ABSTRACT

Title of dissertation: FURTHERING PSYCHOLOGICAL UNDERSTANDING AND OVERCOMING COST-RELATED SHOPPING CART ABANDONMENT WITH GEOLOCATION CROWDSOURCING

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Online shopping cart abandonment continues to be a widely studied phenomenon in the e-commerce space. While many existing studies are designed to analyze a breadth of factors, our specialized study aims to further our understanding of purchase hesitation and subsequent cart abandonment specifically caused by shipping fees.

In order to explore shipping fee-related purchase hesitation, we employed a two part study in which we 1) collected data regarding the amount of additional fees a user is willing to pay at different price points as well as the user's psychological responses to these fees, then we 2) integrated crowdsourcing techniques into the results of part 1 and proposed a new interaction model, CrowdShop, that aims to crowdsource users' orders together based on geo-location proximity in order to reach a minimum free shipping threshold. Furthermore, we presented CrowdShop as a functioning prototype to gauge user response and sentiment. In both parts of

the study, we employed a grounded-theory approach along with statistical methods for the analysis of the data.

In order to reach a free shipping threshold for online orders, we found that many users combine purchasing efforts with closely-located family members and friends. However, user success of reaching a minimum order amount was hindered by the manual nature of such a collaboration. Through user testing sessions, we received positive responses in favor of Crowdshop's ability to streamline and automate collaboration efforts. However, there still exists opportunities for further development regarding user concerns with CrowdShop.

FURTHERING PSYCHOLOGICAL UNDERSTANDING AND OVERCOMING COST-RELATED SHOPPING CART ABANDONMENT WITH GEOLOCATION CROWDSOURCING

by

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Thesis submitted to the Faculty of the Graduate School of the
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Professor Bo Zhou

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To Mom, Dad and Grace, I want to express my very profound gratitude for providing me with unfailing support and continuous encouragement throughout my years of study and through the process of researching and writing this thesis. This accomplishment would not have been possible without them. Thank you.

Last but not least, all I do would not be possible if not for God. Thank you for opening doors and affording me a firm foundation for me to build my life upon.

Chiun-yao Josh Chang

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List of Abbreviations

BFBP	Best-fit Bin-packing
SPA	Shopping Cart Abandonment
UMDCP	The University of Maryland, College Park
JSON	JavaScript Object Notation

Chapter 1: Introduction

1.1 Introduction

The prevalence of online shopping is marked by the success of large online-only players such as Amazon and Wayfair, joined by the efforts of brick and mortar stores moving into the e-commerce space (e.g. Walmart). Moreover, many brick and mortar shops had their start in e-retail, a selling platform that has comparatively low barriers to market entry. While e-commerce can drive online sales, these platforms render themselves helpless against shoppers who decide to forgo their online purchase, a phenomenon known as shopping cart abandonment.

Many factors can be attributed to the occurrence of cart abandonment, such as user concerns over failed delivery or misrepresented products. In previous studies, added shipping fees in particular have been shown to affect user's decision to finalize a purchase [1]. Many users are unwilling to pay additional fees beyond the subtotal, as shipping fees are an intangible cost. Abandoned carts become a large part of potential revenue that could otherwise be generated. With that said, most e-commerce stores do not have the resources of leading e-commerce companies, such as Amazon, to offer consistent free delivery options to customers. Instead, free shipping may be offered with a minimum cart spend, e.g. a threshold determined by

the retailer.

Having identified this adverse sentiment that has yet to be addressed, we ask the following questions: how do cost-related factors (e.g. shipping fees) affect users' online shopping throughput, and how can crowdsourcing techniques be used to improve purchase throughput? We aim to enhance current understanding of cost-related shopping cart abandonment, analyze the psychological threshold of accepting any given shipping cost at various price ranges, and identify potential exit points in the online path of purchase. Afterwards we plan to design a novel model to help users overcome cost-related shopping cart abandonment by utilizing crowdsourcing techniques based on geolocation. Our crowdsource model will strategically match users together based on geographic proximity and combine orders in order to surpass shipping thresholds. In our study, we will utilize the University of Maryland, College Park as the geolocation constraint and it's students as the primary participants. The results of this study will identify user behavior when faced with additional shipping fees, and apply crowdsourcing techniques to counter purchase hesitation along identified exit points in the path of purchase.

Chapter 2: Related Works

2.1 Rise of E-commerce

Internet accessibility has never been more readily available. Even in low-income households, a study has shown that 51% of adults are internet users. The percentage of internet users is positively correlated with income, with 81% of the adult median income demographic (of the United States) being internet users [2].

