Human Computer Interaction Design: Final Report

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Website Name: Duffl

Website URL: https://www.duffl.com/?view=Landing

Our Prototype Site URL: https://254gj2.axshare.com

1. Executive Summary:

A few fundamental workflows on an ecommerce website named Duffl (www.duffl.com) was redesigned in our project with the aim of enhancing this website's usability and user experience. Some tasks (mentioned below) were assigned to our participants, and we recorded any errors that occurred, resulting in metrics and laws being broken and later fixed in the redesigned website. Our main area of improvement/redesign was:
- Improve the searching and category listing.
- Implement a way for easier category selection.
- Achieve a significantly better method for a user's decision and selection.
- Implement filtering of products as wished by the user.
- Selection of the size of a few products (For example: Merchandise).
- Decrease the number of mouse clicks while choosing products like shirt.
- Achieve a much easier checkout.
- Enhance the review and payment page .
- Clear indications of items, adding description and giving more product information to users.

By adhering to good design principles like Chunking, Confirmation, Mental Model, Recognition over Recall, Jacobs Law, Zeigarnik Effect and enabling necessary constraints, optimizing the number of mouse clicks per page, and adding filter, easier reviewing and payment pages, we have successfully completed all of the aforementioned goals.

2. Method:

Who we tested?

We tested totally on 12 participants (6 participants for the original website and next 6 participants for the redesigned website). The demographics for the 12 participants are mentioned below:

AUDIENCE TYPE	COUNT
New Users	11
Existing Users	1
TOTAL	**12**

AGE	COUNT
15-20	2
21-25	9
25-30	1
TOTAL	**12**

GENDER	COUNT
Male	7
Female	5
TOTAL	**12**

COMPUTER USAGE	COUNT
0 - 10hrs/week	0
11 - 20hrs/week	10
20+ hrs/week	2
TOTAL	**12**

2.1. What did Participants do?

In the following project, the participants for the original website had spent more than 5 minutes while executing the tasks in the original website and the participants who worked on executing the same set of tasks in the redesigned website, they had to spend less amount of time in executing the tasks. They were first provided with a basic description of tasks which gave a clear indication of what needs to be done, and they followed it to execute the tasks. The participants were asked to execute 3 tasks in both the original and redesigned website. The first task involved ordering a chips packet of the users interest (while we suggested on pringles – cheddar cheese) and then moving to the review order/payment page. The second task involved the user trying to add chips of a certain number (we suggested 20 pieces) and then adding something healthy to buy and moving towards the review order /payment page. The third task involved the user buying a shirt of his interest with a size of L or XL. The tasks are explained in detail below.

Task 1:
- The first task involves a user entering the website and using a search category to find the chips category page.
- The second step in the task is adding chips of count 2.
- The third step involves going to the review order/payment page.

Task 2:
- The first step in task 2 is going to chips page and adding chips of count 20.
- The second step is going to the healthy food category page.
- The third step involves adding yogurt of count 1.
- The final step involves moving towards the review order / Payment page.

Task 3:
- The first step in task 3 is going to the merchandise page.
- The second step involves finding a T-shirt and adding of persons size preferably X-large or Large.
- The third step involves going to the review order/Payment page.

2.2. Metrics collected:

Number of Mouse Clicks:

The higher the number of mouse clicks there will be more time taken to complete each and every task. This task involves calculating the number of clicks that the participant has done to evaluate the usability and time taken to complete each and every task.

Task Time:

The total time taken by the participant to complete each and every task is calculated here. This is one of the best ways to check the efficiency of a website.

The Task time is calculated based on the following formulae:
T = E - S, Where T is the total task time taken, E is the end time of the task and S being the start time of the task.

System Usability scale:

Users' post-session evaluations of a set of tasks can be used as a comprehensive design analysis tool to gauge a product's overall usability. Here a questionnaire is provided to the participant post execution of all the above-mentioned tasks, by doing this we are able to see how comfortable the participants with the redesigned website are.

2.3. What improvements were made to the site?

Issue 01: **Having icons that are not recognizable**

Principle: **Recognition over recall.**
According to this design theory, websites should allow users to create objects and images using their general memory or memories rather than forcing them to become accustomed to particular website features. For instance, when looking at the back button, typically or left arrow button to return. So that users don't have to remember how each website presents icons for particular tasks, all websites should adhere to this common standard. Similarly, using icons like shopping cart, payment, search, category will help them recognize easily since they can recall using similar icons from previous/similar/sister ecommerce websites they have used.

Issue Description:

To aid visitors in recalling how the linked site operates, the original website makes use of instantly recognizable icons. But rather than a typical shopping cart or cart, this website's checkout process is represented by a set of page icons. Customers are directed to the home page by the letter "d" rather than the "home" symbol or the website logo on the website. Thus, there is initially some hesitancy or uncertainty regarding the designation used.
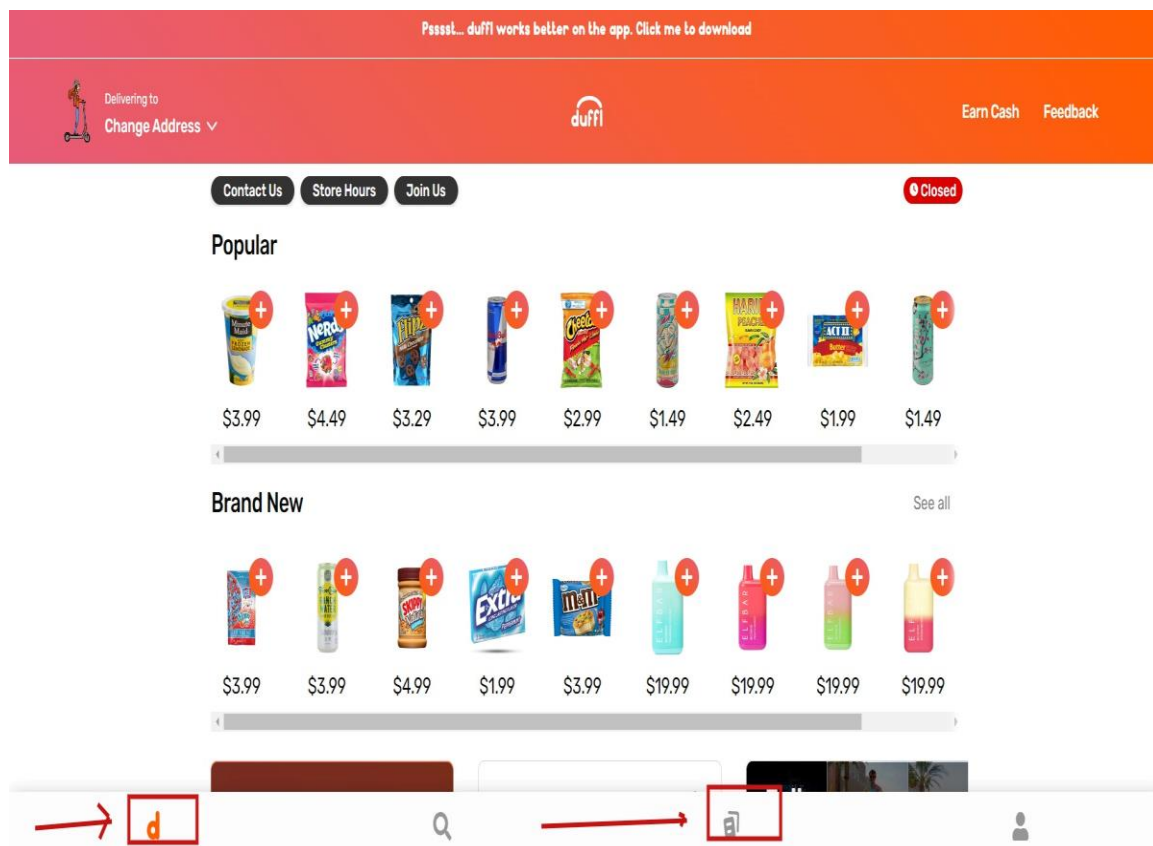
Fix for the issue:

The redesigned site will use the common shopping cart or shopping bag symbol to represent orders and replace the house icon "d" with the full logo. Thus, it reduces the user's effort to remember the functionality of the website and makes it easy to identify.
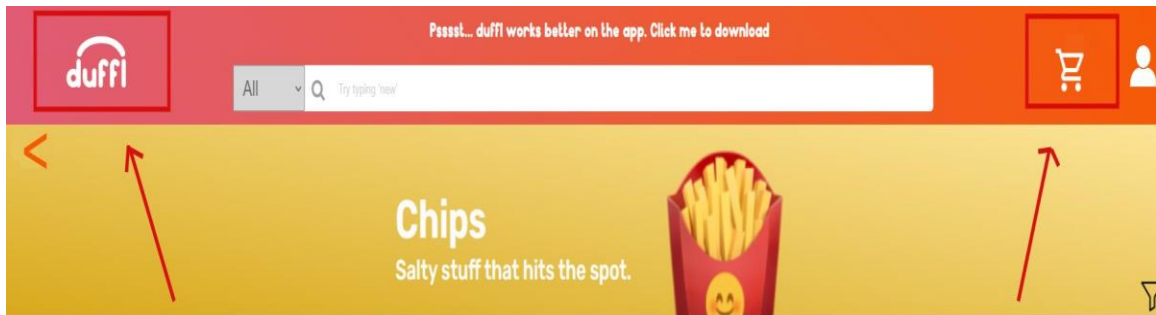
Issue 2: Not having proper icons to add and remove items from the cart

Principle 2: Errors

This theory contends that errors are merely accidents brought on by numerous human factors. Slips and Mistakes fall into one of two categories. When tasks are not completed as planned, slips happen. These are referred to as operational errors or execution errors occasionally. Intentional or planning errors can result from wrong intentions as well.

Issue Description:

The issue with the current website is that when a user adds a product to their hand in order, it does not display how many products have been added, making it challenging for users to decide how many to add. So if he / she adds multiple products he needs to go to the review page every single time to see what he has added to cart.
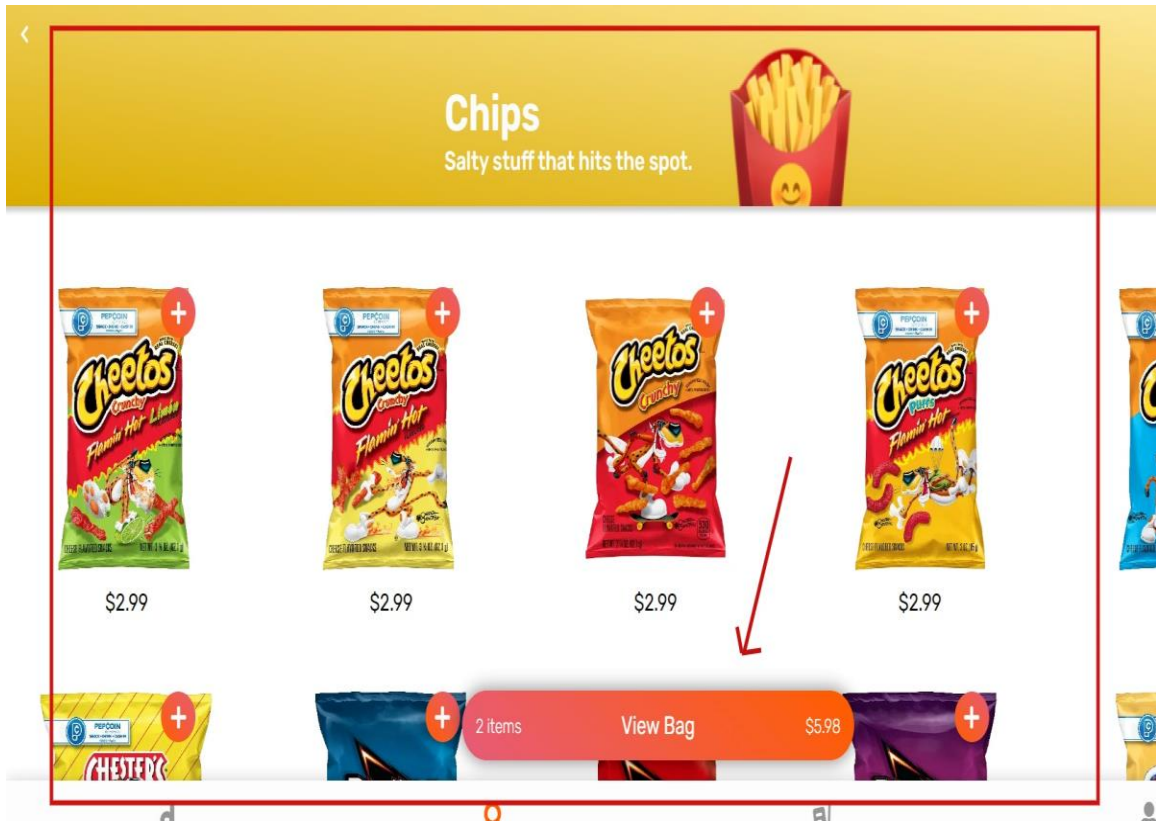
Fix for the issue:

With regard to every product, the redesigned website will add the "+" and "-" symbols. As a result, it will guarantee that the customer is aware of the product he has added as well as its quantity.
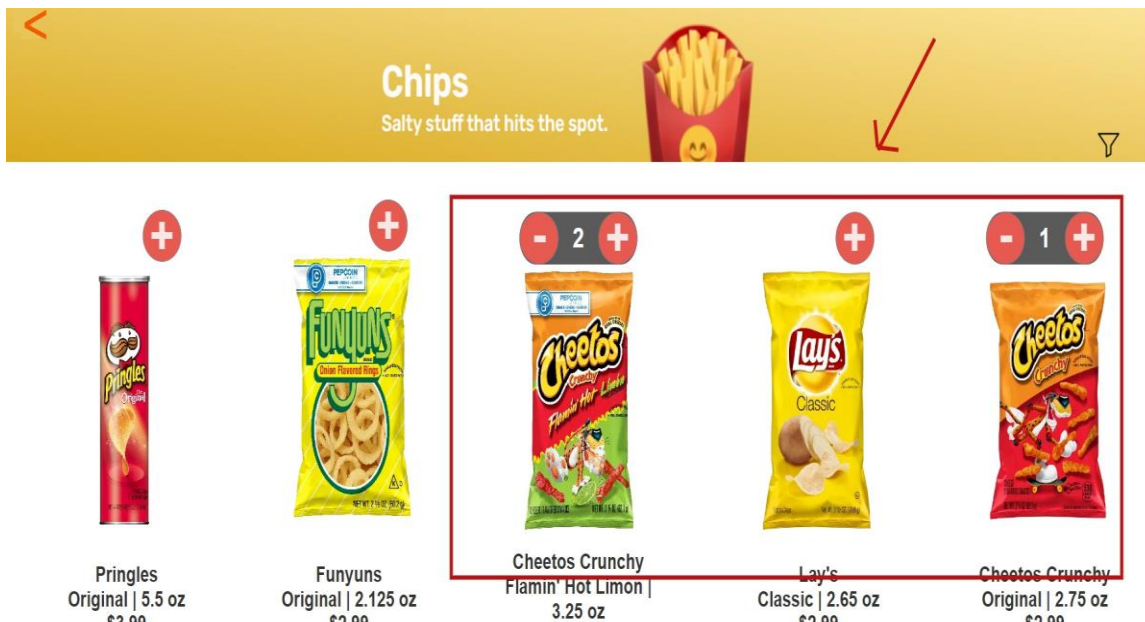
Issue 3: Visibility and usage of search and categories page

Principle 3 : Visibility

The fundamental tenet of visibility states that the more visible an element is, the more likely it is that users will be aware of it and understand how to use it. The opposite is also crucial: it's challenging to know about and use something when it's hidden.

Issue Description:

The issue in the current website is that the search icon isn't properly visible or highlighted in a proper way and thus it becomes difficult for the user to find it . Thus it results in the user taking more than the required time to search for a particular product than it is necessary to add them to the cart and order.
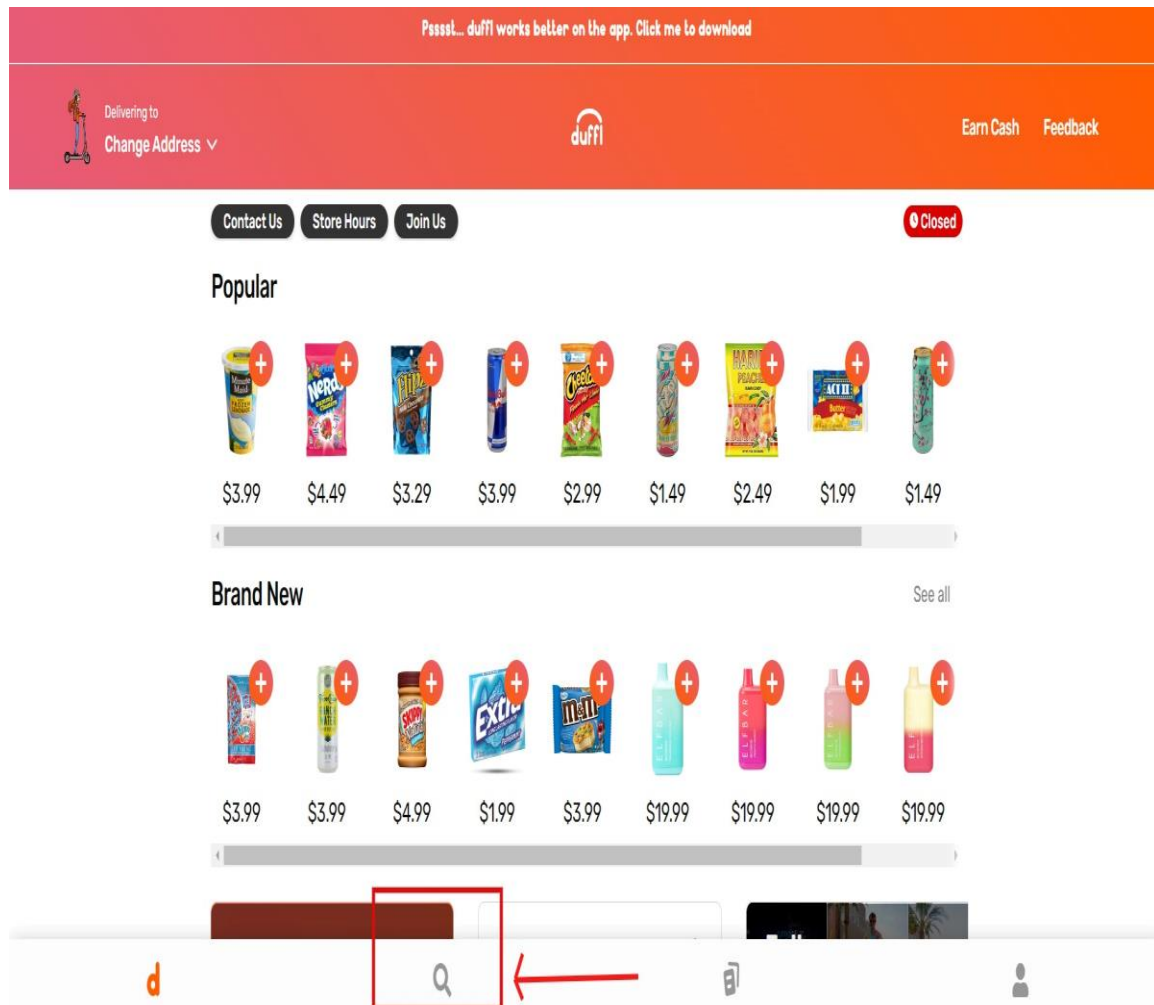
Fix for the issue:
In the redesigned website, we have brought the search icon to the top of the page and will be available over all pages where the user can search and also we have provided a drop down along with the search which the user can use to see the different categories available and can use them to search.
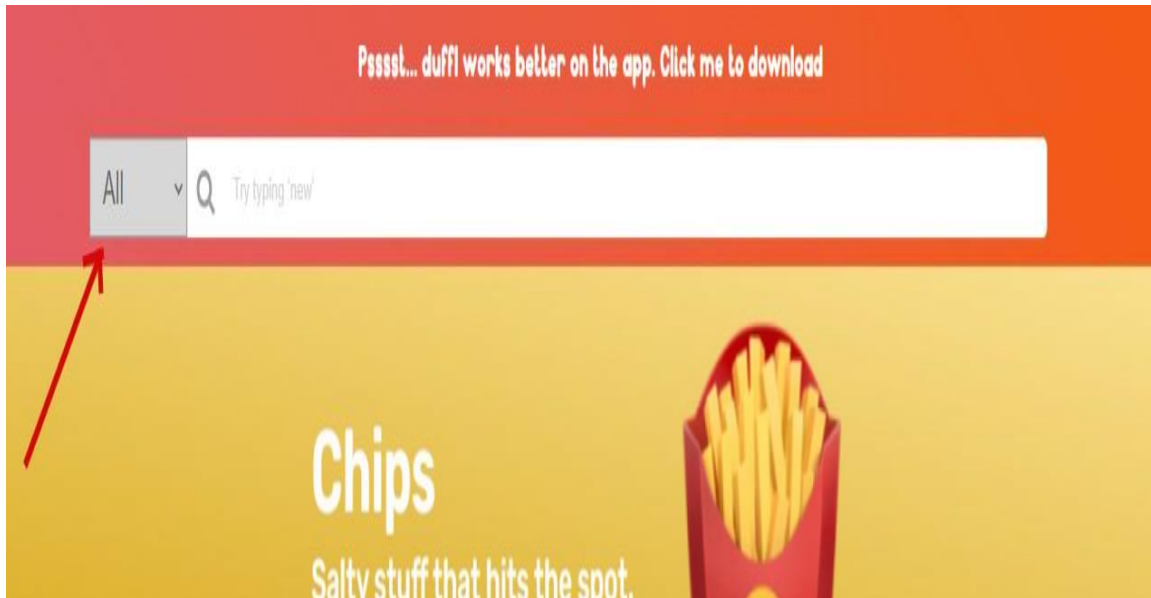
Issue 4: No clear Confirmation / reviewing of orders and payment

Principle 4 : Confirmation
Users can confirm their "option/action" using the confirmation technique before engaging in any significant activity. It serves as a safeguard against user error, commonly known as slips. A confirmation option before any important actions helps users to evaluate before it is posted because sometimes accidental actions can have a significant negative influence on users' experiences with the site.

Issue Description:
One of the major problems in the Duffl website was that the user doesn't get to review what he/she has in the cart before they make the payment and after adding their location. Hence we can say there is no confirmation and the user won't be able to undo the process if he has made a mistake in the product selection or would want to add more items to the cart.

Figure 1: Original Review / Payment Page

Fix for the issue:

We used the concept of confirmation in the last page before the payment is made. The confirmation page includes the details about the product that the user has selected, and we give them an option to modify the cart if needed. We have confirmation of the amount and the payment as well. This way we give an opportunity for the users to review and optimize the choices if any unintentional mistake is made.
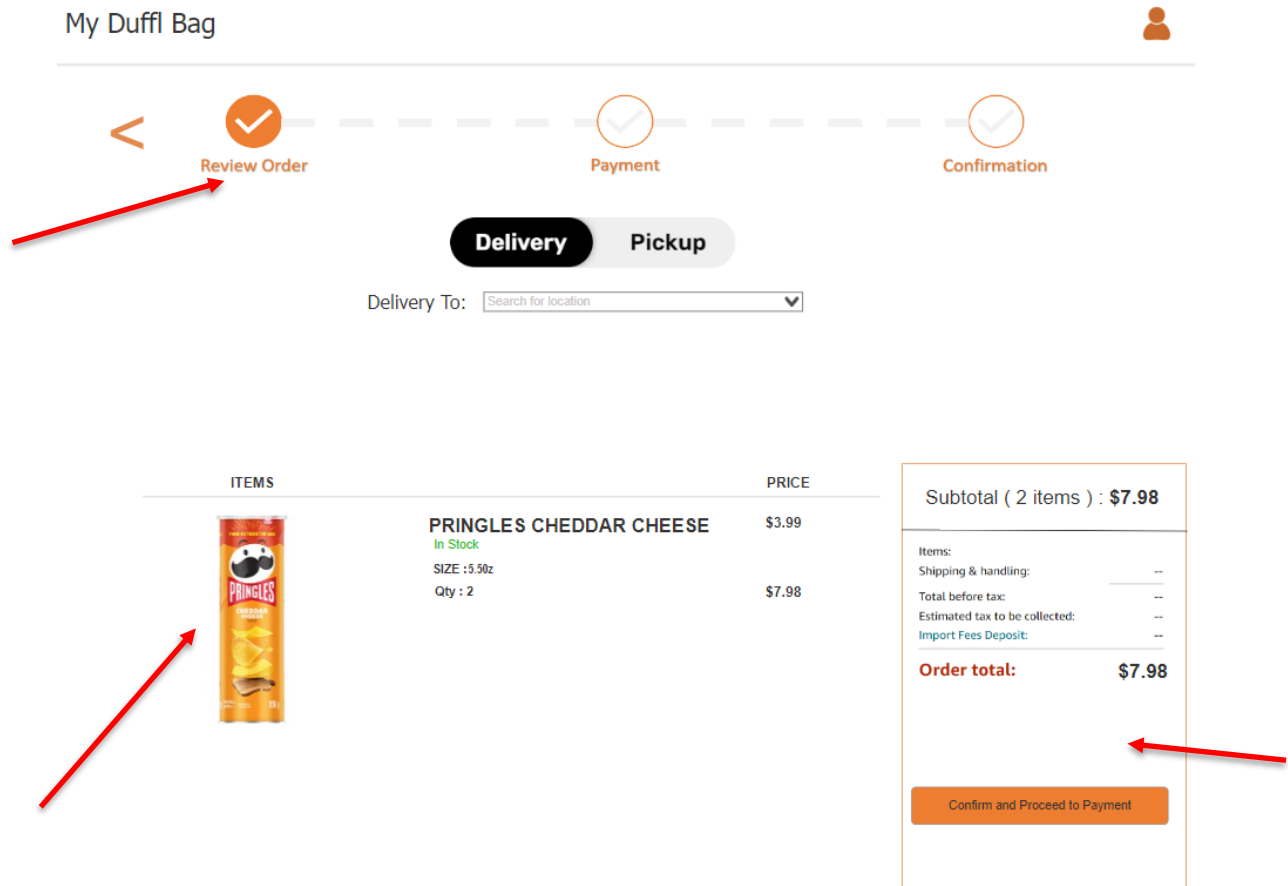
My Duffl Bag

