The Universal Shopping Cart

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Abstract

The Universal Shopping Cart is an online application that will be utilized by any who have ever wished online shopping to have a more efficient and user friendly flow across companies. The user base will encapsulate all those who have taken to the growing ecommerce industry and each user type will require the site to provide features that allow for a seamless and frustration-free experience.

Three prototypes for the universal shopping cart have been developed to test the flow, amount of information given at each step, and the flavor of the end of the experience that users might prefer. Each prototype illustrates the flow of the universal shopping cart experience with accuracy while remaining non-functional so that focus will be on the design.

Evaluation of the prototypes was done by extracting the testers' initial conceptual model and comparing it to their formative conceptual model. The purpose of this approach was to determine which of the three prototypes best implemented the design to checkout items from different websites in one universal online shopping cart the best. Overall, the evaluations encouraged the rethinking of the design in regards to naming pages and being more clear with the design choices.

Overview of System

This new system will be a hub of potential purchases to which items can be added from any online retail store. The advantages of the universal cart include not

having to re-enter personal information such as shipping address and payment information.

This system would also have a straightforward and intuitive user interface which would link users back to the original website if they wanted to edit an item. The universal shopping cart would also ask for the users standard information such as shipping address, payment information, email/phone number (in case a 3rd party website requires one), as well as shipping options (if available). The project will focus on the seamless interaction between the user when entering their information and completing the checkout process on all of the third party websites involved in the transaction. Additionally, a user friendly and intuitive browsing view of the universal shopping cart will also be a focus for this project.

There will also be features dedicated to comparing the prices and quality of items that are similar but come from different retailers. This will allow users to more effectively shop for deals or find the items they really want without having to switch back and forth between websites to do so.

Overview of User Base

The user base for this project is quite inclusive. Almost every age group is a participant and the user base is split nearly down the middle in terms of gender. There are users from all around the world and from many different cultures. Few demographic groups can be excluded.

User Base Details and User Distribution

The Buyers

Research on the people who are typically shopping online, where they live, and what they are doing while they're shopping gives some important insights into who would be most likely included the user base. An analytical article examining some online shopping data by Business Insider points out that millennials are the ones doing the most spending when it comes to online shopping, despite the fact that they are bringing in less income than the older generations; however, it is important to note that the baby boomers and the older generation have taken to the ecommerce scene in numbers proportional to their numbers in the population as a whole. All this points to the fact that while millennials may be doing the most spending online, the older generations cannot be ignored in a user base for a universal shopping cart. In fact, every age group old enough to be spending money online has high enough numbers in terms of participating in online shopping that they cannot reasonably be left out of the user base.

That same article by Business Insider also addresses the gender split in retail. While it is commonly thought that women are driving the retail industry, online shopping is actually almost split evenly down the middle. In fact, in the teen category males are actually outspending females. Another Business Insider report digs deeper into the habits of online shopping between men and women. This report uses a study done by Walmart who was investing in customers shopping online, and reinforces the notion that men are shopping at much higher rates online than in person retail. One thing this article also points out is that when polled whether they would like to move all of their

shopping online, men overwhelmingly answered yes. It also points out that men are more likely to search for a better deal which is very relevant as the application would allow for price comparison and browsing many different sites to look for products.

Since geographical location and a large aspect of the buyer user base to be considered is the geographical location of the users. Statistics pulled from statista.com show that the United states is 7th in terms of the percentage of its population online shopping. This means that it is highly likely user base will be geographically distributed amongst many places outside of the United States. The countries ranked above the United states include: China, South Korea, UK, Germany, Indonesia, India.

One final indicator of who might be included in our buyer user base is the actual products that are being bought. Statistics from statista.com indicate that books, video games, music, and movies are the products that have had the most dramatic transition to online purchase. Other big transitions include toys and consumer electronics. This means that there will be a large overlap in the user base of the universal shopping cart and the user base of these specific products. A look at who most watches movies shows that the demographic and geographic layout of the movie watching user base is very similar to that of what has already been discussed in regards to online shopping. Much like online shopping, young people lead the way in terms of consumption with the second place prize going to the 50+ age group. It also shows that while women have a slight edge on men, the viewing is nearly even overall - almost identical to the online shopping users. As for technology, the user base is somewhat surprisingly evenly

distributed across **all** generations, including the aging baby boomers. This furthers the notion that no generation can be excluded from the user base.

The Sellers

The companies currently with the biggest ecommerce footprint are: Amazon, Walmart, and Apple; however, the top of the list also includes firms, clothing retailers, and discounters. Almost every large, recognizable retailer has a large footprint now in the ecommerce industry. This means that on the seller side of our user base, very large corporations will likely be the majority.

