "compare all" to see a side-by-side comparison of their selected items. This comparison would highlight the most relevant features of the items, and display them alongside one another. These features would include price, item ranking, reviews/stars, general description, and a picture, which mutually we agreed upon since these features seemed to be the most relevant ones that our

contextual inquiry participants would consider. Then, we sketched a low-fidelity prototype of our vision so that we could all be on the same page before spending substantial time developing a higher fidelity prototype.

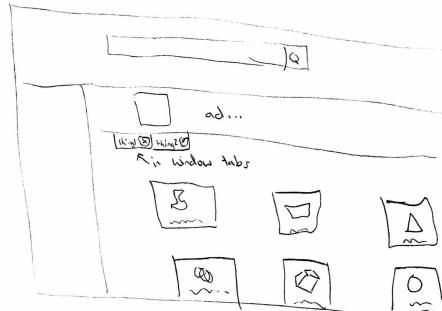


Figure 7 – Item Tab Bar Sketch

The next problem to tackle was non-shopping site navigation. When we asked each participant of our contextual inquiries to file a complaint about an item, none of them could easily navigate to the right page. What if a user wanted to leave the vendor a review? It would require wandering the site until the proper link was clicked, or a Google search for the page. An early idea to remedy this was to increase the size of the help link on the bottom of the page. We also thought changing its location to a more central one would help. Ultimately, we realized the success of the "product search bar" on the main page due to the freedom it granted users to search for *exactly* the pages they were looking for, and we decided to take a similar approach to improving site navigation. We proposed a search bar that would provide a real-time dropdown menu of links that match the user's query. The user would then be spared many redundant clicks in the hunt for their destination. The help bar would help reach pages such as: file a complaint, my addresses, 1-click settings, Prime Pantry, Prime Video, Store Directory and others.

PROJECT I: WEB-BASED SERVICES PROTOTYPING

After fully realizing our ideas to improve the interface, we started to build our prototypes. We began with sketches for each idea that we proposed.

These designs evolved through more iterations of sketches until we could agree upon a design and begin creating higher fidelity prototypes. We were fortunate to discover InVisionApp, which was ideal for rapidly prototyping our “Compare Products” idea, but unfortunately was infeasible for our “Help Bar” proposal. For that, we were forced to improvise by learning jQuery and developing a fully functional Chrome extension.

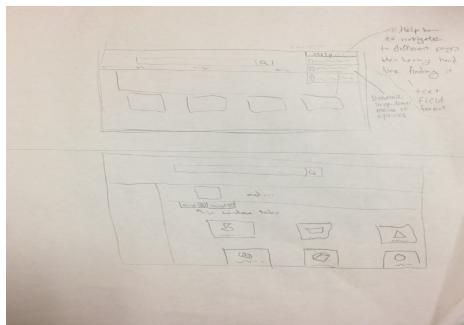


Figure 8 – Help Bar Sketch

Since our InVision prototype would not scroll beyond the length of the pictures we uploaded, we quickly realized that this prototypical website felt nothing like the real Amazon website. In order to have the full screen capture of Amazon, we used a Google Chrome extension called Full Page Screen Capture. It captured the entire page without decreasing the quality of the pictures embedded within it. Then we used Adobe Illustrator to add “compare” buttons and bars and organize the image by using gridlines and rulers. Realizing that the compare bar would be too small to recognize which items were which, we decided to make the compare area near the advertisement on top of the page and make it larger than we originally

expected. We added each product's details with Adobe Illustrator.

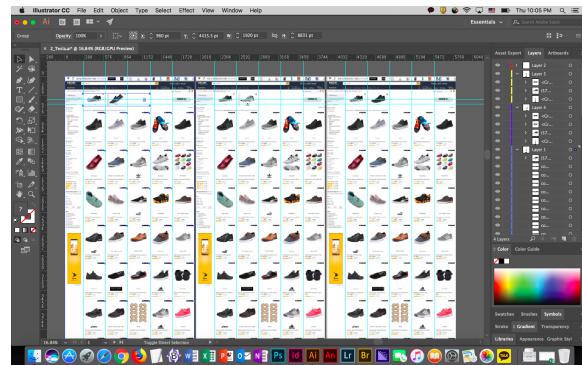


Figure 9 – Adobe Illustrator Setup

At last, InVision allowed us to implement the compare feature that improves the online shopping within the site. So, we were able to overlay clickable links onto each shopping item's “compare” button area that was designed in Illustrator. In this banner area, there is a "compare all" button to the right of all of the currently selected items. Upon clicking “compare all” the interface then displays a side by side comparison of the most relevant features of each item.