Whether the purpose is to display current inventory or to allow for a wider audience to purchase their products, an online presence is common for mega-department stores to mom-and-pop shops alike [3]. Brick and mortar shops stand to gain from the online market [4], as e-commerce widens their potential customer base to potentially sell items to locations all over the world.

Considering the advancement of internet technologies over the last few years, online stores (e.g. e-commerce) have experienced an unsurprisingly tremendous amount of growth. According to the quarterly census from the Census Bureau, revenue generated through e-commerce has been reported to grow nearly three fold from 2008 ($36.5 billion) till now ($105.7 billion) [5].

Previous analysis of internet shopping as an activity has shown it to be a commonplace activity for internet users. 93% of internet users have at one time or

another completed an action related to e-commerce. On a day-to-day basis, more than a quarter (26%) of internet users are online performing actions relating to e-commerce [2].

2.2 Demographics, Motivations, Benefits and Risks

In previous studies, researchers have quantified and analyzed the demographics of internet users in e-commerce. These studies have looked at factors such as: gender, income, race, education, and region in regards to the population of e-commerce shoppers. The knowledge of the e-commerce user group demographics affords us greater understanding of user motivation, as well as the benefits and risks that are of users' concern.

In other studies, the gender ratio of online shopping has mixed reports. In Rohm's study [6] the results report a 3:1 ratio of female to male, whereas [2] reported a balanced 1:1 ratio. Regardless, online-shopping as an activity is not exclusive to any gender, with significant percentages of the population having some experience in e-commerce. In both reports, the majority of shoppers fall between 30 and 49 years of age, and for shoppers, the propensity to shop online is also positively correlated with their education level. Users having a college degree or higher occupied more than 50% of the total percentage of online shoppers.

Having solidified the demographic information of the e-commerce user base, we move to examine the motivations of these users and how purchase behavior is influenced. Past research on consumer motives for retail (e.g. in-store) shopping

include shopping convenience, information seeking, immediate possession, social interaction, retail shopping experience and variety seeking [6]. E-commerce websites cannot afford the same level of experience as a retail store, but comparatively, online stores capitalize on the convenience and time saving factors, namely reducing the customer's time spent on traveling and waiting in line. Online stores often provide more bargaining power as well, due to the greater wealth of information regarding a product and avenues (e.g. other sites that offer the same product) for purchasing. However, online stores suffer due to the lack of sensory perception on the products. Shoppers cannot interact with a tangible object as they search for and evaluate products, which leads to buyer hesitation [7].

With that hesitation in mind, previous works have identified the psychological factors that affect shopper's hesitation, categorized as various risks. The categories of risks include: financial risks, product risk, non-delivery risk and convenience risks [8] [9]. Examples of each type of risks are outlined below:

- Financial Risk: the risk of losing money and financial details (e.g. credit card information)
- Product Risk: the risk that a delivered product is not the same as described online
- Non-delivery Risk: the risk of an item lost in delivery and never arriving
- Convenience Risk: the risk that the user wants to return the product (e.g. return process)

As a result of the above risks, users may become hesitant during their online shopping experience, which ultimately may lead to the phenomenon called Shopping Cart Abandonment. Shopping cart abandonment occurs when a shopper places products into the virtual cart but ultimately does not complete the purchase [10]. There are numerous exit points throughout a customer's path of purchase in which abandonment can occur as a result of these hesitations.

2.3 Exploring Additional Cost as an Abandonment Factor

As stated above, there are numerous factors that ultimately push shoppers to abandonment their purchase. A factor that has not been discussed in great depth is additional costs (e.g. shipping fees) and their relation to abandonment. While an established company such as Amazon has the ability to offer free shipping, many small shops do not have the resources and logistical network to absorb all shipping fees. E-commerce stores such as Amazon have the ability to utilize a variety of measures (e.g. membership, compensating for costs elsewhere) in order to provide free shipping to shoppers. Smaller stores may also present the offer of free shipping after user subtotal exceeds a certain threshold. All in all, previous studies point to a significant amount of users abandoning their purchases due to shipping fees [1], and many e-retailers are faced with constraints over shipping fees.

2.4 Purchase Behavior in a College Setting

Having explored the demographics, motivations and fears of e-commerce shoppers, the college student demographic distinguishes itself as a motivated user base for evaluation [11]. Xu's work in 2005 [12] examined rural v.s. urban colleges and the student's attitude toward online shopping (apparel focused).