User Roles

The typical user roles associated with the universal shopping cart will be buyers. However, there will be different kinds of buyers and as such separate user roles. **Mass buyers** were considered first as customers who need to buy large quantities of multiple products at the same time or on a scheduled basis. This buyers may be purchasing for businesses or production of a certain product. Regardless, this user will need to be able to track large quantities, but will benefit from being able to buy from multiple sources in one place. On the other hand, there are **casual buyers** who are buying smaller quantities of goods, but still across a larger range. Within casual buyers, this role splits further by users who are more concerned about price and those that aren't, as well as users that are shopping for their families and those that are shopping as

individuals. These different types of casual buyers will be explored in User Personas. The user distribution of casual buyers, especially family buyers, can be assumed to be similar to those who shop online at Walmart, as Walmart supplies a wide variety of products, and does not sell in bulk. Lastly, **sellers** must be considered as a user role as integration with sites that users usually go to make online purchases will make the universal shopping cart most effective for its users. This is a completely different user distribution as it involves connecting with online shopping marketplace companies.

User Personas

Francis the grandmother

Francis is a grandmother with two grown children who each have a family of their own. Two of her grandchildren are already in college, and that brings along with it a certain tightness on the money front. Francis has been retired for years and she's alone with a bunch of life insurance money laying around. This makes her think that sending her grandchildren in college periodic gifts will give them a surprise that will ease their stress in school and perhaps provide them with some items that are practical and make their lives run more smoothly. One of the biggest problems is: one grandchild is an outgoing, preppy girl and the other is a boy who is still stuck in the emo stage of his life. In short, they like very different things. Francis wants to be able to shop for gifts for both of them at the same time and send them at the same time so that neither feels left out, but navigating the web to view different stores and look for things that might please each of her grandchildren proves challenging.

Thanksgiving has just passed. At thanksgiving, the younger members of the family showed Francis this amazing new browser extension called The Universal Shopping Cart and she knew this would be a solution to her problem. She is of the generation where technology is not a skill learned from adolescence, so it takes more time for Francis to be able to navigate a certain application. Francis has noticed that she learns applications more quickly when there is some tutorial available to teach her to use it.

Conclusions: This persona illuminates the fact that there will be users who have no idea what they are doing. The site should have an interface that is optional but still available for a tutorial. The tutorial should be simple and easy to follow and should leave an inexperienced user to be able navigate the website easily.

Chad the rich frat bro

Chad has always had everything. Chad has a lot of money. Girls are always trying to talk to Chad on the weekends when he has a cold beer planted firmly in his right hand and at least $1,000 worth of clothing on his body. Because of the seemingly endless flow of resources into Chad's life, Chad is very familiar with the concept of spending money. One really valid and credible problem Chad has when he's shopping for branded clothing online is that he can never remember which store has his favorite quarter-zips, which has his favorite collared polos, and which has his favorite button downs. He is constantly changing back and forth from high end clothing websites to

compare the clothing to see which will suit him best. Another challenge that has crossed his path more than one time is that Chad wonders what a certain shirt would look like if he was wearing it on a jet ski. Chad wants a place where he can add items from different stores so that he can compare prices (always pick the highest), styles, and jet ski compatibility quickly.

Conclusions: This persona shows that some people will be using the shopping cart mainly for the purposes of comparing similar items from different retailers. This means there needs to be a seamless interface for comparison and also deletion of items from the cart once a decisions is made.

Sara the broke college student

Sara is juggling a lot. She doesn't really have time to go shopping like some of her friends her age because she is juggling her computer science course work and two jobs at the same time. Sara works hard so that she is able to treat herself on occasion and go on a shopping spree, but she finds herself needing to do this online for the sake of efficiency. The problem is that she spends so little time looking/shopping at online stores on a regular basis that she often gets overwhelmed and is unsure where to look and if there is something else for a better price elsewhere. Sara often goes to websites, adds items to her cart, and then forgets they're there because she went on to try and shop elsewhere looking for things that are maybe cheaper or more her style. Sara need a place that will keep hold of all of the things that she finds and likes so that she can jump from store to store and add anything that she might want to consider and compare

later. This will allow her to compare, choose, and order everything she wants all in one place so that she can get back to trying not to fail operating systems, stylishly.

Conclusions: This persona alludes to the fact that that there will be users who will be using the shopping cart to avoid forgetting items they wanted on one site as they move in between sites. This persona, like the frat bro, will utilize the comparison and removal aspects of the shopping cart. This functionality might need to be very easy to use and available since it seems it will be used by multiple types of user.

Adam the stay at home dad

Adam is a proud stay at home dad. Adam is not shopping for his own personal uses but rather for the household and lifestyle items that the family needs regularly. Adam has his shopping down to a science. He knows exactly where the best prices are and where the items he needs are. Adam is using The Universal Shopping cart not to compare and contrast prices as he has enough experience to know this information already. Adam is simply trying to expedite the process of online shopping so that he can make it to little Timmy's soccer game on time. Adam needs the process to be fast and easy so he can go to the sites he needs, add everything to the one cart, and checkout very simply and quickly.

