Phase 3: Evaluate

MIE240 Tutorial 01

Eran Vijayakumar, Spokesperson

Tatiana Leon-Prado Ortiz, First Author

Richard Jing, Project Manager

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Executive Summary

In phase three of the Metro website redesign, the team designed a usability experiment of the prototype developed in Phase 2 to test our design and ensure it addresses the current website's shortcomings and is in line with the overall goal of improving the "comparing between products" feature. In addition, the team conducted usability testing on a representative sample of our target users - five university students who had experience with online shopping platforms; to observe how real-life potential users interact with the design. This allowed the team to evaluate the design and highlight its strengths and weaknesses.

To conduct the usability testing, a low-fidelity prototype was created. Then, participants were instructed on how the design works, and we observed their interaction with the prototype. During the observations of usability testing, we collected quantitative data, including time and number of clicks taken, and qualitative data like the participants' emotions were recorded. Participants had also done a post-study questionnaire to provide their ratings of different parts of the design and feedback and recommendations. We also collected information that could help us improve user experience, such as how they would prioritize the types of information they would like to see.

After compiling and analyzing the data collected, a few usability problems were disclosed. For example, the design would not be intuitive for the first time because it operates in an uncommon task sequence. Therefore, we incorporated participants' feedback to develop recommended solutions that could potentially address or improve these usability problems.

Finally, we assessed the benefits and limitations of the usability test. This helped us understand how the design would be used in a real-life situation and eliminated false assumptions. However, improvements can still be implemented to address limitations, such as small test group size. In the future steps, we shall incorporate the usability problems we identified and the limitations, to produce a better prototype and conduct better usability tests.

1.0 Introduction

As the global pandemic developed, online shopping became extremely popular, with many companies making their services available digitally. To make Metro stand out among its competitors, we have been tasked to redesign a feature of its website; for us, this is the "comparison between products" feature. Comparing two products on the Metro Website requires the user to repeatedly go back and forth, which results in a slow and inefficient process. As well as the inconsistency of the website, which makes it harder to decide which product to choose as not all of them have information aside from the price. In phase three of the project, we conducted usability testing of the prototype developed in Phase 2 and analyzed this data to evaluate our design and highlight its strengths and weaknesses.

2.0 Part 1: User Profile

We decided our user scope to be young adults, specifically college-age students. Not only are students the most affected stakeholders when talking about e-commerce, but they are also the ones [1] who grew up in the midst of the transition to the online world we are currently living in. A retail's new reality report found out that "82% of 13-39 years old have been online shopped more since COVID than they had ever done in the past"[2]. And even with the global pandemic starting to ease, young shoppers aren't eager to go into stores right away. Therefore, we selected our main users to be students, and thus we conducted the usability testing on five university students (20-21 years old) who had experience with online shopping platforms which is representative of the 18-22 year old student demographic. The reason we chose this age range is because there are numerous online shopping platforms available, so if we want young adults to choose Metro over other platforms, we should make it stand out in usability and efficiency. To test our prototype in performing better than Metro's competitors websites we must ask for feedback from users that have tried other online shopping platforms.

3.0 Part 2: Tasks Selected for the Usability Evaluation

Our goal is to identify usability problems that affect the functionality of the display design in order to increase efficiency of product comparison, and secondly what type of information to display and prioritize to allow for product evaluation and comparison.

Three tasks were selected for usability testing (refer to HTA in Appendix A for more detail):

1. Look for the first and second products to compare (Task 1.0 and 3.0)
2. Evaluating product information / accessing information (Task 2.0)
3. Comparison (Task 4.0)

The first task involves selecting products to compare. The prototype creates a new user interface whereas the current website does not have a dedicated UI. We are interested in the user's ability to navigate to the comparison tool. The second task involves accessing product information within the comparison tool. We are interested in the drop-down feature in terms of ease of use and efficiency. The third task we are evaluating is making comparisons between two products. We are interested in how the new comparison tool user interface increases efficiency and satisfaction of this task in addition to whether sufficient information is presented for comparison.

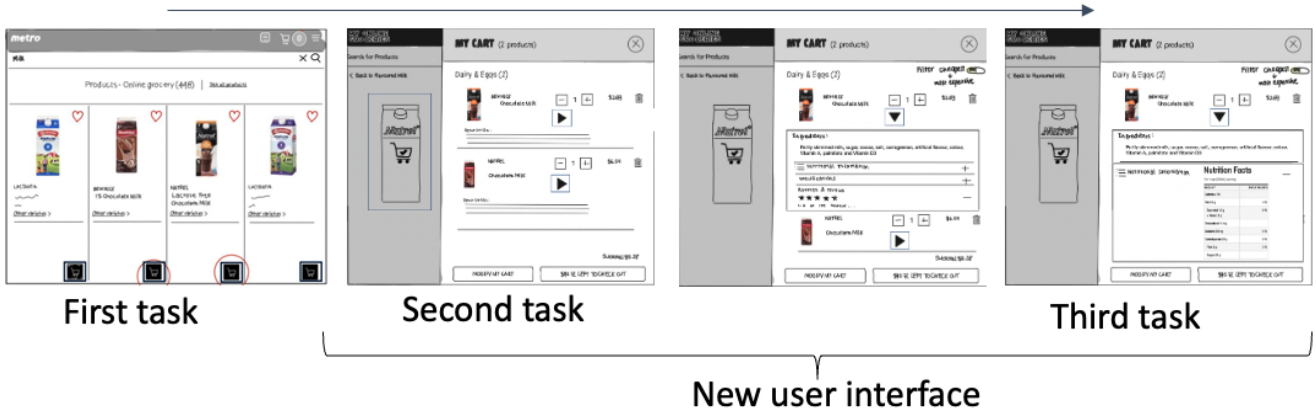

Figure 3. Sequence of user interfaces that will be tested. Refer to Appendix B for larger images.

4.0 Part 3: Data Collection and Analyzation

4.1 Usability Testing Prototype

Usability testing was conducted using a low fidelity prototype (see Appendix B) to test for usability problems and the prototype worked to address the original website's shortcomings. The prototype included detailed information to get reliable feedback on users making comparisons between products. Making comparisons is a cognitive process that requires detailed information and is not only about information display. Additionally, research has shown that a more detailed prototype can increase user performance [3]. PowerPoint was created to test each of the tasks identified in Part 2. Users were given a link to the PowerPoint with written instructions: they were told where the comparison tool was located (in the cart) but they had to figure out which buttons to press in order to navigate to it and which button was the comparison tool. When participants were interacting with the prototype, we recorded quantitative data including the time

and number of clicks they took to complete the tasks. We also observed their emotions and barriers encountered as qualitative data. Before testing began, the purpose and procedure of the testing was explained and users were asked to volunteer for this testing and provide consent to participate. In addition to the observation method, qualitative data was collected by survey.