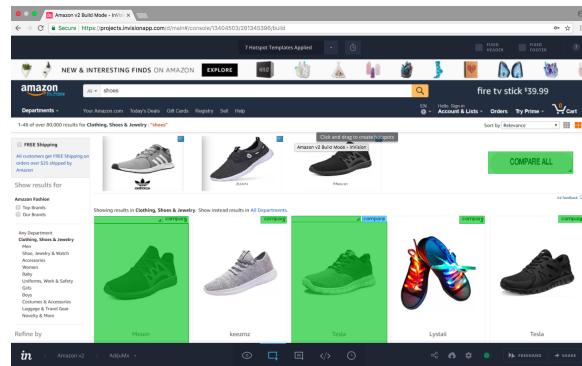


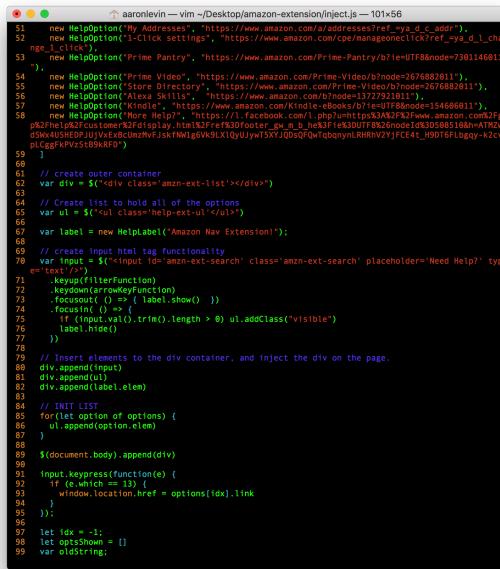
Figure 10 – InVision Setup

Although InVision enabled us to add the compare feature, it couldn't help us develop the new search-bar feature that we were interested in testing. Thus, we developed this prototype separately, by

PROJECT I: WEB-BASED SERVICES

PROTOTYPING

coding a Google Chrome extension that adds a help bar to any subdomain of amazon.com.



```

1  aaronlevin — vim ~/Desktop/amazon-extension/inject.js — 101×56
2
3  new HelpOption('My Addresses', "https://www.amazon.com/addresses/ref_=ya_d_c_addr"),
4  new HelpOption('1-Click settings', "https://www.amazon.com/cpo/manageoneclick/ref_=ya_d_1c
npo_l_click"),
5  new HelpOption('Prime Pantry', "https://www.amazon.com/Prime-Pantry/ref_=i-eUTF8&node=393146991
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6  new HelpOption('Prime Video', "https://www.amazon.com/Prime-Video/ref_=i-eUTF8&node=267682011"),
7  new HelpOption('Amazon Prime Now', "https://www.amazon.com/prime-now/ref_=i-eUTF8&node=267682011"),
8  new HelpOption('Alexa Skills', "https://www.amazon.com/b?node=1372791811"),
9  new HelpOption('Kindle', "https://www.amazon.com/kindle-ebooks/ref_=i-eUTF8&node=154686111"),
10 new HelpOption('Amazon Pay', "https://www.amazon.com/gp/yourstore/youraccount/ref_=i-eUTF8&node=154686111"),
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12 new HelpOption('Twitter', "https://twitter.com/1..."),
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96 new HelpOption('Amazon Devices', "https://www.amazon.com/b?node=1372791811"),
97 let idx = -1;
98 let optsShown = []
99 var oldString;

```

Figure 11 – JavaScript, jQuery, and HTML for Help Bar

What originally started as a simple Chrome extension that used JavaScript and HTML to implement a search bar with a dropdown menu, quickly turned into much more than that. Every small task was twice as cumbersome as expected to implement, even for the smallest of features. Eventually, the entire codebase needed to be rewritten from plain JavaScript into jQuery, so that arrow key functionality could be implemented in order for users to be able to traverse the list without using the mouse. This made us really appreciate rapid prototyping tools like InVision, as they certainly save tons of time while still proposing feasible solutions early in the design process.

Ultimately, we were able to successfully implement our high-fidelity, fully functional prototype of the fully responsive, real-time search bar.