Conclusions: The stay at home dad persona exemplifies a user that will be using the shopping cart to make their regular and repetitive shopping much faster. This

allows for the conclusion that while the comparison functionality will be popular and needs to be efficient, the actual speed and ease of checkout can't take a hit for the sake of the comparison feature.

Yin from another country

Yin lives in China. Yin needs a universal shopping cart that makes sense to him. Yin is accustomed to most of the popular sites online having characteristics that clearly play to the western audience. For one thing, the translations on the sites are typically very flawed. Yin often doesn't know how to navigate a site because the continue button actually says pickle and it's not really clear what that means as far as the actions executed by the button.

Conclusions: Since Yin comes from a different culture, it is important to consider in the design perspectives outside of what makes sense to the western audience. For one thing, it would mean the interface needs to have a logical and simple flow so that should a translation be insufficient, the website can still be used.

Task Analysis

Core Tasks (all users need to accomplish these tasks)

- Add an item to the cart
- Delete an item from the cart
- Edit an item in the cart
- Check out (i.e. pay) for the items in the cart at one time

User Role: Casual Family Buyer (Adam)

- Add similar suggested items to the cart
- Checkout quickly once shopping is complete
- Add remembered items (items previously purchased) to the cart

User Role: Casual Penny-Pinching Buyer (Sarah)

- Be able to see comparison prices from other sites by clicking on an item in cart
- Swap out a more expensive item for a cheaper option
- Be able to add items to the cart so that they are automatically saved
- Open a saved cart and add items to it

User Role: Mass Buyer (Buying Business supplies)

- Add a large quantity of products to the cart at one time
- Delete a large quantity of products from the cart at the same time
- Schedule orders to happen monthly/weekly

Usability Goals

- Users should only need to enter personal information one time throughout entire checkout process.
- Users should not associate any ordering confusion with the universal shopping cart but rather the sites they order from.
- Users should be able to seamlessly transition from the universal shopping cart to whichever 3rd party website they're ordering from in order to edit their item(s).

- Companies who wish to partner with the system should be able to propose features to help make buyers' online order process easier.
- Users should save time by using the universal shopping cart.
- Users should be able to compare similar items within their shopping care and easily remove those they decide against.
- Users should be able to access an instructional tutorial should they need help understanding the shopping cart process

Usability Requirements

- Users should be able to checkout with items from multiple sites in the cart at one time.
- Users should be able to compare the price of a product in the shopping cart with the price of that product on other sites, and switch which seller to buy from in two clicks.
- Users should be able to view a tutorial at any time that details the basic actions of adding items to the cart and checking out.
- When logged in, users should be able to open past orders and view which products were ordered, from what sites, and their individual costs as well as total order cost.
- Users should be able to delete an item from the cart, when viewing the cart, in one click.

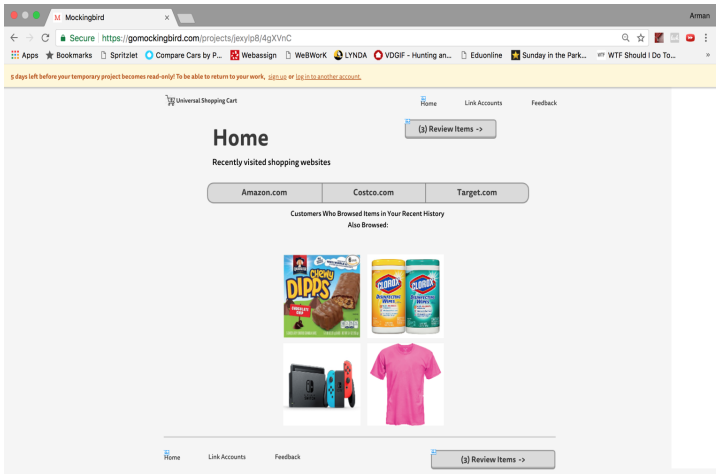
Conceptual Model

The metaphor for this product is being able to take the same shopping cart into multiple stores and checking out at one place. Within this product, the concepts are virtual shopping cart, virtual checkout, links between online shopping sites, online products, and the shopping cart. The online products from online shopping sites will be added into the virtual universal cart and the virtual cart will be taken through the checkout. The user will visit online shopping sites and add items to the universal shopping cart. The user will check out in one place to purchase the items in the cart. The conceptual model for this product is fairly literal and similar to the concept of online marketplaces like Amazon.com, but allows for a greater variety of purchases. Users of online marketplaces should be able to navigate and purchase in a similar manner that they are used to as the underlying conceptual models are similar.