Figure 2: Redesigned Review / Payment page

Issue 5: Finding the right size and comparing sizes

Principle 5:
When using the concepts of chunking, several units are condensed into a small number of chunks. It entails classifying the products. As a result, users can digest and recall the information more easily. If users are given multiple options(sometimes what they are not looking for), it takes a long time for them to process. Since short-term memory is limited, it is preferable to divide the items up into a number of meaningful categories.

Issue Description:
As seen in the screenshot of the website above, we can see that the same product is illustrated 3 times separately for 3 different sizes (The size is not even reflected anywhere unless the user clicks on it). The user has click through each of these to identify which is his or her right size. Similarly, the user has to go through all the options to find the particular product he is looking for under different categories

since there is no filter or sort option. For example a snack packet can come in various sizes or grams so showcasing the same products multiple times because of different quantity makes it redundant and confusing.
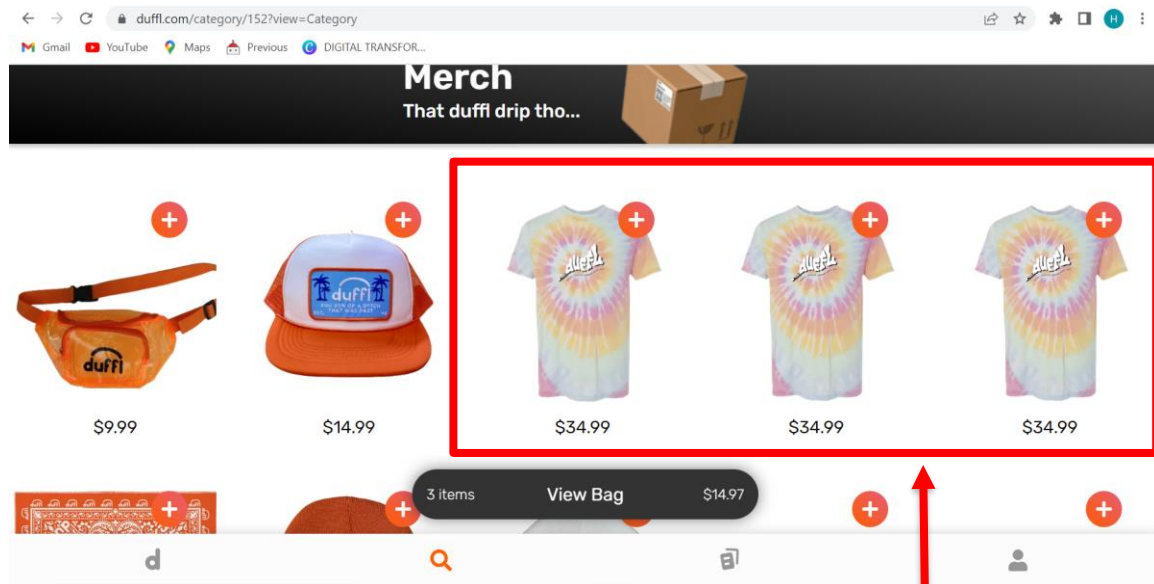

Figure 3: Original Page without chuncking

Fix for the issue:

We plan to use the concept of chunking and combining similar/same product as one and then within which we can have a drop down to choose the size or input our filters. Similarly for other items, we can cluster different products like all bags, caps, shirts, scarfs into individual section within the merchandise category so that the user is not overwhelmed with too many random choices on their website and has to explore only through the product he is looking for. All similar types of products are categorized together or create limited number of chunks.