4.2 Participant survey

A survey form (refer to Appendix C) was designed to collect users' feedback, recommendations, and other mental activities we failed to detect during the observations. By doing a survey after the trial, a participant could take the time to reflect on the experience and provide well-constructed feedback and recommendation.

Before the user tested the prototype, we used the first section of the survey to collect users' background information. Since our prototype was designed to increase the efficiency of the system, we wanted our participants to have sufficient online shopping experience so that they would be able to compare the new design with their past experiences and hopefully capture an evident difference. Questions including "how often do you shop online" were included in this part of the survey.

After the trial, the participants would proceed to a post-study questionnaire where they would be able to share thoughts on the experience and provide feedback and recommendations. Our primary goal was to validate if the design could boost system efficiency, but rather than asking leading questions like making comparisons with the original website, we prompted the users to evaluate the design as its own. This would work out because our design was an additional feature instead of a change in the original UI. We asked participants questions including "was the comparison tool easy to use" and "was it difficult to find the drop-down button" and let them rate the experience on a 1-5 scale. Together with the quantitative data of time cost and the number of clicks recorded during the observations, we were able to evaluate the efficiency of the design.

In addition to the usability of the new prototype, the survey is intended to collect data on the effectiveness and performance of the comparison process. Two design principles are related to this goal. The first one is proximity compatibility, which suggests that relevant information should be listed close to each other. The second one is salience compatibility which suggests

emphasizing the most important information. In general, we want to make the type of product information that users care about the most more evident and noticeable and make them accessible together. We listed the common types of product information including price, product description, nutrition facts, ingredients, and customer ratings. We then questioned the participants about what type they cared about the most and second. See Appendix C for a copy of the survey. In addition, we also surveyed the participants if they encountered any noticeable barriers during the trial, their general feelings about the design, as well as their comments and recommendations.

4.3 Heuristic Evaluation

The less-is-more-effect is a decision-making evaluation heuristic that states that too much information can decrease accuracy of a comparison task[4]. To understand how the display of information and how much information affects the accuracy of comparing two products the less-is-more effect was adapted to understand the prototype in relation to the current website and the optimal website. Our interpretation is that no more information should be added to the display.

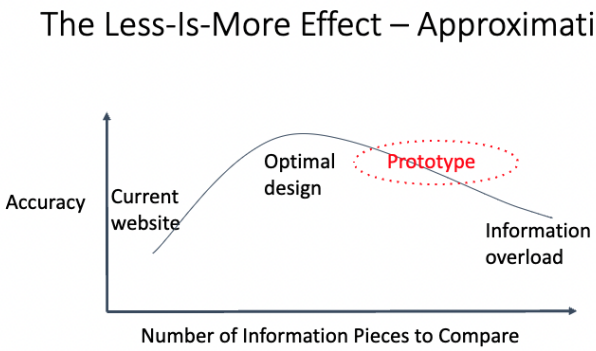

Figure 4.3 Adapted from Less-Is-More-Effect from Oxford Handbook of Cognitive Engineering [4]

5.0 Part 4: Usability Problems

5.1 Usability problems identified

Unclear sequence of tasks:

Even though participants liked the idea of our prototype, they mentioned that it was hard to understand what to click next as the system was not very intuitive. This made the experience both unfavourable and inefficient. This can be linked to the knowledge and understanding section in the Human Factors scale of measurement; as this problem affected the users' understanding of the prototype.

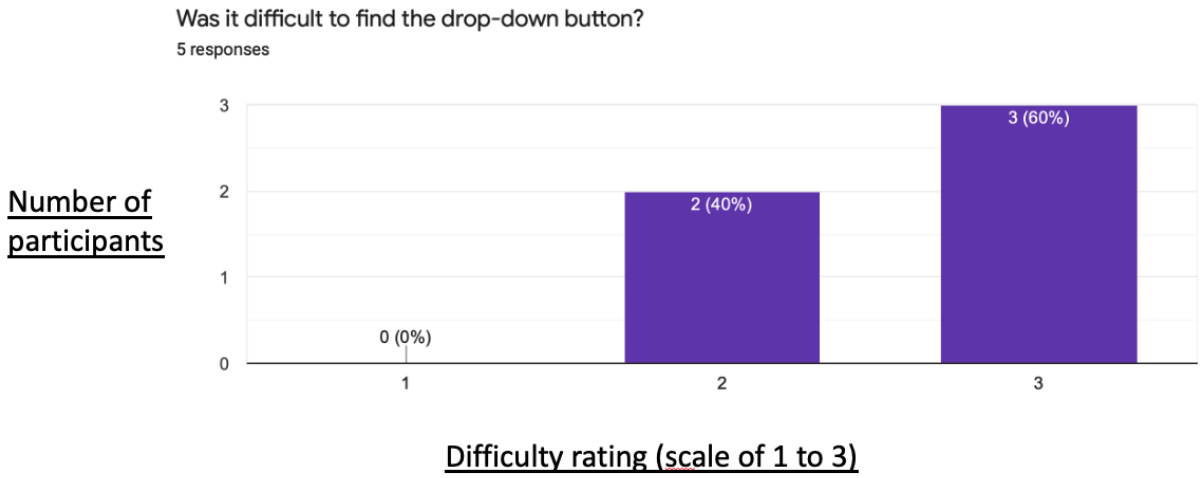

Figure 5.1.1. Difficulty rating of finding the drop-down menu on a scale of 1(difficult) to 3(not difficult at all). Two out of five users were indifferent or found it moderately difficult to find the drop-down button to access more information. The majority of users did not face difficulty in finding the drop-down button.

Too many clicks to access information:

Even though the number of clicks decreased compared to the original Metro design, there were still too many clicks to access the information, making the experience less efficient. In terms of the Usability dimensions, this problem affected task performance and the user's satisfaction as they prefer to have all the information to make a faster decision. Linking this to the design principle of Attention, we would like to minimize the information access cost. See figure D.2 in Appendix D for evidence of user efficiency rating of the feature.

Inability to compare two product's nutritional information at the same time:

The users were forced to go back and forth between the products as they could not see the two nutritional pieces of information at the same time. This was the problem we wanted to change from the original Metro design. It improved in the sense that at least they can see the price and the products they are deciding to take at the same time (as they are in the cart); nevertheless, they

are not able to compare the product's information (such as the calories) at the same time, forcing them to recall the information. We would need to focus on the memory design principle of support recognition rather than forcing recall to solve this problem.

Reliability of Data:

All users that participated in usability testing are representative of our target users. All users were between ages 20 and 21, all had used online shopping before, and four of five users had used online grocery shopping. The majority of users use online shopping at least once or twice a month.