Description of Prototypes

Based on the user research, usability requirements and conceptual model of the system, the following three prototypes were developed, specifically with the task of the checking out and ordering through the universal shopping cart.

Prototype 1



The first prototype is a website mockup. This design was chosen because it communicates familiar and relevant information in a straightforward manner. Most

online shoppers are familiar with the generally accepted conceptual model of an online shopping cart as well as the checkout process. The prototype built with Mockingbird implements a design that builds off the accepted conceptual model by adding a view that allows shoppers to see the items and respective stores in one straightforward place; shoppers are also able to edit their order upon reviewing it.

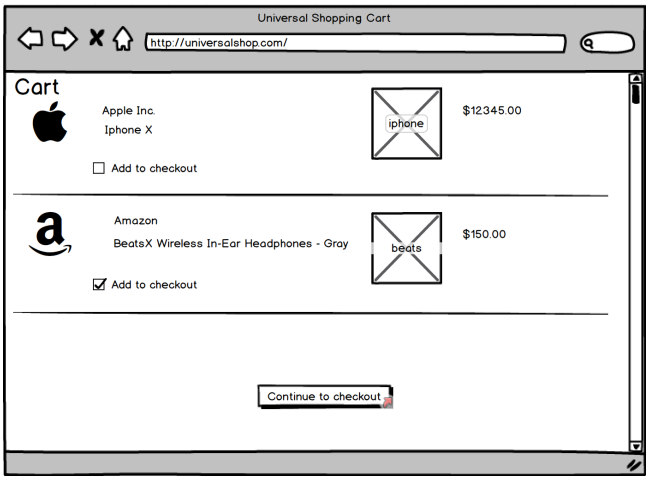
The home page was designed to be simple and plain, considering that we do not want to advertise/promote any specific online retailer. The review items page fits most online shopping conceptual models with an added logo representing which store the listed item came from. The checkout page asks the users to fill out a page of overarching information that different websites may require from the user. The design of the checkout page was designed in order to provide a straightforward process of checking out. Only important information is presented on the screen, such as the total sum price. Under the total sum price, users have to option to see a more in depth break down of prices from individual retailers, but unless the user specifically wants to see that, a total sum price is the best design choice. This prototype meets the usability requirement of being able to checkout with items from different site at once, as illustrated on the check out page.

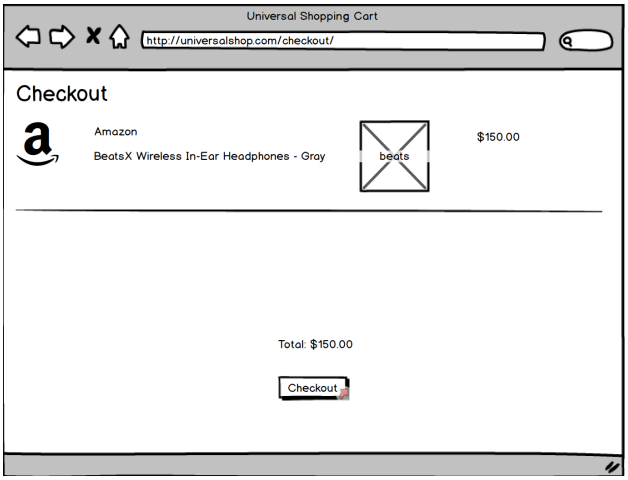
Though the interface was designed assuming the users are familiar with an online checkout process, the design is intuitive enough for a new user to complete an online order with ease. For instance, directional arrows on the buttons on the top and bottom of the page make the checkout process more intuitive for unfamiliar/new users. The design also appeals to users who keep a track of the websites they are ordering

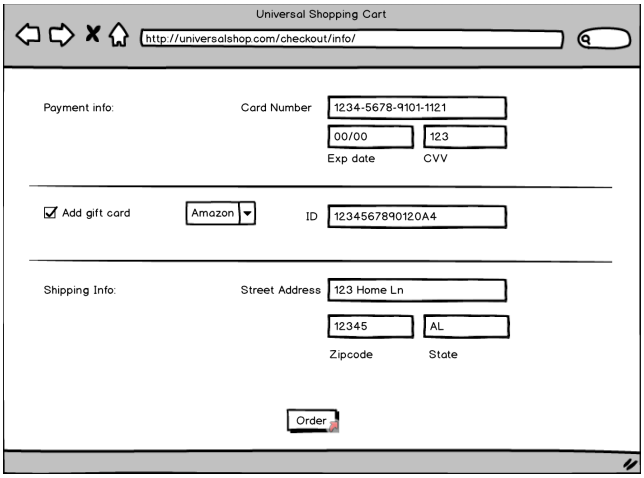
from online in two ways. First, the user sees a numerical list of online retailers, and secondly when the user is reviewing items in the shopping cart, each item has a the logo of the corresponding store.