Figure 4: Redesigned Website with chunking and better selection

3. Overall findings and Recommendations:

3.1. Metrics Value

i. Original Website

TASK 01:

SR NO	USER	START TIME	END TIME	TASK TIME	MOUSE CLICK
1.	Natrajan	0:22	2:34	132 seconds	18
2.	Aakash	0:35	3.08	153 seconds	19
3.	Camreen	0:15	2.36	141 seconds	18
4.	Sabarish	0:28	3:27	119 seconds	17
5.	Ananya	0:21	2:26	125 seconds	20
6.	Venkat	0:16	1:54	98 seconds	17

TASK 02:

SR NO	USER	START TIME	END TIME	TASK TIME	MOUSE CLICK
1.	Natrajan	3:08	4:45	97 seconds	40
2.	Aakash	3:11	5:26	135 seconds	44
3.	Camreen	2:38	4:02	84 seconds	38
4.	Sabarish	3:27	5:25	118 seconds	41
5.	Ananya	2:28	4:54	146 seconds	43
6.	Venkat	1:54	4:09	135 seconds	44

TASK 03:

SR NO	USER	START TIME	END TIME	TASK TIME	MOUSE CLICK
1.	Natrajan	4:47	6:01	73 seconds	23
2.	Aakash	5:29	7:26	117 seconds	36
3.	Camreen	4:03	5:23	80 seconds	24
4.	Sabarish	5:27	6:30	63 seconds	23
5.	Ananya	4:55	6:15	80 seconds	19
6.	Venkat	4:09	5:16	67 seconds	31

ii. Redesigned Website

TASK 01:

SR NO	USER	START TIME	END TIME	TASK TIME	MOUSE CLICK
1.	Nivetha	0:15	1:06	51 seconds	8
2.	Manisha	0:09	0:45	36 seconds	10
3.	Kalpana	0:14	1:03	49 seconds	9
4.	Jitesh	0:12	0:53	41 seconds	9
5.	Ajay	0:12	1:13	61 seconds	10
6.	Sam	0:15	1:33	78 seconds	11

TASK 02:

SR NO	USER	START TIME	END TIME	TASK TIME	MOUSE CLICK
1.	Nivetha	1:07	1:53	46 seconds	28
2.	Manisha	0:47	1:45	58 seconds	29
3.	Kalpana	1:07	2:10	63 seconds	27
4.	Jitesh	0:55	1:54	59 seconds	27
5.	Ajay	1:14	2:30	76 seconds	29
6.	Sam	1:34	3:03	89 seconds	30

TASK 03:

SR NO	USER	START TIME	END TIME	TASK TIME	MOUSE CLICK
1.	Nivetha	1:55	2:35	40 seconds	12
2.	Manisha	1:47	2:22	35 seconds	9
3.	Kalpana	2:11	2:55	44 seconds	12
4.	Jitesh	1:56	2:42	46 seconds	14
5.	Ajay	2:32	3:47	65 seconds	17
6.	Sam	3:05	4:19	74 seconds	15

iii. Post Session Survey

User Set 01	Original Website Score	User Set 02	Redesigned Website Score
Natrajan	52%	Nivetha	88%
Aakash	42%	Manisha	82%
Camreen	42%	Kalpana	96%
Sabarish	44%	Jitesh	92%
Ananya	52%	Ajay	90%
Venkat	53%	Sam	96%

3.2. Findings and Recommendations based on the performance metrics

i. Task 01: Adding a snack

Number of participants	12
% successful	100%

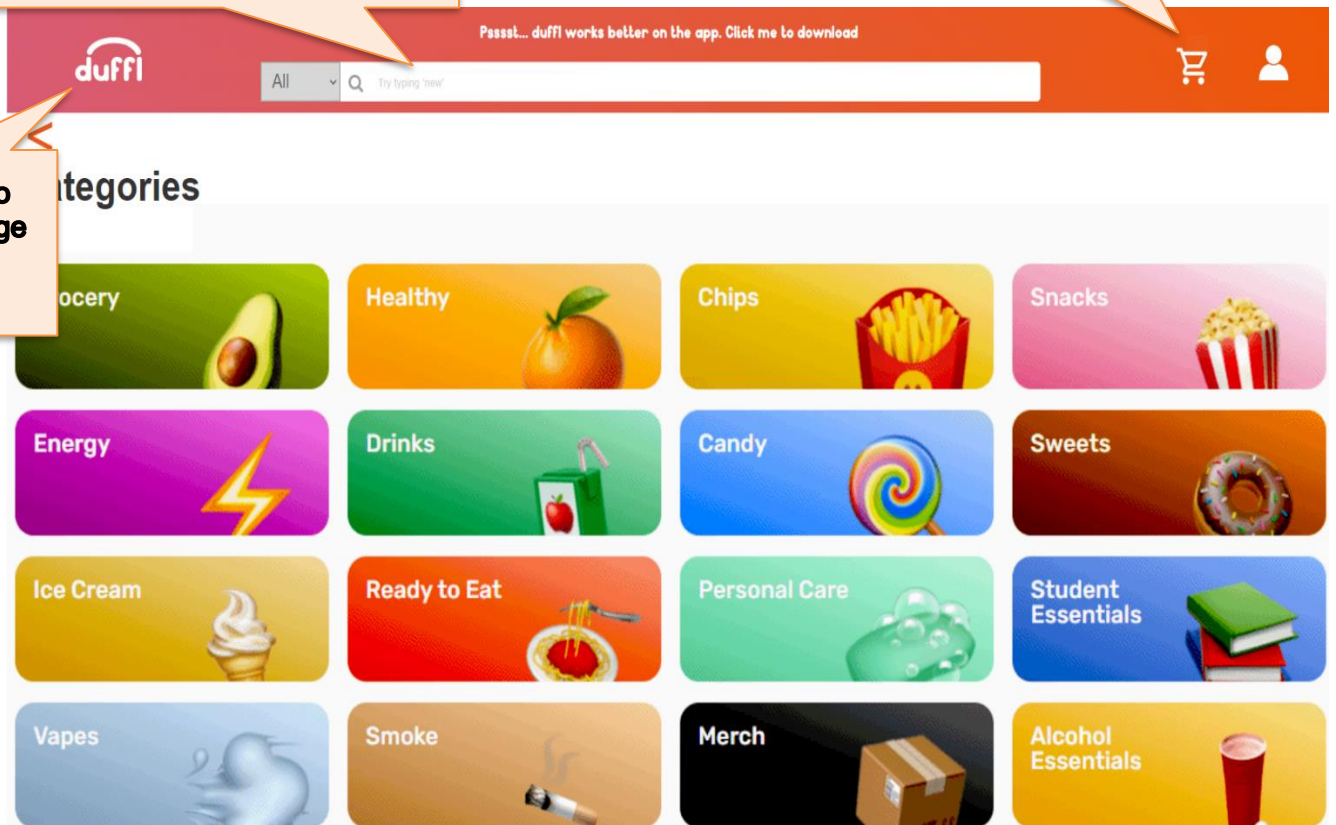|		MEAN	SD	T-Test & P-Test Result	SIGNIFICANCE
TOTAL TIME	**ORIGINAL**	128	17.320	The t-value is 7.60809. The p-value is .000018. The result is significant at p < .05.	The average amount of time taken by users while working on redesigned website is comparatively less than the average time taken on original website. The average time to perform task 01 reduced by 58.85%. Further the reduced standard deviation (SD) shows that various users who performed task on redesigned website, completed the task in substantially more similar amounts of time overall.
	REDESIGNED	52.66	15.10		
	ORIGINAL	18.16	1.169	The t-value is 13.51676.	The average number of mouse clicks is lower on the

MOUSE CLICKS	**REDESIGNED**	9.5	1.04	The p-value is < .00001. The result is significant at $p < .05$.	redesigned website than it was on the original one, as seen. The typical amount of mouse clicks used by a user to complete the task 01 has decreased by 47.68%. The decreased standard deviation on the website's redesign shows that users completed the task 01 assigned with substantially more of the same number of mouse clicks.