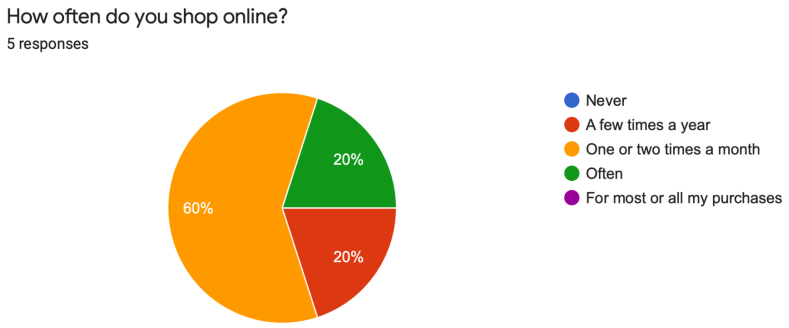

Figure 5.1.2. User responses to how often they shop online.

5.2 Recommended solutions

The sequence of tasks is not clear as this is not a common type of design:

The essential cause of the problem is that the task sequence of navigating to the comparison tool in the cart is not common. Normally, people would make comparisons first and then add to the cart, but this design allows users to add first and then make comparisons. The result is that the design is not intuitive to use for the first time when customers are not aware of the design. However, as the user takes notice of the existence of the new feature, it is expected to become handy later, based on the assumption that our targeted users are frequent shoppers. This is supported by the 40% of users being indifferent and 60% facing no difficulty (se figure 5.1.1). Another solution could be sending a notification when the feature is launched or prompting users to use the new tool.

Increase proximity compatibility and enable comparing two products at the same time:

This problem can be improved by allowing users to "drag" the item bars in the cart and move them up or down. In this way, the user can put two items being compared beside each other so that their information would potentially be able to appear together. Another solution would be the alternative design of "parallel feature comparison" from phase 2: Create. The design will enable users to pick two products and compare their information in a pop-up window. This design is again a stand-alone feature that does not interrupt the current UI.

Too many clicks to access the information:

Although we can list all products in one location, a few clicks are still required to unfold their information. As suggested by a participant, we could add a switch at the top of the item list. Once it is turned on, all products' drop-down lists will be unfolded at once. We will also make the most important type of information unfold as the default setting.

5.3 Usability successes:

Variety of information sources displayed:

Users have a wide preference for the information they primarily use to evaluate products and make comparisons. The prototype included several product information sources such as ingredients, nutritional information, and customer ratings and reviews (see figure 5.3.1). Users also had a wide preference for the information they use in addition to their most important information source. This result reinforces the need for a variety of information sources when making a comparison (see figure D.1 in the Appendix). The prototype allows for users to see multiple types of information right next to each other such as price and customer ratings. Future iterations of the prototype should display multiple product information categories and balance information proximity and efficiency.

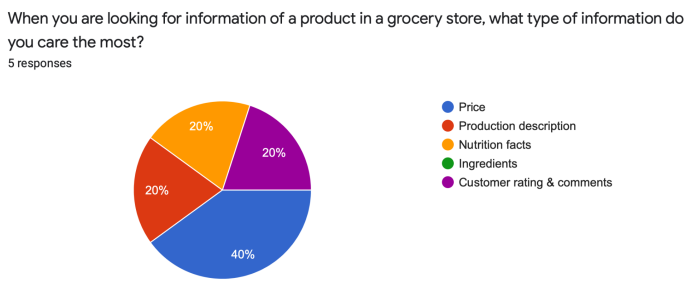

Figure 5.3.1. User choices for product information they care the most about.

6.0 Part 5: Benefits and Limitations of Usability Testing

6.1 Benefits

The faster users learn to use the new design, the more likely they will keep using the interface. The only way to understand whether our design is easily understood by the users is by conducting a usability test. Usability testing is crucial because we might understand the design, but external customers might not. The usability test allowed us to visualize the progress of our prototype and ensure that the plan is in line with our overall goal; by observing how real-life students interact with the product.

6.2 Limitations

Aside from the benefits of the usability test, there are still limitations within the test we are conducting. First, we could only collect a limited amount of information with the low-fidelity prototype. Many functions are limited and thus it cannot perfectly simulate the real scenario. In fact, a few problems and barriers occurred during the trials due to the prototype being low fidelity. For example, as planned in the design, two products' drop-down lists can be unfolded at the same time, but due to the limitation of the page length of the slideshow, this feature couldn't be implemented. Another issue is that the usability test is very time-consuming. It would take several iterations; for each participant, a complete process of observation and survey. Consequentially, with the time we have, we can only conduct usability tests on 5 participants. Although established human factors principles suggest that 5 participants would report 75% percent of usability problems, we still believe there is room for further usability testing. For example, out of the 5 participants, only one claimed to care about the nutritional facts, which we believed to be an important one—however, this probably could also be why we needed to conduct a usability test, to exclude false assumptions.

Conclusion and Future Steps

Over the past four months, we have completed the design cycle to improve the current website's comparison functionality which has resulted in a basic functional design prototype that has undergone usability testing. In the next iteration of the cycle, we would use our understanding of the usability problems to implement solutions to further improve the prototype. Changes will be incorporated into a high-fidelity prototype and we will conduct usability testing with a larger group of participants on the new iteration of the prototype.