The author found a significant correlation between students attitudes and intentions toward online shopping as a result of geolocation. Specifically, whether or not students had access to a vehicle directly influenced their decision to purchase online. For example, a suburban college such as UMDCP lacks a wide range of brick-and-mortar shopping options in the surrounding areas. Therefore, students who lack a method of transportation must turn to online shopping in order to purchase items they desire.

2.5 Crowdsourcing Interaction Model

Collaborative interactions have recently become a topic of interest; open-sourcing [13], a very popular model of collaboration has since become a mainstream model for software development, even extending to hardware in certain cases [14]. As a recently developed concept, varying definitions of crowdsourcing exist, often contradictory to one another. In Estelles' [15] work, the author sought to define, based on previous examples, an exhaustive and consistent definition. Ultimately, the results of the author's works defines crowdsourcing as "... a type of participa-

tive online activity in which an individual, an institution, a non-profit organization, or company proposes to a group of individuals of varying knowledge, heterogeneity, and number, via a flexible open call, the voluntary undertaking of a task. The undertaking of the task, of variable complexity and modularity, and in which the crowd should participate bringing their work, money, knowledge and/or experience, always entails mutual benefit. On the sourcer's end, their benefited by receiving and utilizing what the users have brought to the venture".

Citing the definition above, there exists a clear "sourcer" role: the person who initiates the crowdsourcing and receives the benefit or user responses, and the "users" role: one who contributes with their money, expertise, etc to complete the task defined by the sourcer.

This two way model has come to define a variety of crowdsourcing tasks. Doan [16] explores the different types of crowdsourcing systems on the web, categorized into either Explicit or Implicit Systems. Explicit systems let users collaborate with the knowledge of the goal, while implicit systems are distinct as they do not inform users of the end purpose. Explicit systems are standalone, meaning that they do not derive off another system's data. Standalone systems leave the issue of needing to recruit users, while implicit users can be either standalone or piggyback (e.g. utilize another system), in which case the need for users depends on the chosen architecture. For example, "Ten Thousand Cents," a digital artwork by Aaron Koblin, creates a representation of a $100 dollar bill. Thousands of users used a custom drawing tool to paint a small portion of the final piece. Users were unaware of the final outcome: a $100 bill comprised of the users' painted pieces, stitched together by the artist.

Implicit systems also enable a sense of privacy in which users will never interact with other collaborators but the crowdsourcing goal will be reached regardless.

2.6 Geo-location Advantages

With most traditional crowdsourcing implementations, the assigned tasks are completed virtually (e.g. mechanical turk [17]). With e-commerce, however, the experience extends past the online interface. The product ultimately needs to be delivered to the user to complete the experience. In Kukar's work, the author effectively paints the scenario by stating: "[in order] to take advantage of the relationship between overall cost concerns and consumers intention to buy from a bricks-and-mortar store, multi-channel retailers should offer customers options such as buying online but being able to pick up the purchase from the land-based store location. This would allow the consumers to avoid the cost of shipping and handling fees, while permitting them to achieve the same low product prices offered online. Similarly, returns of items at bricks-and-mortar store locations should be accepted to alleviate consumers concerns about having to pay return shipping fees" [1]. This explores an interaction where shoppers are able to utilize the service of in-store pick up to circumvent the cost of shipping and handling fees. Despite the benefit, in-store pickup is still constrained by geolocation, as shoppers would be less inclined to choose a store that is further from their frequented locations.

Taking the factors above into consideration, the college campus presents itself as an ideal geolocation for evaluation of a collaborative shopping interaction model.

First, by utilizing a pre-determined campus location as the "pick-up store", we can effectively circumvent shipping costs and provide ease of return. Secondly, a college campus and it's demographics of students adheres to the need of collaboration in close geo-proximity as a campus naturally centralizes it's student body (e.g. dorm communities). Lastly, a (in the case of UMDCP) suburban college offers a user base that is motivated to purchase online and in turn, provides enough users to leverage crowdsourcing techniques.

Chapter 3: Part 1: User Psychology and Purchase Behavior

3.1 Overview

In the first part of this study we focus on the psychology of user purchase behavior. Through designing and conducting an online questionnaire, we seek to evaluate user perception of what determines a "justifiable" amount of shipping fees in relation to a given subtotal. To give an example: users may express varying degrees of willingness to pay a five dollar shipping fee on a $100 cart subtotal versus a $10 subtotal. Moreover, we also evaluate general sentiment towards shipping fees as well as past collaborative experience in reaching retailer shipping quotas.