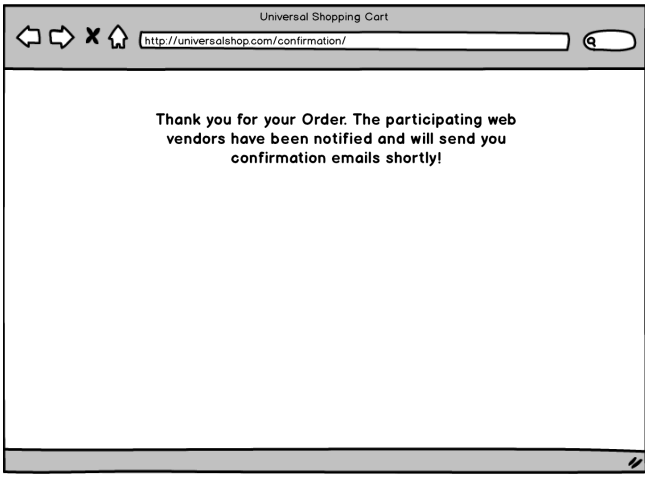
A mockup prototype was chosen as the prototyping strategy as it allowed creativity while maximizing functionality. Other prototyping strategy would either be less functional - such as a paper prototype - or take longer to create without adding any additional functional benefits.

Prototype 2









The second prototype is a mockup of the flow of the checkout process on the universal shopping cart website. This prototyping method was chosen due to the fact that the essential functional elements could actually be simulated and the flow of the website could be experienced with ease. This is because the buttons in the mockup can be linked to another mockup page making it easy to simulate the actions of submitting a form to get redirected to the next page. However, the lack of real functionality in this is

appropriate as most of the logic behind the website will deal with actually buying products which is not necessary at all for the testing of the interface.

The design of this mockup was chosen for multiple reasons. For one thing, The general layout of this mockup checkout scheme is consistent with what people expect from other checkout schemes, promoting external consistency. One difference may be that there are two screens in which the items to buy can be viewed. The reason for this is the need for a comparison mechanism for the users that are attempting to compare prices or value and still checkout easily. On the first screen, every item that has been added to the cart will show up. The user can then select which of the items to add to the actual checkout and move on to buying them from there.

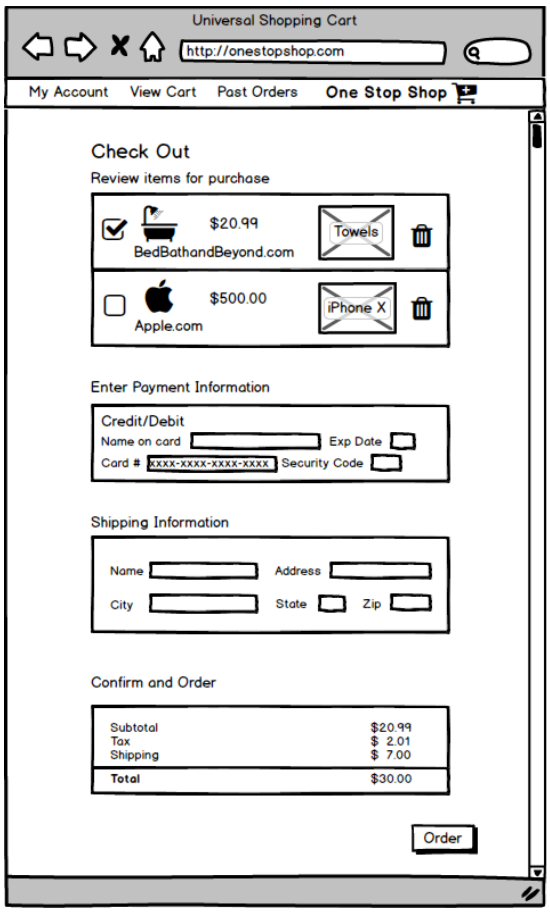
The final confirmation page addresses the need for users to end on high note as according to the Peak End Rule, people judge their entire experiences based on the peak and the end. The final screen reassures the user that what they intended to do was actually accomplished and answers any questions they might be having after the interaction about what will be happening next for them.

Some design decisions were based on the motivation to minimize user slips. Because of the nature of modern web browsers, back buttons made all the operations reversible to address capture errors. There’s a possibility for mode error slips between the cart and the checkout screens where both display a list of items from different stores. This is minimized by the fact that none of the functionality from the cart page is included on the checkout page and there are indicators of mode (price total at the bottom and label at the top) to help the user distinguish between the two modes.