Bibliography

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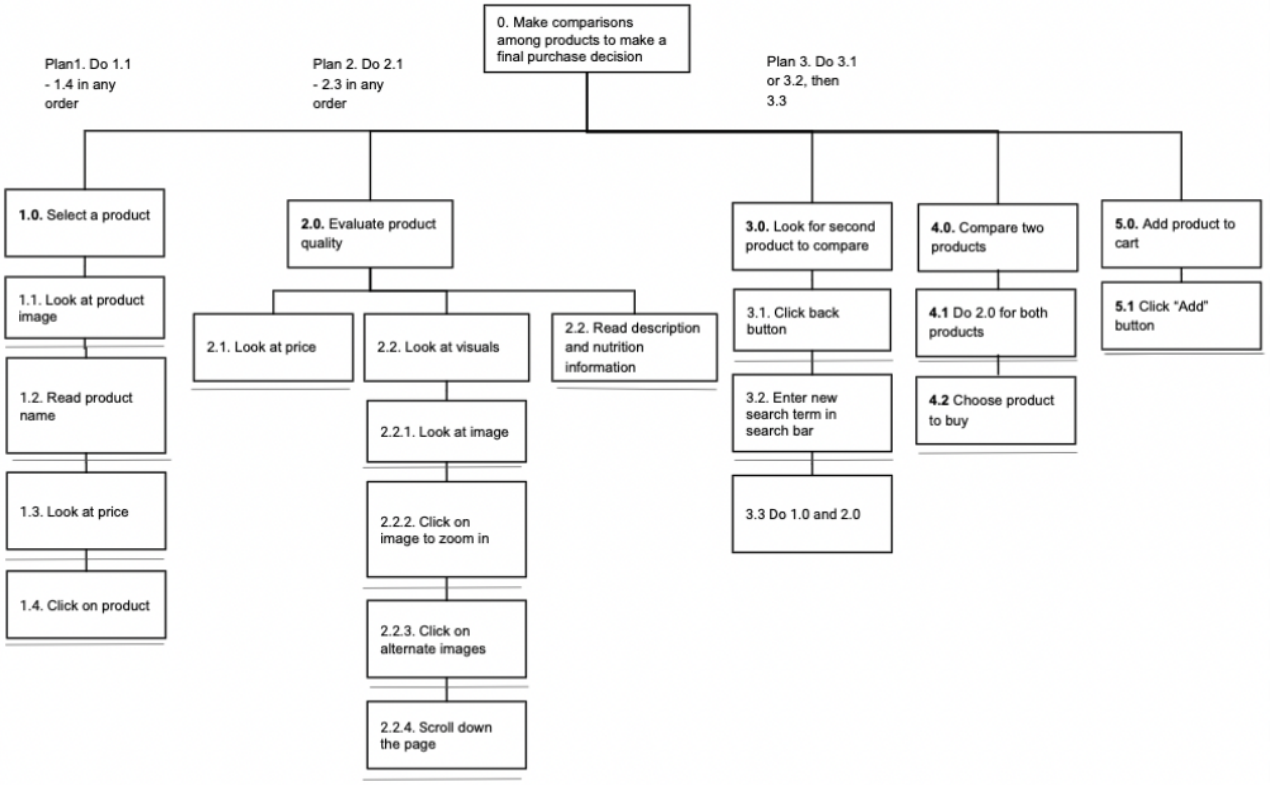
[4] *librarysearch.library.utoronto.ca*. [Online]. Available: https://librarysearch.library.utoronto.ca/permalink/01UTORONTO_INST/fedca1/cdi_oup_oho_10_1093_oxfordhb_9780199757183_001_0001.

Appendix

Appendix A. Hierarchical Task Analysis Diagram


0. Make comparisons among products to make a final purchase decision
Plan1. Do 1.1 - 1.4 in any order
Plan 2. Do 2.1 - 2.3 in any order
Plan 3. Do 3.1 or 3.2, then 3.3
1.0. Select a product
1.1. Look at product image
1.2. Read product name
1.3. Look at price
1.4. Click on product
2.0. Evaluate product quality
2.1. Look at price
2.2. Look at visuals
2.2.1. Look at image
2.2.2. Click on image to zoom in
2.2.3. Click on alternate images
2.2.4. Scroll down the page
2.2. Read description and nutrition information
3.0. Look for second product to compare
3.1. Click back button
3.2. Enter new search term in search bar
3.3 Do 1.0 and 2.0
4.0. Compare two products
4.1 Do 2.0 for both products
4.2 Choose product to buy
5.0. Add product to cart
5.1 Click "Add" button

Appendix B. Usability Testing Prototype

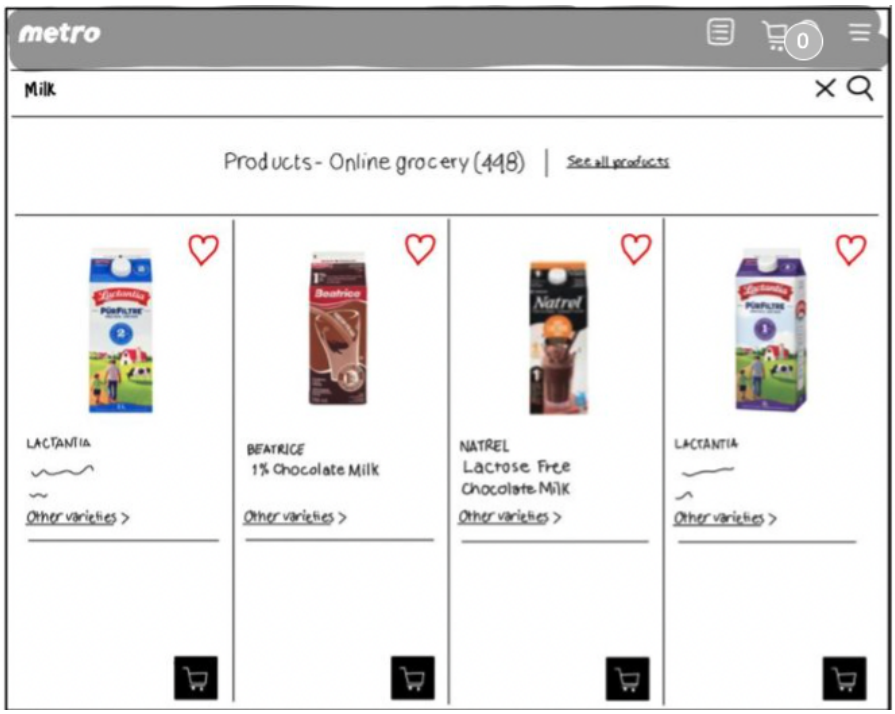
Low-Fidelity-Prototype

Instructions:

- Scenario: you want to buy 1 chocolate milk, but you're undecided between two different products
- If you want to compare the product details you can do so in the cart
- Follow the instructions on the left side of the screen if applicable
- Do not use your keyboard, only your mouse to press buttons on the screen
- To start, press the start button