3.2 Methodology

3.2.1 Recruitment

In order to reach enough power, we opted to design an online questionnaire that can generate responses rapidly. Participants were recruited via electronic means, such as web postings and electronic newsletters; we specifically recruited through the UMDCP HCIM/HCIL listserv as well as social media sites such as Facebook and Twitter. We leveraged our social network by posting a recruitment message with

the questionnaire link and users in our network were free to participate by clicking the link and filling out the survey.

3.2.2 Eligibility and Enrollment

Survey participants were screened for the following criteria: participants must be 18 years of age or older and participants must have prior experience on e-commerce sites. The rationale for this filter is that first, most minors will likely not have the ability to fund their purchases, and therefore we seek participants who are legal adults. Furthermore, adult participants must have prior experience with online shopping in order to provide relevant responses to the questionnaire. We aimed to recruit 100 - 200 people in this part of the study.

3.2.3 Initial Procedure

Due to minimal risk in this part of the study, we requested a waiver of consent through the standard consent form. Instead, survey takers were informed of the nature of our study, recorded information, and confidentiality of results. Then, survey takers were required to digitally sign the virtual consent form.

After participants were recruited, they were given the link to the online survey and directed to complete the survey to the best of their ability. Participants were not forced to complete the survey and were able to exit the survey at any given point.

3.2.4 Questionnaire Design

We designed this questionnaire in two parts: the first part consists of a set of questions aimed to gather basic demographic information as well as general sentiment towards shipping fees. The questionnaire started with asking users whether they "have ever asked a friend/family/co-worker to purchase products on a particular site together in order to reach free shipping". This question aimed to validate one of our initial assumptions in which users either purchase additional items or seek collaboration when encountered with shipping fee caps. As a follow up, we asked users whether or not the individual they sought collaboration with was geolocated in close proximity. This question aims to validate whether users innately seek out potential collaborators who are within close proximity. Lastly, an open-ended question prompted users to provide their opinion of shipping fees.

The second part of the questionnaire had users consider the following: given 5 different cart subtotal ranges, how much in shipping fees would users be willing to pay for each range? The pricing ranges were derived from Amazon.com's pricing range. We chose Amazon over other online retailers due to their wide shopper reach. A major retailer such as Nordstrom may feature brands and prices that deter certain demographic segments from shopping on their site. 'Amazon, on the other hand, does not limit itself to any given demographic, as the retailer carries a wide selection of accessible products and brands. Amazon.com's pricing is composed of five categories: 0 - 25 dollars, 25 - 50 dollars, 50 - 100 dollars, 100 - 200 dollars and 200 dollars and above. For each pricing range, we asked survey participants to

indicate the amount of shipping fees they would be willing to pay (in US dollars). The Qualtric questionnaire software allows users to respond to these questions with sliders, which affords a visualization of the selected amount relative to the subtotal category.

3.3 Analysis

After the collection of data, we proceeded to perform an analysis of 118 total responses. Our participants were divided into 52 males and 63 females, while two users declined to identify. 67% of users were in the age range 18-24 and 18% of users were 25-34, all others were evenly distributed across the other age ranges. Lastly, 81% of users held a four-year degree or more advance. We employed a grounded-theory [18] coding section to evaluate the question "can you briefly tell us about your opinions on shipping fees?". We utilized one coder, Chiun-yao, to first utilize a open coding process to label concepts, define and develop categories and afterwards we finalized the coding with another pass through of the data. We primarily coded based on keywords that relate to sentiment and categorized those first, then synthesized a more encompassing theme as a finalization. Furthermore, we also included a statistical analysis section. The methods and results of analysis are outlined below.

3.3.1 Qualitative

We collected the responses to user's opinions on shipping fees, and performed coding on the responses to identify and group responses into themes. Unsurprisingly, users are not fond of shipping fees, as most users responded with neutral to negative feedback. A significant number of users expressed the belief that shipping fees are reasonable and justified, while also revealing their active avoidance of shipping fees entirely. Therefore, we will discuss other themes in greater detail.

3.3.1.1 Reasonable, Understandable, but Unpleasant

This was the most dominant theme, as 20% of user's response included this thematic code. Users whose responses fell into this theme understood the need for shipping fees, and how shipping fees affects logistics of delivery. More than one user pointed out that "there's nothing for free, [shipping fees] will be calculated into prices somehow if not billed separately". However, despite understanding the necessity of shipping costs, user's still respond negatively due to the "unpleasant" nature of fees. We found that under certain scenarios, user's response to shipping fee differs.