Prototype 3


Universal Shopping Cart
http://onestopshop.com
My Account
View Cart
Past Orders
Express Checkout
Help
One Stop Shop
Recently purchased items
Amazon.com
Camelbak
Apple.com
iPad Mini
BedBathandBeyond.com
Curtains


Universal Shopping Cart
http://onestopshop.com
My Account
View Cart
Past Orders
One Stop Shop
Your Cart
Check the item(s) you want to buy
$20.99
BedBathandBeyond.com
Towels
$500.00
Apple.com
iPhone X
Continue to Checkout


Universal Shopping Cart
http://onestopshop.com
My Account
View Cart
Past Orders
One Stop Shop
Check Out
Review items for purchase
$20.99
BedBathandBeyond.com
Towels
$500.00
Apple.com
iPhone X
Enter Payment Information
Credit/Debit
Name on card
Exp Date
Card #
xxxx-xxxx-xxxx-xxxx
Security Code
Shipping Information
Name
Address
City
State
Zip
Confirm and Order
Subtotal $20.99
Tax $ 2.01
Shipping $ 7.00
Total $30.00
Order


Universal Shopping Cart
http://onestopshop.com
My Account
View Cart
Past Orders
One Stop Shop
Success!
Your items are on the way from Bed Bath and Beyond
and you will receive a confirmation email shortly.
$20.99
BedBathandBeyond.com
Towels
Back to Shopping

The third prototype also illustrates the flow of ordering an item through the universal shopping cart, from the home page to confirmation of the order. Again this mock up was designed to maintain external consistency with other common electronic commerce sites that users are accustomed to. This consistency includes, viewing the cart, being able to edit the cart, review items to purchase, and entering payment and shipping information in order to purchase. This mockup slight diverges from the other mockups, in that the items to be bought and their information remain present on the same page as the user enters their payment and shipping information, rather than separating the two by moving to a different page. This difference will test whether users prefer to separate their information, or be able to see the entirety of their order in one page, even if it means scrolling.

One of the features in this mockup is the ability to delete and item from the shopping cart (when viewing the shopping cart) by clicking on the trashcan icon next to the item, which satisfies one of the previously stated usability requirements of being able to remove an item from the cart with one click. Additionally, the home page is a step towards completing the usability requirement of users having the ability the easily view past orders and the prices that each of their items were purchased at. This home page allows the user to see their recently purchased items and prices, a helpful feature for users who may be making repeat orders of certain products.

This mockup also has the ability to link pages together and thus the usability of the site can be tested in a more realistic setting than a paper prototype, as buttons are clickable and lead user's through the flow as they would in the real application. As the

user base for the universal shopping cart is somewhat similar to users of electronic commerce sites such as Amazon.com and Walmart.com, the testing environment for the universal shopping cart should maintain a level of consistency that will allow users to complete important actions (adding a product or products to the cart, viewing the cart, and checking out) with ease.

Design Details

The conceptual model for these designs was the already existing conceptual model of a shopping cart that is used by most online retailers today. The only difference between this model and the model that we adopted is the idea that this shopping cart is not limited to one store, however it still functions so much like the typical shopping cart model that users will have no problem understanding the model.

Based on this conceptual model, multiple design principles from class were applied in three different ways in the attempt to create an effective pool of prototypes. Two main design principles highlighted in these prototypes were to provide feedback and clearly marked exits to the user. In prototype, there is a clear back button during the checkout process which allows to the user to easily get out of checking out and go back to their cart. In all three prototypes, there is feedback from consistently showing prices of items in the cart, showing subtotal and providing a clear confirmation at the end of the checkout process that the order has gone through. External consistency within other similar electronic commerce applications was also kept in mind during the design of the prototypes to provide an intuitive experience to users who are already familiar with such applications.

Other design principles include the minimizing of error via slips. To avoid memory lapse slips, each prototype is kept to three steps. In the second prototype, the url names suggest the path that was taken to get to the current step so that if a slip were to occur, the previous steps will be obvious. Names at the top of each screen eliminate mode error slips when the actual cart and the page for comparison could be mistaken for one another.

Prototype Design Questions / Important Differences

One of the main differences between the first two prototypes and the third one is that reviewing the items is on a separate page than entering payment and shipping information and completing the check out. As briefly mentioned above, testing the usability of these prototypes will determine whether customers prefer to have all of their information on one screen, or prefer to have separate pages for separate parts of the check out process with the ability to go backwards and forwards.

Another difference is the presence of the cart total on the actual checkout page. This will allow the prototype testing to reveal whether or not a user is more likely to complete the checkout process if the total is displayed when they have to commit to checking out, or if the absence will allow them to forget how much money they are spending as they commit to the buy.

A third difference is the approach each prototype takes for the end of the process. The first takes a minimalist approach simply thanking the user for using the application and allowing them to go back home, the second gives some explanation

about what will happen next, and the third offers explanation while also redisplaying what was ordered. Testing this portion of the prototype will determine how much information is the best amount to give to the user to make sure their experience ends on the highest of notes.