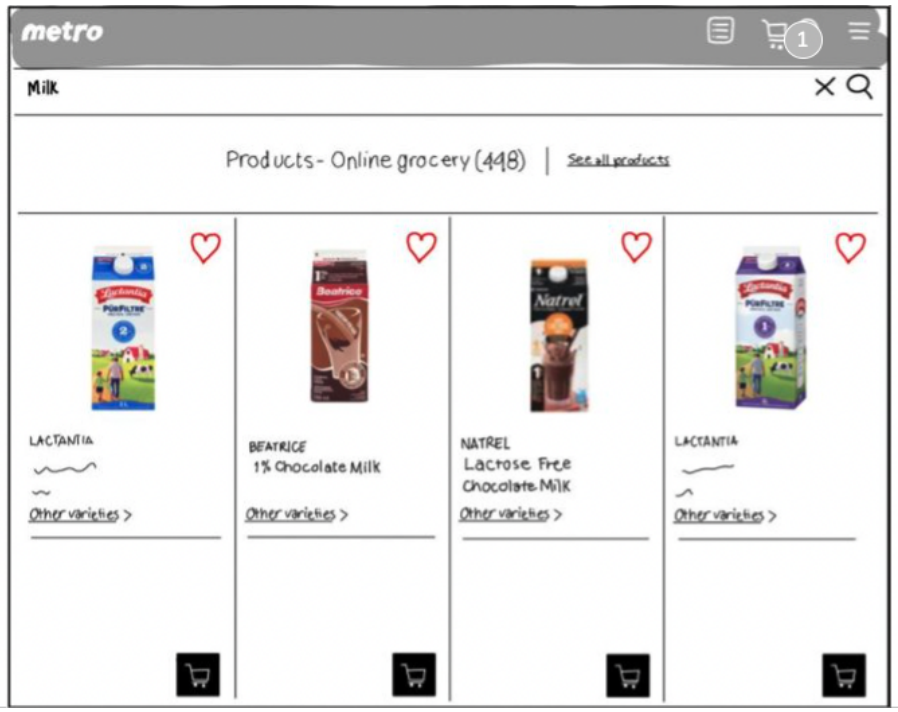
START

Select the product that captures your attention

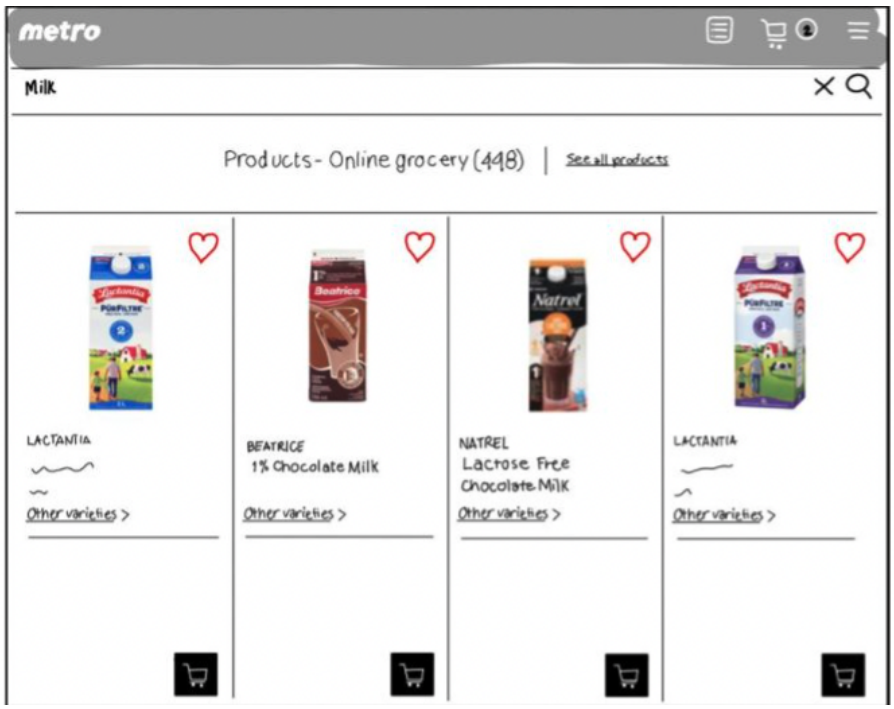


Is there any other chocolate milk that captures your attention?

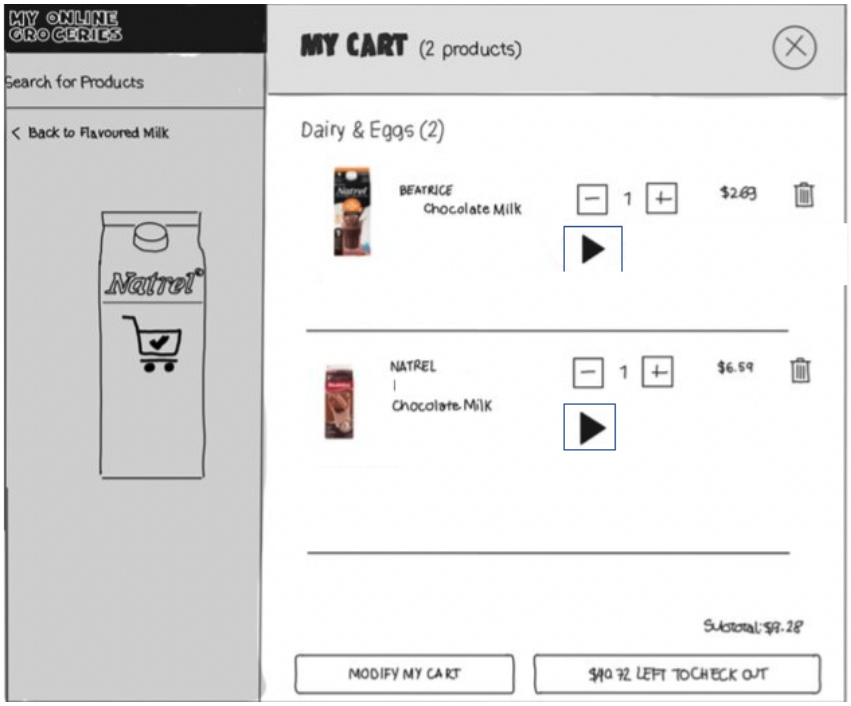
Add it as well.