3.3.1.2 Incentive

For the first of these scenarios, we code as Incentives. Many online retailers use a minimum threshold for free shipping in order to incentivize users to spend more. User's echoed that they "end up buying some other item because otherwise

[they'd] be spending almost that same amount in shipping fees". Otherwise, users choose to not purchase at all. Users must choose between these two paths when faced with a minimum order threshold.

3.3.1.3 Proximity

The second scenario is driven by Proximity, e.g. are there physical stores close to the user where the item is being offered for purchase? When faced with the decision to purchase a item, users take into account the proximity and ease of purchase at brick and mortar retail stores. A user also indicated that he/she takes into account the possibility of returning purchased items. The user indicated that he/she "will not purchase from [online] shops if free shipping is not offered and a physical store is not in proximity should I need to make a return". We conclude that the presence or lack of local retail stores either deters or motivates users to pay online shipping fees.

3.3.1.4 Avoidance

Avoidance is the second most dominant theme that was coded in our responses. In these scenarios, users take one of the following approaches. 1) Abandon the purchase entirely 2) Attempt to consolidate items to reach the minimum subtotal required 3) Search for the same item on other e-commerce sites that may offer free shipping. As discussed above in 3.3.1.2, the first two approaches are common tactics when users are faced with shipping fees.

3.3.1.5 Amazon

As stated in 3.3.1.4, approach number 3 features users' attempt to search for free shipping offers for their desired item across different websites. Users who reported this pattern of interaction tend to state that they utilize Amazon Prime because of the free shipping service. Users equate Amazon Prime with free shipping although Amazon Prime is a paid subscription service ($99 a year and $49 a year for students). It is undetermined whether the users who responded in favor of Amazon Prime are paying for the account, or if they "bother [their] friend who has Amazon [Prime] to avoid shipping cost". With that piece of information, it may provide clarity to user motivation (e.g. users may exclusively shop on Amazon to maximize the benefits of having an account).

3.3.1.6 Flat Percentages

We also coded responses that indicated users' psychological belief of what is considered fair shipping fee pricing. Some users reported "fair shipping rates" of absolute figures, such as $6 and $10, while others reported a range of less than $5. Other users reported acceptable shipping rates as a percentage of their cart subtotal. Notably, more than one user agreed that shipping fees exceeding 50% of the cart subtotal would deter them from finalizing the purchase. These flat percentages or flat rates are "arbitrary" as a user described, and cannot be assumed as a general consensus.

3.3.1.7 Transparency

A small portion of users commented on the lack of retailers' transparency regarding shipping fees. Users reported that shipping fees are "necessary and will be part of the transaction whether disclosed in any price (consumer goods) or not" and that users "prefer transparency and thus can decide if the convenience is worth the cost". With this belief, users prefer retailers to be upfront about shipping fees instead of tacking the fee on at the very end of the checkout process.

3.3.1.8 Collaboration

Lastly, certain users have opted to collaborate on their past orders with other users. This collaboration happens by asking people in close proximity to help them reach a minimum free shipping threshold. However, the purchasing process is slowed due to the time spent "asking people (or encouraging them) to buy things". From this, we note that collaboration is a viable and explored method, but the existing user effort to coordinate a group order prevents users from actively utilizing this method.

3.3.2 Quantitative

Of all responses obtained, 67 out of 118 participants responded that they had asked a friend/family/co-worker to purchase products on particular sites in order to reach free shipping in the past. In particular 81% of those 67 participants responded that the friend/family/co-worker they asked to pool their orders together was located

in close proximity.

Subtotal	$0 - $25	$25 - $50	$50 - $100	$100 - $200	$200+
Mean	$3.24	$5.06	$7.14	$9.14	$13.06
Standard Deviation	$2.04	$2.96	$5.35	$7.21	$10.90
Standard Error	$0.19	$0.28	$0.51	$0.69	$1.04

Figure 3.1: Average Data Points with Standard Deviation and Standard Error

For each of our pricing categories, we calculated the average of the amount of shipping fees in which users responded that they were willing to pay, then for each pricing category we calculated the standard deviation (STDEV.S) and then standard error. Combining the average and standard error, the two pieces of information gave us a plus/minus range for each of the pricing categories. Lastly, we plotted the 15 data points (5 data points for pricing category average, plus/minus standard error per average) into a line graph. In Figure 3.3 we see a visual representation of the data in a line graph. Performing Single Factor ANOVA on the reported data, we arrive at a ρ value $= 2.02E - 27$, therefore concluding that there exists significant difference between each subtotal category.