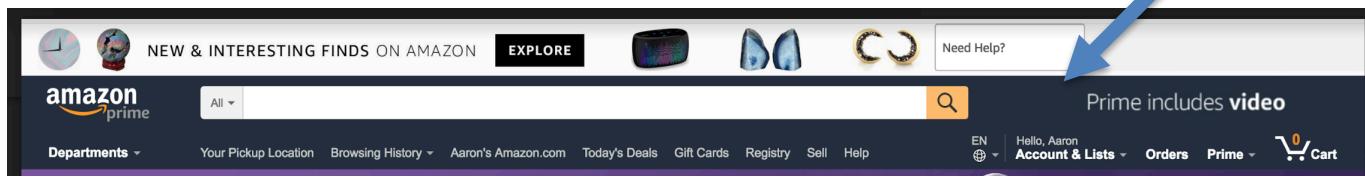


Figure 12 – High Fidelity Search Bar Prototype

PROJECT I: WEB-BASED SERVICES EVALUATION

After developing our usable prototypes, we then sought new participants to test our designs. Our goal was to assess whether or not our designs were intuitive, efficient, and above all pleasurable to use. Unbiased feedback would help us determine whether or not more work should be necessary to further improve our proposals.

We found a random sample of 5 people to test each of our prototypes. We gave each participant 3 specific tasks: 1) compare four items and add one of them to the cart, 2) figure out all of the addresses saved in this account, and 3) navigate to Amazon Prime Pantry. Task #1 was designed to assess the quality of our InVision “comparable items” prototype, while tests #2 and #3 were supposed to assess how well the help bar improved the users’ ability to navigate to unfamiliar pages within Amazon.com.

After completing all 3 tasks, each user filled out 2 System Usability Scale (SUS) reports (one for each prototype) based on their experience during the demo. Based on these reports, as well as the notes that we took during the new inquiry, we were able to identify a number of further improvements that we could make to our prototypes.

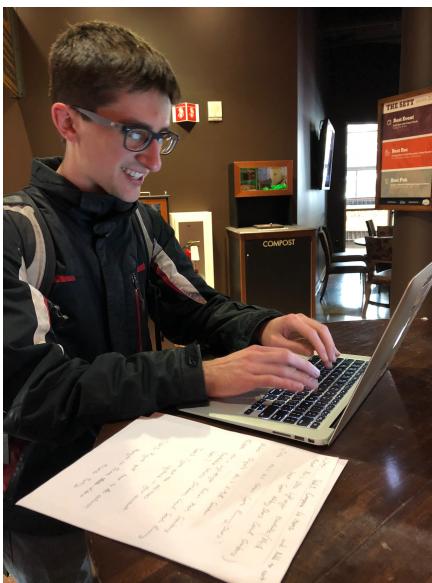


Figure 13 – Participant happily tests each prototype

System Usability Scale				
© Digital Equipment Corporation, 1986.				
	Strongly disagree	Strongly agree	CHP	Help
1. I think that I would like to use the system frequently	<input checked="" type="checkbox"/>	1 2 3 4 5	2	2
2. I found the system unnecessary complex	<input type="checkbox"/>	1 2 3 4 5	2	2
3. I thought the system was ready to use	<input type="checkbox"/>	1 2 3 4 5	2	3
4. I think that I would need the support of a technical person to be able to use the system	<input type="checkbox"/>	1 2 3 4 5	1	1
5. I found all the various functions in this system were well integrated	<input type="checkbox"/>	1 2 3 4 5	3	3
6. I thought there was too much inconsistency in this system	<input type="checkbox"/>	1 2 3 4 5	2	2
7. I think that most people would find it difficult to use this system very quickly	<input type="checkbox"/>	1 2 3 4 5	3	5
8. I found the system very cumbersome to use	<input type="checkbox"/>	1 2 3 4 5	3	1
9. I feel very confident using the system	<input type="checkbox"/>	1 2 3 4 5	4	4
10. I do not feel I learn a lot of things from the system by going with the system	<input type="checkbox"/>	1 2 3 4 5	2	2

Figure 14 – Filled out SUS

inadequately degraded some of the users' experiences. Because everything was implemented with dozens of hard copies of photos, users were limited in the ways that they could interact with the platform. Thus, they could not explore the website as freely as they were attempting to—they were ONLY able to use it in the way that we had designed it to be used.

More importantly, by observing our users interact with our prototypes firsthand, we noticed some of them completely miss the “compare” button on each item. Likewise, users flat out didn’t notice that the help bar was there either. However, once realizing its presence, users were able to navigate to their desired pages within Amazon.com substantially faster than without the help bar. To measure exactly how much faster they could navigate, we measured the number of clicks and the amount of time that it took them to complete the navigation tasks. We were pleased to see that with the help bar, generally only one click was required (after typing) to navigate to the desired pages, whereas originally it would take users between 10 and 20 clicks.