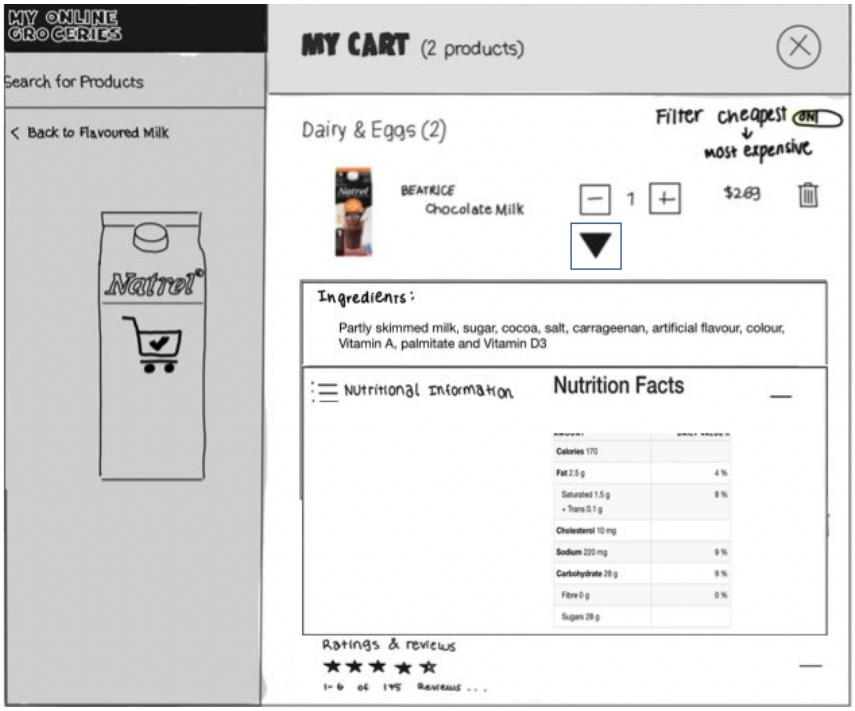


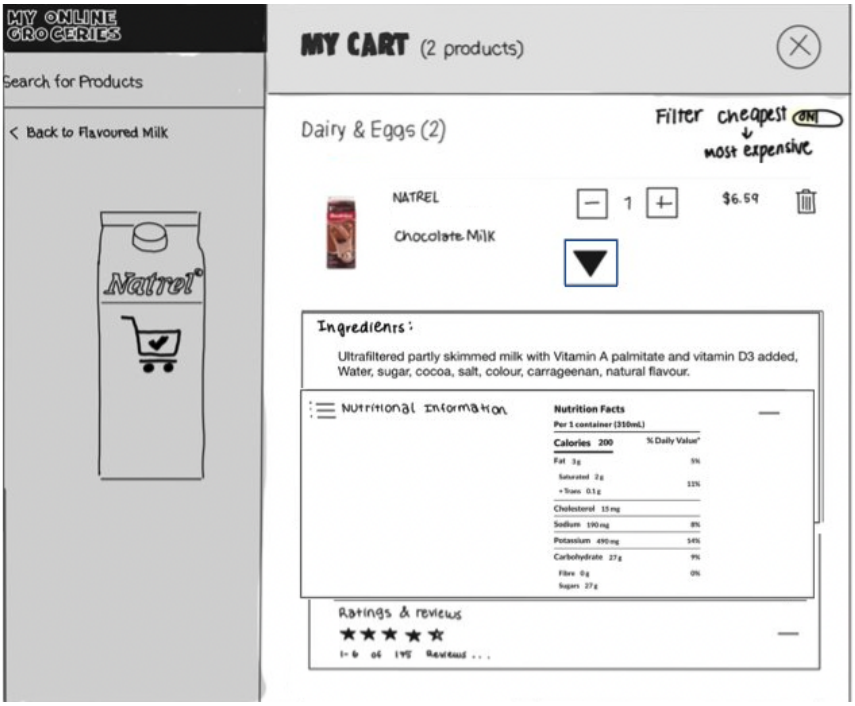
Products have been added to the cart.



Press one of the drop down triangles

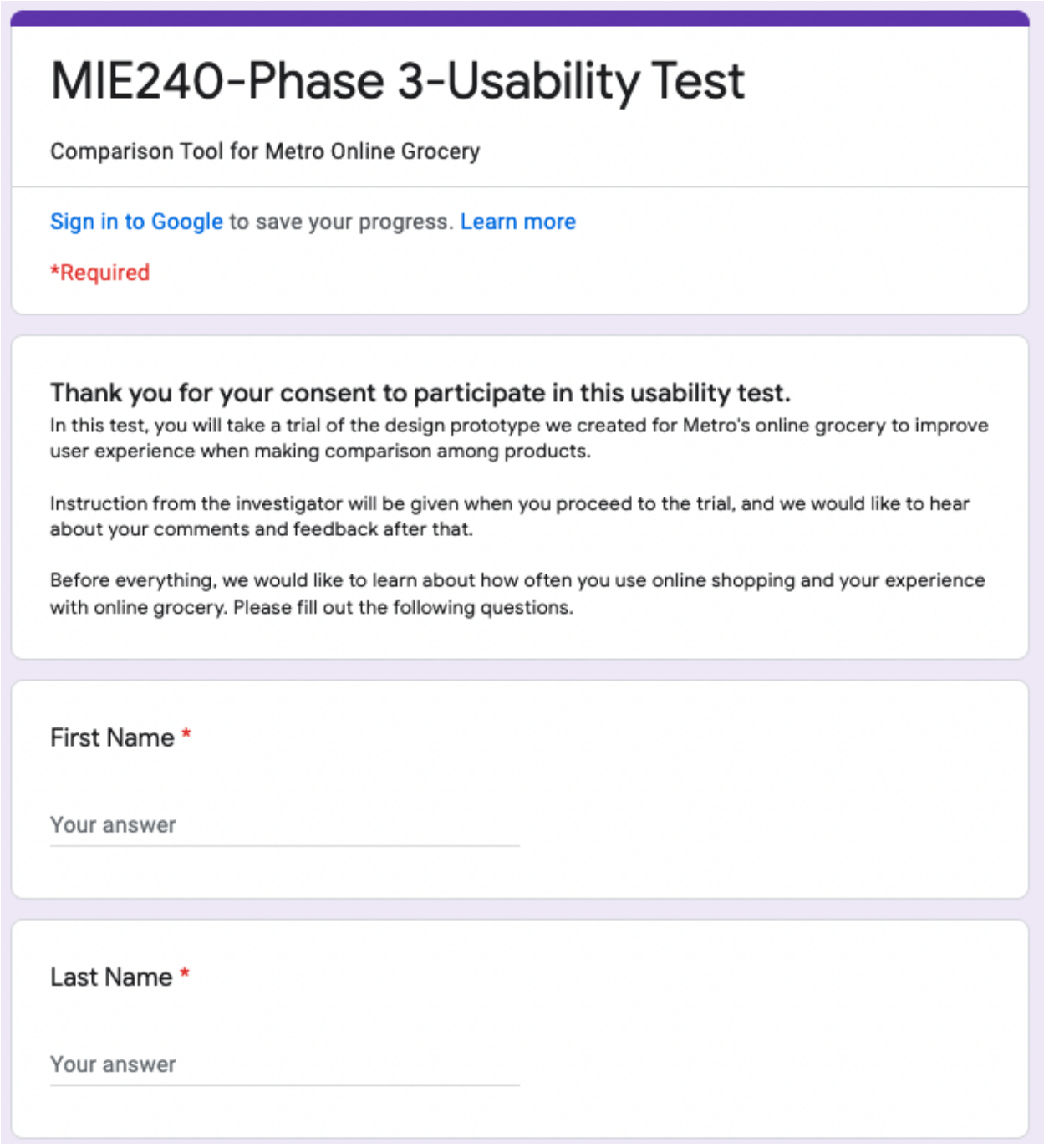





MY ONLINE GROCERIES
Search for Products
< Back to Flavoured Milk
Natrel
MY CART (2 products)
Dairy & Eggs (2)
Filter cheapest ONE most expensive
NATREL
Chocolate Milk
1
$6.59
Ingredients:
Ultrafiltered partly skimmed milk with Vitamin A palmitate and vitamin D3 added, Water, sugar, cocoa, salt, colour, carrageenan, natural flavour.
Nutritional Information
Nutrition Facts
Per 1 container (310mL)
Calories 200
% Daily Value*
Fat 3 g 5%
Saturated 2 g + Trans 0.1 g 11%
Cholesterol 15 mg
Sodium 190 mg 8%
Potassium 490 mg 14%
Carbohydrate 27 g 9%
Fibre 0 g 0%
Sugars 27 g
Ratings & reviews
1-6 of 195 Reviews . . .