Therefore, as significant different exists and pricing categories are not incremented on a consistent scale, we provide a box-and-whisker plot of the same data in 3.4, which separates the relationship between each pricing category.

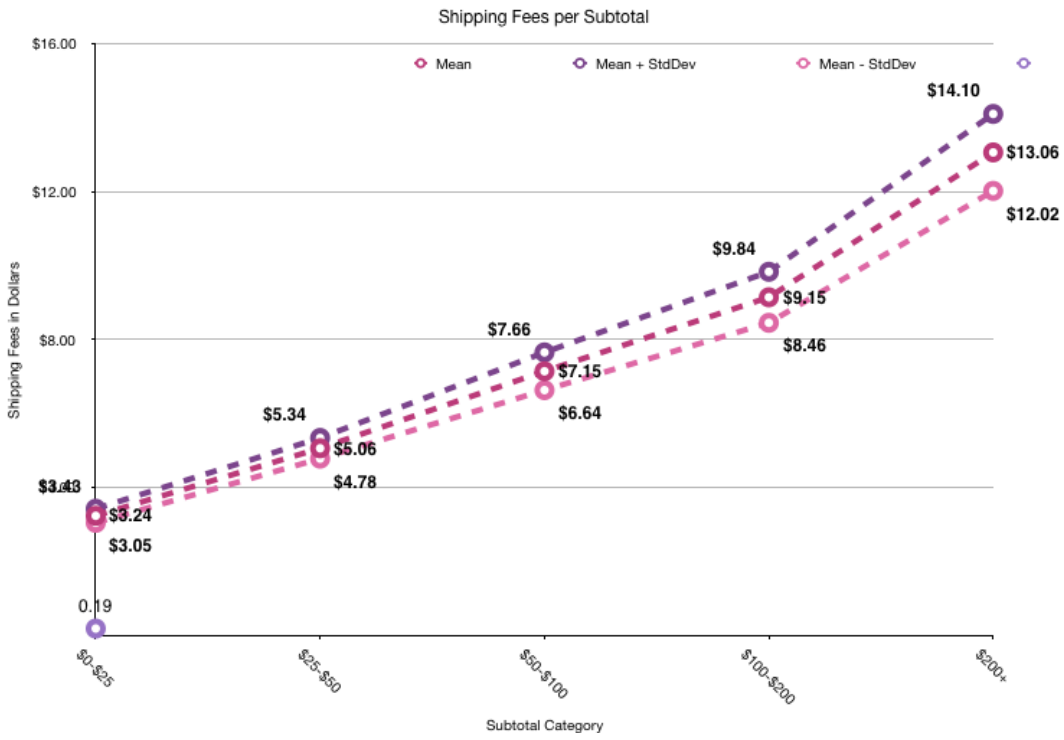

Figure 3.2: Line Plot of Shipping Fees per Pricing Category

3.4 Discussion and Limitations

We start by identifying that users fell into either one of two categories: users that will pay for shipping fees if perceived as reasonable, and users that refuse to pay additional fees no matter what. We note that users have arbitrary definitions of what constitutes reasonable, from flat percentages to flat rates. After encountering additional shipping fees, users attempt to find the same products on different sites that may offer free shipping. A popular option is to search on Amazon where Prime membership allows for the order of numerous items without an added shipping fee. However, the validity of Amazon Prime's popularity requires finer exploration as we did not access whether the users paid for their own accounts. If no sites offer free

ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	6309.48624	4	1577.37156	37.0949027	2.02E-27	2.38844074
Within Groups	22962.2018	540	42.522596			
Total	29271.6881	544				