FINDINGS	COMMENTS | RECOMMENDATIONS
Users are not able find the search icon as it is not properly visible on the website	• The redesigned website has brought a search bar at the top of the page which is clearly visible to everyone. • The redesigned website has replaced the previous icons with the new cart style icon. • The redesigned website is updated with a duffl logo.
Users are getting confused with the cart icon	
Users are getting confused with the home icon as it is represented by 'd'	

The search bar has been brought to the top of the page and will be available in all pages

The cart symbol has been revamped

The option to go to the home page can be done by using duffl logo

duffl

All

Try typing 'new'

Pssss... duffl works better on the app. Click me to download

tegories

Grocery

Healthy

Chips

Snacks

Energy

Drinks

Candy

Sweets

Ice Cream

Ready to Eat

Personal Care

Student Essentials

Vapes

Smoke

Merch

Alcohol Essentials

Task 02: Adding 20 items of a snack + healthy item

Number of participants	12
% successful	100%

		MEAN	SD	T-Test & P-Test Result	SIGNIFICANCE
TOTAL TIME	**ORIGINAL**	119.16	24.29	The *t*-value is 4.64319. The *p*-value is .000918. The result is significant at $p < .05$.	The average amount of time taken by users while working on redesigned website is comparatively less than the average time taken on original website. The average time to perform task 02 reduced by 45.31%. Further the reduced standard deviation (SD) shows that various users who performed task on redesigned website, completed the task in substantially more similar amounts of time overall.
	REDESIGNED	65.16	14.87		
MOUSE CLICKS	**ORIGINAL**	41.66	2.422	The *t*-value is 12.06045. The *p*-value is < .00001. The result is significant at $p < .05$.	The average number of mouse clicks is lower on the redesigned website than it was on the original one, as seen. The typical amount of mouse clicks used by a user to complete the task 02 has decreased by 31.99%. The decreased standard deviation on the website's redesign shows that users completed the task 0 assigned with
	REDESIGNED	28.33	1.211		

					substantially more of the same number of mouse clicks.

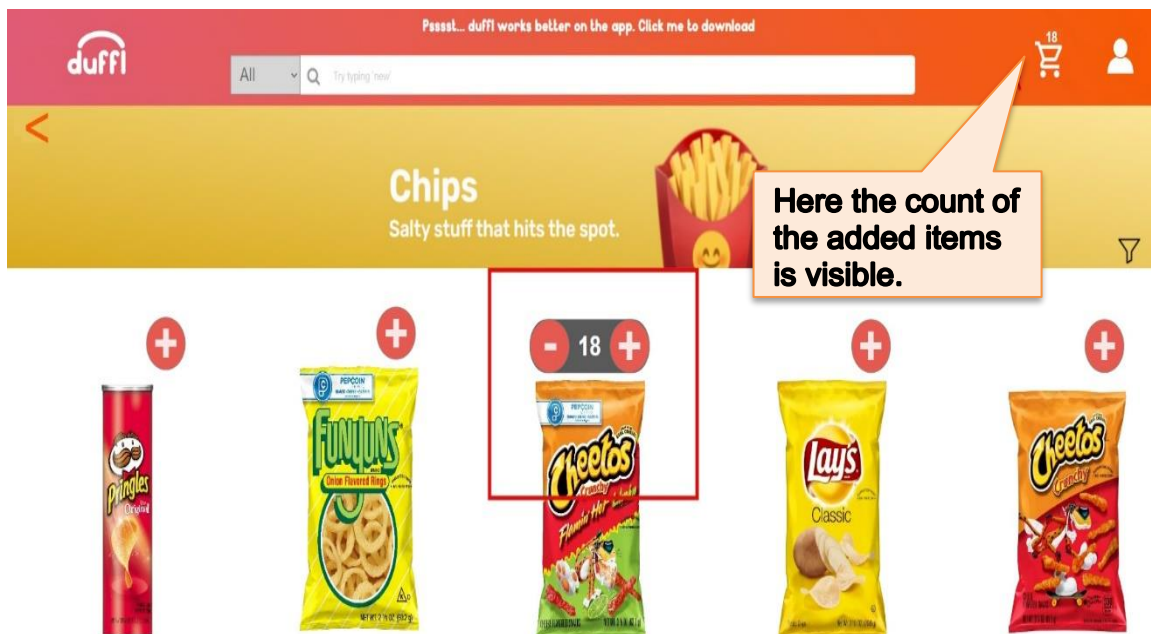| FINDINGS | COMMENTS | RECOMMENDATIONS |
|---|---|
| Users are not able to buy items of their own interest for a count more than 10. | In the redesigned website, we are now letting the customers add 'n' number of items. In the redesigned website, the user can see the count of number of products added. The redesigned website boasts a completely revamped review order and place order page. |
| Users are not able to properly know the count of items they have added as no proper value is shown | |
| Users are not able to properly review items that they have put for order. | |

My Duffl Bag

Review Order — Payment — Confirmation

Delivery | Pickup

Delivery To: [Search for location ▾]

The review page has been completely revamped

ITEMS		PRICE
PRINGLES CHEDDAR CHEESE In Stock SIZE : 5.5oz Qty : 2		$3.99 $7.98

Subtotal (2 items) : **$7.98**

Items:
Shipping & handling: --
Total before tax: --
Estimated tax to be collected: --
Import Fees Deposit: --

Order total: **$7.98**

Confirm and Proceed to Payment

Pssst... duffl works better on the app. Click me to download

duffl   [All ▾] [Q Try typing 'new']   🛒 18 👤

Chips
Salty stuff that hits the spot.