Appendix C Participant Survey

Screening questions:



MIE240-Phase 3-Usability Test

Comparison Tool for Metro Online Grocery

Sign in to Google to save your progress. Learn more

*Required

Thank you for your consent to participate in this usability test.

In this test, you will take a trial of the design prototype we created for Metro's online grocery to improve user experience when making comparison among products.

Instruction from the investigator will be given when you proceed to the trial, and we would like to hear about your comments and feedback after that.

Before everything, we would like to learn about how often you use online shopping and your experience with online grocery. Please fill out the following questions.

First Name *

Your answer

Last Name *

Your answer

Please enter your age *

Your answer

Have you used online shopping websites before? *

- ◯ Yes
- ◯ No

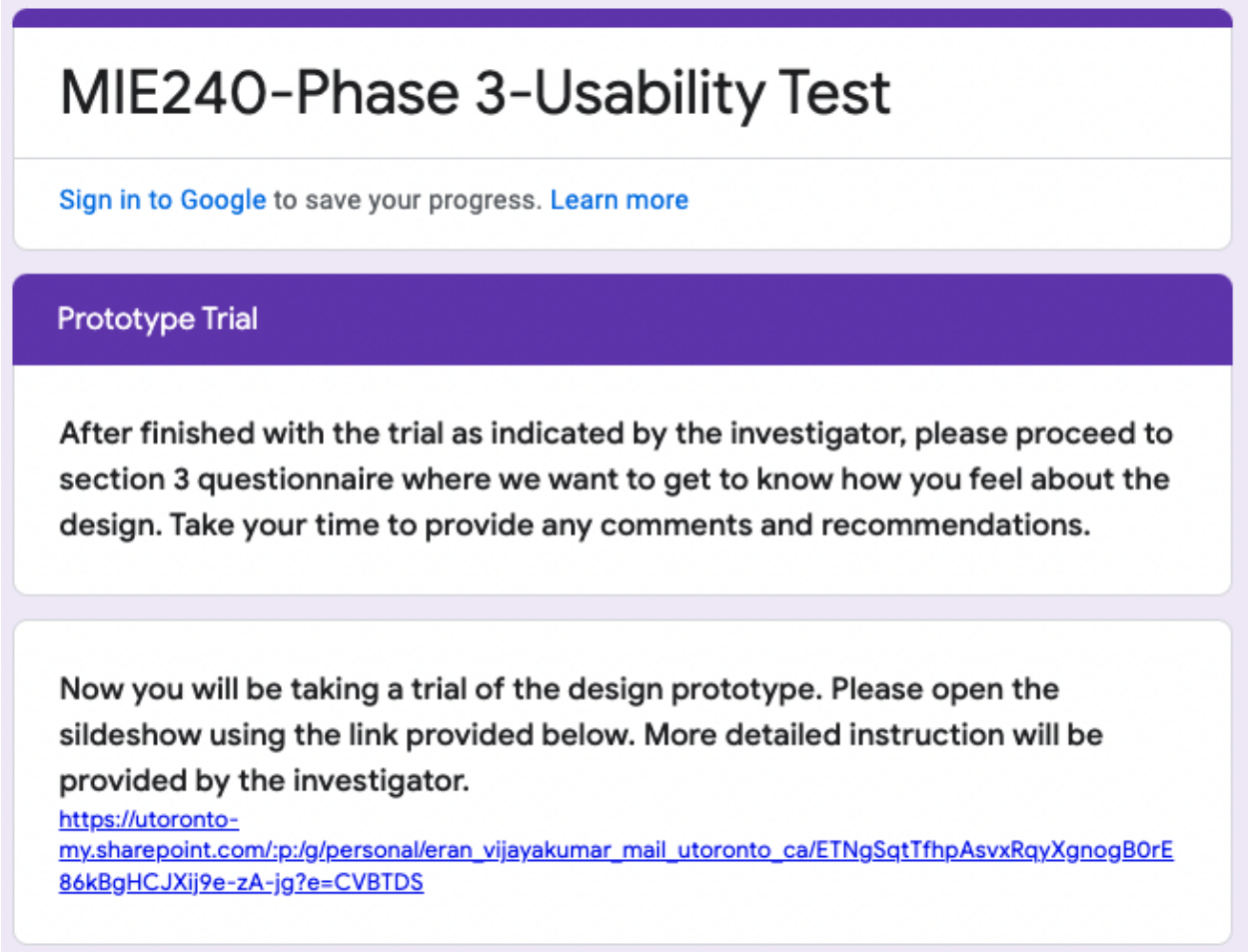
Have you used online grocery shopping before? *

- ◯ Yes
- ◯ No

How often do you shop online? *

- ◯ Never
- ◯ A few times a year
- ◯ One or two times a month
- ◯ Often
- ◯ For most or all my purchases

Prompt to start usability testing



Survey

MIE240-Phase 3-Usability Test

Sign in to Google to save your progress. Learn more

Post usability test questionnaire

How would you rate your experience when comparing two products?

	1	2	3	4	5	
Unsatisfied	○	○	○	○	○	Satisfied

Did you find the comparison tool useful?

- ○ Yes
- ○ No
- ○ Maybe

What do you think about having the comparison tool in the cart?

Your answer

Is this design easy to use?

	1	2	3	4	5	
Not easy at all	○	○	○	○	○	Very Easy

Was it difficult to find the drop-down button?

	1	2	3	
Difficult	○	○	○	Not difficult at all

How would you rate the design as its potential to increase efficiency of the website?

	1	2	3	4	5	
Not efficient at all	○	○	○	○	○	Very efficient

When you are looking for information of a product in a grocery store, what type of information do you care the most?

- ○ Price
- ○ Production description
- ○ Nutrition facts
- ○ Ingredients
- ○ Customer rating & comments

What other information would you like to see as well?