Figure 3.3: Single Factor ANOVA

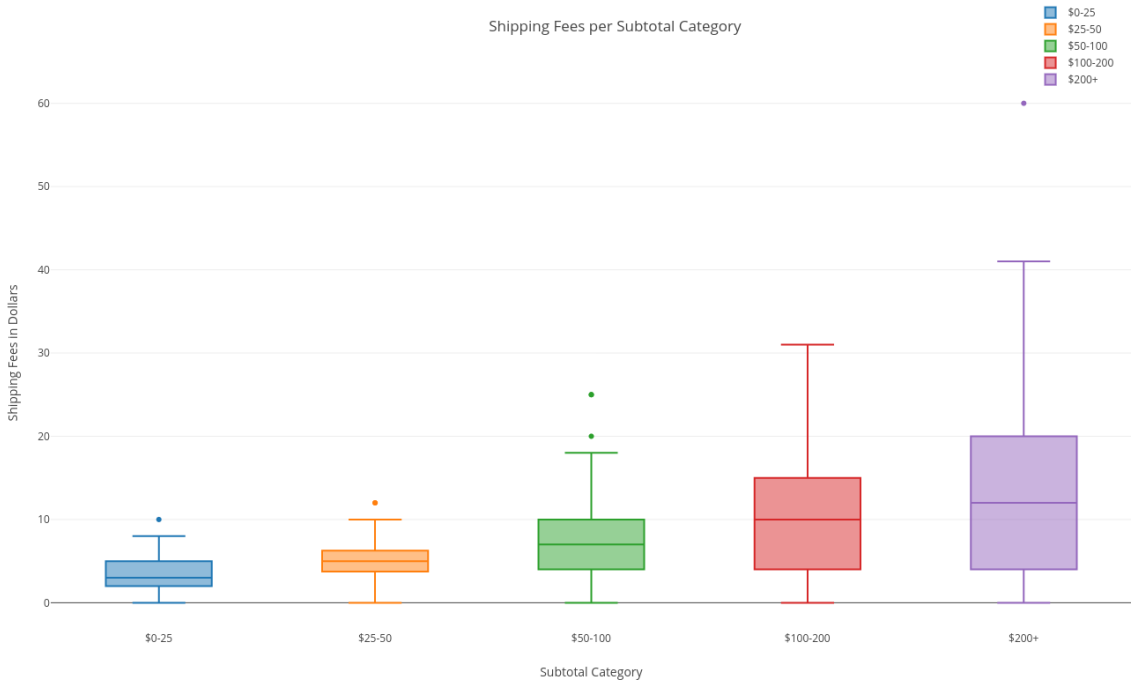

Figure 3.4: Box and Whisker Plot of Shipping Fees per Pricing Category

shipping, users will either 1) purchase additional items to reach the minimum 2) abandon the purchase or lastly 3) seek to collaborate. We found that users consider collaboration but the effort required to complete the process is a deterrent to the overall purchase throughput.

Having identified user's interaction pathways, we specifically focus on the collaborative branch of the interaction. Considering our quantitative statistics, in which more than half the surveyed users responded with experience of collabora-

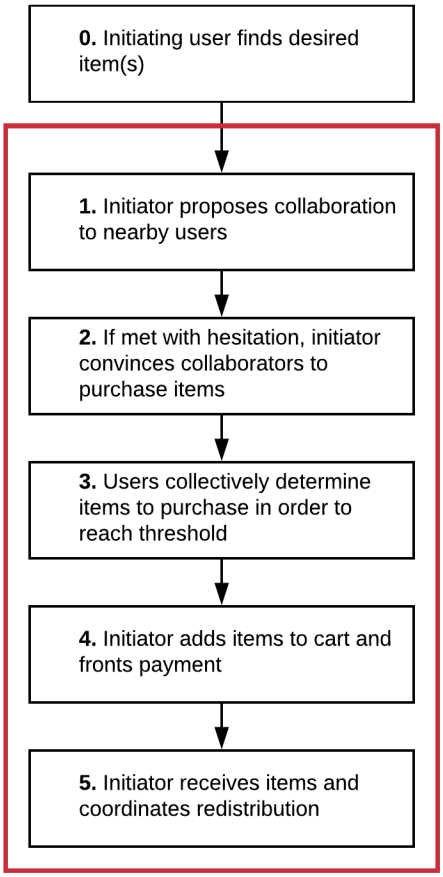

Figure 3.5: Manual Collaboration Model

tion, and specifically, close-proximity collaboration, we conclude that collaboration is a viable method for users to achieve free shipping. In a normal purchase flow, which we utilize simple observation to synthesize, a user adds an item, checks out, and then receives the item in delivery. Taking into consideration how collaboration changes the purchase model, based on our obtained responses, we break down the model into the following steps: 0) Initiating user finds an item that he or she has decided to purchase 1) User initiates by proposing collaboration to other closely located users 2) If met with hesitation, originating user must convince collaborators

or abandon the purchase 3) Upon reaching an agreement, users must work together to ensure subtotal reaches minimum threshold 4) Originating user foots the bill up front 5) Originating user receives the items and contacts collaborators to arrange for pickup. We observe that in this breakdown (Figure 3.5), steps 1 to 5 require the initiator to coordinate and manage the entire process. Unless collaborators can readily purchase alongside the initiator, the shopping process slows down and purchase throughput is lowered (as noted in section 3.3.1.8). We therefore seek to improve upon this current collaboration interaction model with the application of different techniques to develop a novel interaction model.