Prototype Evaluation Plan

The main purpose of the evaluation is to determine the usability level of the prototype in terms of intuitive look and feel. The specific research questions that we hope to tackle through the evaluations are, “Which design accomplishes the usability requirement of users being able to checkout items from multiple sites in one universal shopping cart the best?” as well as “Which design accomplishes the usability requirement of users being able to view a tutorial at any time that details the basic actions of the universal shopping cart the best?”.

We planned to compare the intended conceptual model from the testers based off of images of the prototype and compare that to their formative conceptual model - their understanding of the website after using it. Based off the feedback from the evaluations, we will try to alter the design in order to overlap the initial and formative conceptual models as closely as possible.

Prototype Testing Methodology

Firstly, testers were asked to share their initial reaction to a static picture of a prototype design and talk about their understanding of what they are seeing. After

discussing this, we had an understanding of whether or not the testers were forming the conceptual model that was intended. The testers were then asked to carry out the task of reviewing items in the shopping cart and checkout and hence, complete the transaction. The tester was asked to think out loud so we could try to understand the thought process behind the tester's actions. After completing the task, the tester was once again asked to share their thoughts on the website in terms of what they think the experience will be like if they were to use the system again and their overall understanding of the system after using it to complete a task.

Either four or five people used each of the prototypes that were tested. The testers were a mixed group of students between the ages of 18-22 from both the CS program through the engineering school as well as other majors and schools from UVa as well as aging adults who are approximately the age of parents of these students.

Though not every tester was a student at the UVa, the majority of the testers were. This could be a limitation on the testing results and their validity. However, of the user personas that were kept in mind while designing the prototype, two were college students and one was a parent. Additionally these testers did not spend longer than 20 minutes with the prototypes, and as such there were certain onboarding processes and contexts that had to be explained to users.

Results were interpreted by finding overarching themes of comments on all three prototypes and determining what design principles could be brought in to fix these issues, or determine what was being done well in the prototypes across the board. Some level of user comments will be dependent on what users are used to in online

shopping experience, which may cause some split thoughts on how things should be laid out. For such issues, for example, whether checkout should be on one page broken out into smaller pages, they may need to be tested on a larger audience to determine a group consensus.

Summary of Results

Prototype 1:

Feedback

- The buttons are links to the websites, users think they direct you to another website
- Link accounts could potentially be used to link stuff together
- Normal online shopping experience - straightforward
- Users concerned that the website knows recent shopping websites
- Review items should take user to a page to review it,
    - User preference of review button on top vs bottom
- Users appreciated further breakdown of prices
- User disappointed that codes, discounts, sales, etc. not featured :(
- Very straightforward process
- Users didn't understand the point of the site before providing context
- The icons would show where you can buy the item and different prices
- If you click the icon of the universal shopping cart it'll take you to review your cart
- Users want shipping options should be specific for each item/wondering if items come together or separately
- Conceptual model initially and formative were the same
- The images displays recently viewed items/other consumers
- Users think Link accounts button would be the different ecommerce websites?
- Users used browser back button instead of back button in page

This feedback was based off of 5 UVA students aged 20, 3 of which were females and two males. All testers reported that the design of this prototype was straightforward and easy to understand. Everyone also recognized that the bar at the top center of the page would link back to the shopping website specified on the block. Unsurprisingly, only 2 out of 5 testers even noticed or commented on the link accounts link at the very top of the page; they suggested that it would be used to sign in to preexisting websites' accounts in order to personalize the search history or product recommendations more accurately. The general consensus was that the formative conceptual model aligned very closely with the initial conceptual model of the system.

When the testers were tasked to review items in the cart and checkout, all testers were able to do so and understood that the "Edit" button could be used to remove an item. 4 out of the 5 testers also commented on the convenience of the button to breakdown the total cost and see detailed charges. The general trend was that nearly everyone had a straightforward feel for the website design and were able to complete the task of checking out with no issues. Interestingly, one of the testers commented that there was no option for adding discount codes or other special codes in the checkout process, which, for some, is a large factor in online shopping.

Prototype 2:

Feedback

- Naming of screens perhaps not appropriate for the functionality of that page
    - Specifically, one tester says the Checkout page should be instead titled "Review My Order"
- Missing fields that are usually present in payment information
- Would like more ease of use features in payment

        - Ex: entering billing address and allowing shared information between billing and shipping address
    - 5/5 testers commented on the simplicity of the design
    - None of the testers seemed to find the final page influential in any significant way
        - One tester referred to it as “nice”
        - All other testers seemed to be indifferent
    - One tester liked how the site wasn’t trying to sell anything else during the checkout process
    - One tester commented on the fact that the urls matched the title of the page which made it easier for them to understand where they were in the process
    - Most did not comment at all on the icons but one tester said they appreciated that there were brand icons AND pictures of the products
    - Some users didn’t understand the comparison aspect without it being explained to them
    - Not overly clear what the meaning of universal shopping cart is

After listening to the feedback from all 5 of the testers - three of whom were current UVa students and two of whom were parents - there are some aspects that seemed to be generally agreed upon across all the testers. For one, all the testers agreed that the simplicity of the design was nice and eliminate the need to figure a bunch of things out upon opening it.