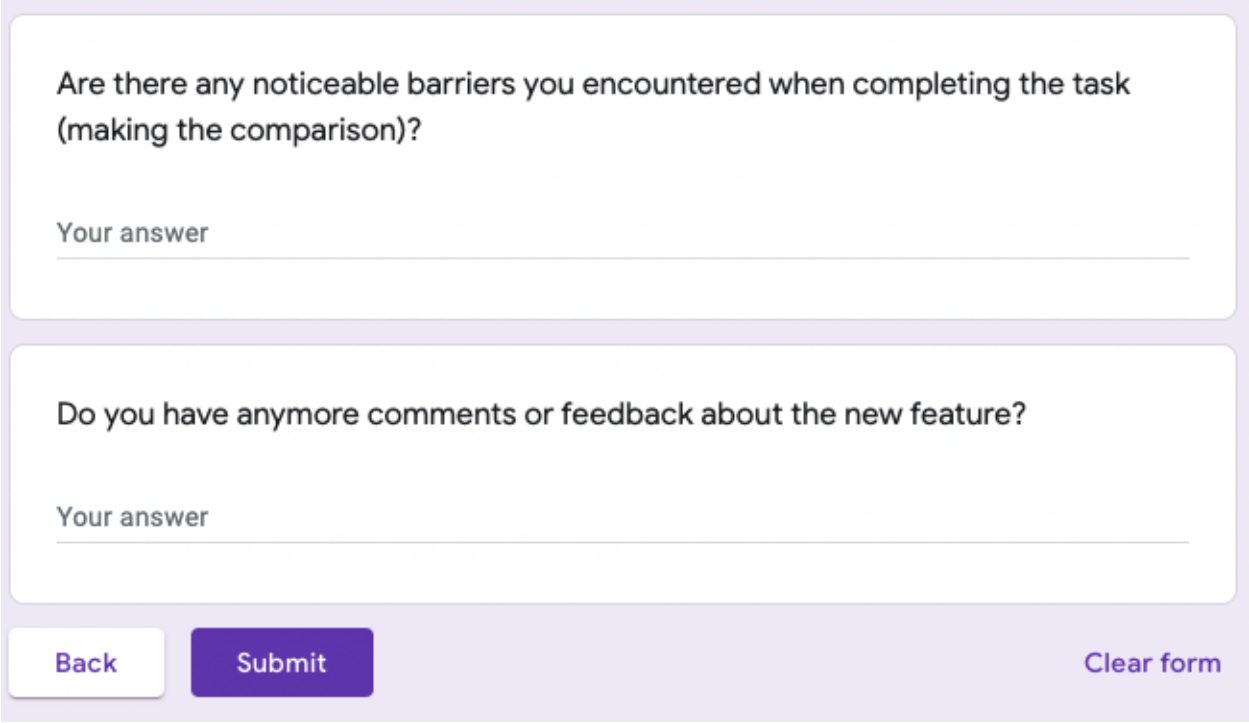
- [ ] Price
- [ ] Production description
- [ ] Nutrition facts
- [ ] Ingredients
- [ ] Customer rating & comments
- [ ] Other: _____

Is there any information that you would like to know that was missing?

Your answer

Based on your experience with other online groceries, what do you think of this design?

Your answer



Appendix D. Survey Results

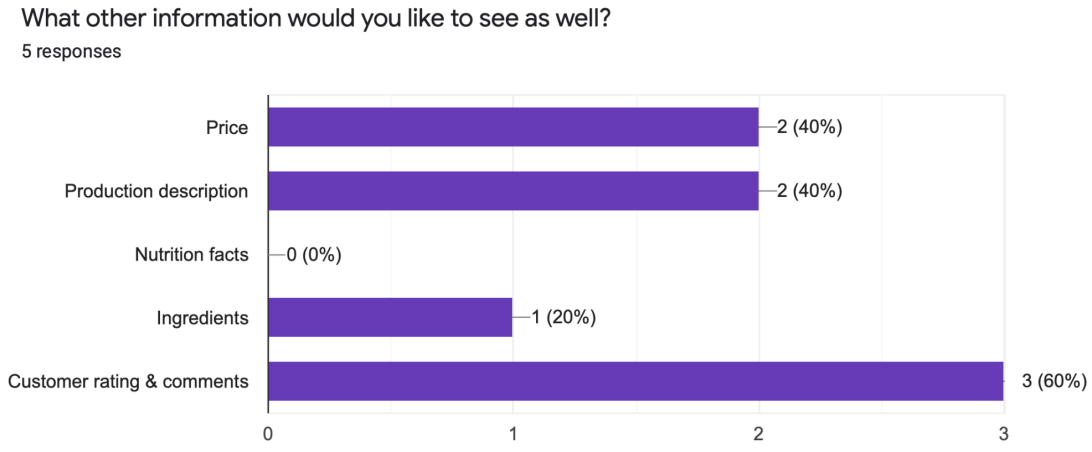


Figure D.1. User choices for secondary pieces of information.

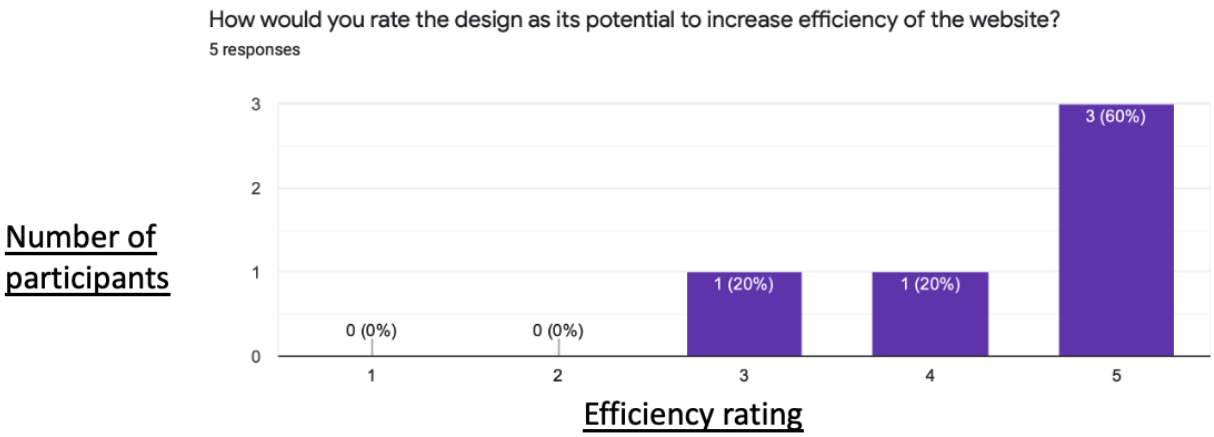


Figure 2. User ratings of design's ability to increase efficiency on a scale of 1 (not efficient at all) to 5 (Very efficient). Two out of five users did not rate it very efficient and one user representing 20% of users was indifferent to the new design's effect on efficiency.