Here the count of the added items is visible.

[+]   [+]   [− 18 +]   [+]   [+]

Task 03: Selecting an L or XL shirt and adding to cart

Number of participants	12
% successful	100%

		MEAN	SD	T-Test & P-Test Result	SIGNIFICANCE
TOTAL TIME	**ORIGINAL**	80	19.37	The t-value is 2.90856. The p-value is 0.015603. The result is significant at p < .05.	The average amount of time taken by users while working on redesigned website is comparatively less than the average time taken on original website. The average time to perform task 03 reduced by %. Further the reduced standard deviation (SD) shows that various users who performed task on redesigned website, completed the task in substantially more similar amounts of time overall.
	REDESIGNED	50.67	15.33		
MOUSE CLICKS	**ORIGINAL**	26	6.27	The t-value is 4.58691. The p-value is .001. The result is significant at p < .05.	The average number of mouse clicks is lower on the redesigned website than it was on the original one, as seen. The typical amount of mouse clicks used by a user to complete the task 03 has decreased 50%. The decreased standard deviation on the website's redesign shows that users completed the task 03 assigned with substantially more of the same number of mouse clicks.
	REDESIGNED	13	2.78		

FINDINGS	COMMENTS | RECOMMENDATIONS
User was not given any filters to categorize various things within the merchandise category. Hence it was difficult for user to go through all the options even though he/she were looking for only a black duffl shirt.	We added some filters in the merchandize page where the user can categorize the products based on type (shirt, cap, bag, scarf), based on color, based on availability. This way will help users to filter out the extra options which he may not want to see
Users found it very frustrating having to select a similar product multiple times because each one of them have a different size which is not visible unless you get into that page. This also takes up a user's working memory.	Instead of having different pages for each size, we created one page which contains the different size available for that particular product making it easy for user to select his size without taking extra working memory like in the case of original website.
Users couldn't find any information about the product which makes it hard to trust the quality. Further it is difficult for the users to decide on buying a shirt or any merchandize without knowing what it looks from all angles and without knowing what it is made up of. Also it is difficult for users to know what really a small/large/medium is. It made users reluctant to buy any product/shirt because they don't know the above mentioned information.	- We added a size chart which tells user exactly how big a small/medium/large etc. sizes are for the particular product making it easier to select the right choice based on his measurements / preferences - We added descriptions which included the material, the type of wash, exact color and other information. Along with that we added different angles and pictures of the shirt and fit which gives user better idea what it looks like. Therefore overall, it gives user more confidence about the product before he proceeds to buy.

Merch

That duffl drip tho...

Filter your options X
Filter by Type
Filter by Color
Filter by Availability

Duffle Fanny Pack
Fanny | 1 fl.oz
$9.99

Duffl Trucker Hat
Hat | one size
$14.99

Duffl 4/20 Tee (2022)
Limited Edition
$34.99

USA Tee
Limited Edition
$34.99

A new filter option added to remove unnecessary extra option and limit the options based on users' interest on the page

<

Duffl 4/20 Tee Limited Edition Small

$34.99 Per Piece

- 100% Polyester
- Imported
- Pull On closure
- Machine Wash
- UA Tech fabric is quick-drying, ultra-soft & has a more natural feel
- Material wicks sweat & dries really fast
- New, streamlined fit & shaped hem
- Loose: Fuller cut for complete comfort

Select Size   Add to Cart

Select Size
Small
Medium
Large
X-Large
XX-Large

Description with more details about a product to give better clarity to users

All sizes placed in one page and made it easier for users to select without having to go back and forth

A option to see this size chart is present where the arrow is marked. This is a list of different sizes giving detailed info about the sizes available for users to make right decision

Duffl 4/20 Tee
Limited Edition

Size Chart   ×

Brand Size	US Size	Chest	Waist
XS	XS	31 - 34	28 - 29
S	S	34 - 37	29 - 31
M	M	37 - 41	31 - 34
L	L	41 - 44	34 - 37
XL	XL	44 - 48	37 - 41
XXL	XXL	48 - 52	41 - 45.5
3XL	3XL	52 - 56	45.5 - 50
4XL	4XL	56 - 60	50 - 54.5
5XL	5XL	60 - 64	54.5 - 59

ii.   Post Session User Satisfaction Metrics

		MEAN	SD	T-Test & P-Test Result	SIGNIFICANCE
SUS	**ORIGINAL**	47.5	5.36	The t-value is -14.00921. The p-value is < .00001. The result is significant at p < .05	Compared to the original website, the redesigned one significantly improved user satisfaction. Following the test sessions we conducted a survey where compared to the original a user's satisfaction increased by 62.48% with redesigned website.
	REDESIGNED	90.67	5.32		

FINDINGS	COMMENTS | RECOMMENDATIONS
Some users found it frustrating when they were unable to locate the menu/category option. It was also frustrating for some to locate where the In almost every task many users were stranded when they didn't know how to select their desired product in the size they want (be it a shirt or a food item). Further since there were no filter options, they were given many options which had overwhelmed them and hence causing so annoyance. There was so size chart to compare the size requirements. Further the material or details of the	- In our redesigned website, the menu options as soon as the user enters the website was made clearer. Along with that we also made it easier for users to identify where the menu is as well as the options. The icons that user can easily recognize were used as per Jacobs Law. - The chunking principle was used in redesigning the website which helps the user not to revisit the previous page over an dover or neither do they have to remember

product was not provided which had make the user reluctant to move further.

The review page was very surprising to many cause there was no proper representation of where it needs to be picked up from or would be delivered to, plus the payment page didn't give any amount which made users get reluctant to move forward unlike the new redesigned website. It was confusing to users to what their final products were and what it costed them.

- the previous content to make a choice.
- We developed and implemented some filters which would help the users to filter out the unwanted and only see what they are looking for. Making it easy for them to select what they want. Further we added descriptions and a size chart which gives them more details about a product they had like to buy and hence makes an appropriate choice.
- The entire navigation bar was placed at the top instead of at bottom (in original). At the top is where usually people try to navigate around the website or check their cart.
- The preview images in the merchandise page helps the user see different angles and material of the product along with its nutrition fact if it's a food item under snacks category
- The website can adapt to different screen sizes including mobile and web
- We have added the progress/status bar which will help users to know ahead of time what next step is before he completes the task.