On the negative side, there was a need for a bit of context when each tester was trying to figure out what exactly “universal shopping cart” meant. There were a significant number of testers who noticed fields missing that are normally present in the checkout process. There were also comments on how the naming of the pages weren’t perfectly clear about what should be happening on the page.

Prototype 3:

Feedback:

- From the initial home screen, users did not seem to understand the main point of the site
- Uncertainty surrounding logging in/my account link at the top of the home screen
    - Several users asked if they could log in and skip some of the steps of checking out like entering shipping information etc.
- One user suggested adding suggested or featured items to home screen to entice people to buy more
- Upon moving from the shopping cart to checkout phase users mentioned ambiguity with leaving unchecked items in the items at the top of the checkout page
- Users were confused about how to go back in the checkout process, no clear answer
- Disagreement between users about having the checkout all on one page vs having a separate confirmation page
- Several users also mentioned including a subtotal on the cart contents page that is visible before heading to checkout
- All users had clear understanding of how to edit and delete items in their cart

This feedback was compiled from having three UVA students ages 20-21 and two adults 50-55. One of the largest issues found from this feedback was a lack of understanding of the point of the site from the home page. Though users understood that the site showed items from purchased from separate shopping sites, all 5 users did not understand that they could buy items from different sites at the same time. Additionally some users were confused about whether or not this homepage was a landing screen after logging in, based on the My Account tab at the top of the screen.

During the task of checking out, users did not have trouble finding the shopping cart, but one of the users pointed out the lack of subtotal of the items contained in the shopping cart. After selecting certain items and proceeding to checkout, all of the users

found it strange or commented in some way that the items not selected in the cart still showed up on the checkout screen. 3 of the users liked that the checkout process was on one page, while 2 users would have preferred to have the checkout broken up into more steps.

Takeaways/Conclusions:

Based on the feedback from all three prototypes, the main purpose of the universal shopping cart needs to be more clear, however this should be added in a way that doesn't clutter the home page and uses the user's language.

Users commented on adding special deals and discount to page on both the first prototype and the second prototype, which would help provide some incentive for users to come to the universal shopping cart site. Additionally, as many only shopping sites allow promo or sale codes to be entered at checkout and feature sales on their homepage, add these elements would help maintain internal consistency.

All users that used the first and second prototype commented on the simplicity and straightforwardness of the design, while this was not mentioned during the use of the third prototype, which may indicate that the first and second prototype are overall easier to use. This contributes to the usability goal that users will be able to save time by using the universal shopping cart.

The majority of the users from the first and third prototype clearly understood how to delete or edit an item in the shopping cart, which fulfilled the usability requirement that a user should be able to remove an item from their shopping cart with one click.

Questions were raised about how shipping would work in the first and third prototype, whether the items would ship separately or different shipping options could be chosen for different items. This questioning indicates that in further iterations of the prototyping there needs to be more feedback to the user about how they will receive the items they purchased and give them appropriate options to ship in different ways if necessary.

Overall, in terms of ease of use, the first and second prototype have better feedback in this respect. In terms of manipulating items in the shopping cart (adding, removing, editing) the users of the first and third prototype had a clearing picture of how to do this and were able to do so in a simple step that satisfied the usability requirement. Based on this, the first prototype accomplishes the usability requirement of users being able to checkout items from multiple sites in one universal shopping cart the best which answers the first research question. While these positives were noted, in the future the prototypes developed should be more clear about the main purpose of the universal shopping cart as well as providing more feedback to the user in terms of checkout.

Conclusions

The Universal Shopping Cart is an online central location in which to add any item from any retail website for the purposes of expediting the checkout and information entry processes and also provide a location in which product comparisons can be made easily. The user base for a product like this encapsulates almost every age group, is

distributed evenly across genders, and will almost certainly be used by consumers outside of the United States and the western world in general. While there are core tasks that make The Universal Shopping Cart useful to all of its users, some different user types might want to focus on other tasks, all of which must be taken into consideration when designing the interface.

The three prototypes created all present a flow that is consistent enough with an already formed concept of an online shopping cart and checkout experience to capitalize on preformed understanding and simple enough to make sure inexperienced users will still be able to follow the steps with ease.

These prototypes were evaluated on potential users and it was determined that while the first prototype accomplished the usability requirements the best, all prototypes need further iteration to meet the needs of the user and adhere further to the design principles. Most importantly, the main purpose of the universal shopping cart should be communicated more clearly in further iterations and eventual implementation.

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