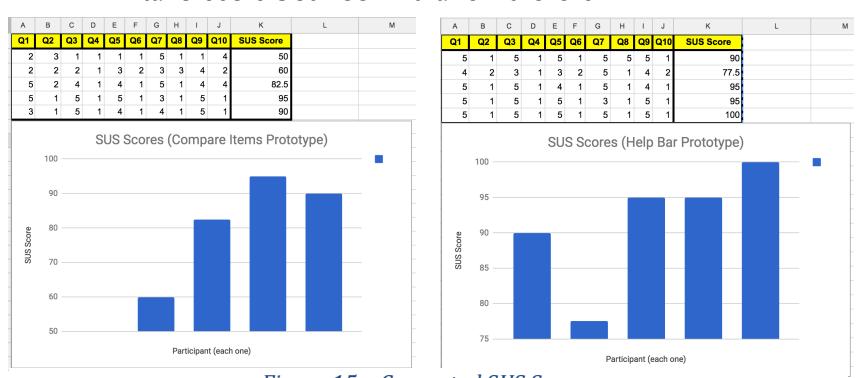


Figure 15 – Computed SUS Scores

PROJECT I: WEB-BASED SERVICES

FINAL SOLUTION

In our evaluation, we discovered that our prototypes did in fact create efficient, enjoyable systems for completing more profound tasks on Amazon. However, there was a major design flaw, in that neither of our solutions were blatantly visible enough to be intuitive to a user who hadn't used them before. Thus, for our final solution, we proposed increasing the prominence of our prototypes on each page. We increased the size of the "compare" buttons, and also made a colored background alongside a label that clearly denotes the browser extension, so that users can tell it apart from the advertisement beside it.



Figure 16 – Idle Search Bar



Figure 17 – Focused Search Bar

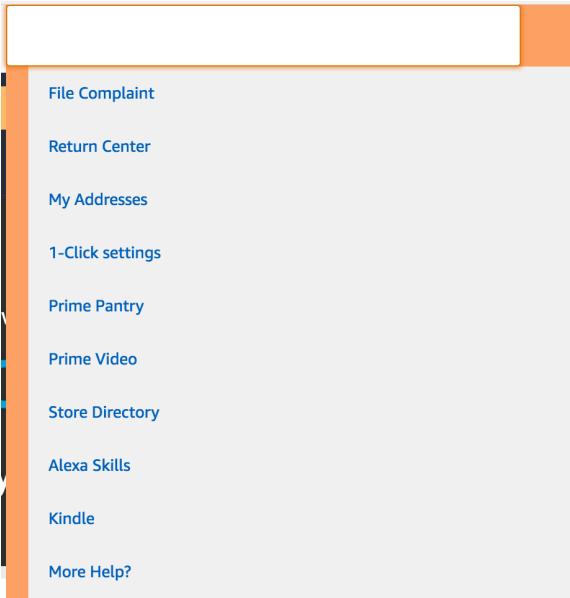


Figure 18 – Expanded Search Bar

The final implementation of the bar was heavy with jQuery. Due to the modular nature of the code that was written, along

with the powerful flexibility of jQuery, adding a new item to the search menu is a single line of code, and new features/styles for the bar also require minimal additional code. The config file associated with the extension specifies that the help bar should appear on any page within Amazon.com, so users are not required to re-enable the extension on every page they visit. Small conveniences like this help reduce the number of clicks users must make to achieve desired tasks, which consequentially makes it easier for users to navigate with less effort.

With regard to the item comparing prototype, we feel as though users were too limited by InVision to give useful feedback (aside from the "compare" buttons not being prominent enough on the page). Our usability study revealed that users were intrigued by the side-by-side display of products after clicking "compare all," but they seemed frustrated by the process they had to go through to select the only clickable items that were available in our prototype. Thus, we aren't sure if users would find it viable in a real setting, but their excitement for the side-by-side comparison seemed very promising. The next steps for this prototype would be to implement a more functional iteration, possible with jQuery and JavaScript as we did with our search bar. Overall, we were very pleased with our findings.

[1] amazon 44% online sales
<https://www.cnbc.com/2018/01/03/amazon-grabbed-4-percent-of-all-us-retail-sales-in-2017-new-study.html>