Although we are able to apply mathematical formulas to determine a trendline for acceptable shipping fees, we cannot conclude that these trends are applicable to other online retailers with different pricing categories. Despite this limitation, provided that there exists a significant dataset, online retailers may be able to utilize a data-driven approach to dynamically adjust shipping rates to alleviate user hesitation and improve purchase throughput.

Chapter 4: Part 2: A Crowdsourcing Shopping Model

4.1 Overview

In the second part of this study, Overcoming Cost-Related Shopping Cart Abandonment with Geo-location Crowdsourcing, we present a novel interaction model that improves upon the standard interaction model. Based on the aforementioned interaction model, as well as statistical reports of users who collaborate based on proximity, we saw an opportunity to integrate proximity-driven crowdsourcing techniques and improve upon the existing model. In this chapter, we explore the design, evaluation and future direction of this novel crowdsourcing interaction model in a suburban college setting.

4.2 Collaborative Interaction Model

4.2.1 Model Overview

Having defined a user-driven collaboration purchase model, we observed that aside from the initial selection of purchase, the succeeding steps require user effort that can be replaced by computer-assisted automation. First, we redefine the standard interaction model as discussed in 3.4: 0) Initiating user finds an item that he

or she has decided to purchase 1) User initiates by proposing collaboration to other closely located users 2) If met with hesitation, originating user must convince collaborators or abandon the purchase 3) Upon reaching an agreement, users must work together to ensure subtotal reaches minimum threshold 4) Originating user foots the bill up front 5) Originating user receives the items and contacts collaborators to arrange for pickup. We specifically target steps 1 through 5 as pain points that we seek to improve in order to reduce user effort.

4.2.2 Model Design

Below we detail the interaction flow of the proposed collaboration model, visually represented in Figure 4.1.

0) User finds an item(s) that he or she decides to purchase 1) User initiates collaboration by adding item(s) to collaboration system's virtual cart 2) User checks out items in cart and the system receives user order details 3) System attempts to group subtotals in some fashion in order to exceed minimum shipping threshold 4) System informs users of successful grouping and places order on behalf of the grouped users 5) Order is shipped to a central location and then system generated notification is sent to users that their purchased items are ready to be picked up.

In accordance to the related works we surveyed, we decided that an Explicit Crowdsourcing System best suits this interaction model. In the defined collaborative purchase model, users will not have access to other user and purchase details in their order grouping; users are only concerned with reaching the minimum threshold goal.

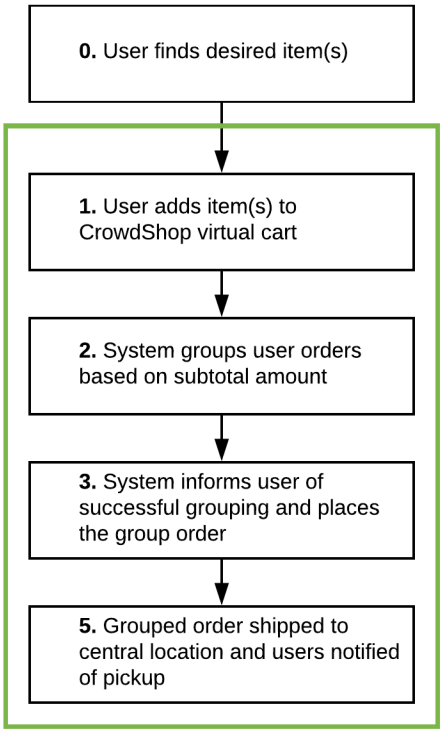

Figure 4.1: CrowdShop Collaboration Model

We can protect purchase privacy by not exposing users' purchase details and only taking into account the individual subtotal when determining groupings. Instead of a user having to front the order total, we propose a payment model that is similar to PayPal. Retailers that utilize PayPal interact with as a middleman; for example, Ebay users purchase items through Paypal, who in turn forwards the money to the seller. In this fashion, we enable users to be accountable for only their portion of the grouped purchase and eliminate the manual transfer of funds between users. The model then simulates a user-collaborated purchase and places the order under a unified name and purchase information. In regards to a central location, we previously identified that proximity is a factor in user purchase throughput;

therefore we utilize a pick-up center to mimic a local brick-and-mortar shop that offers free in-store pickup.

Comparing the standard interaction model and the collaborative model, we observe that steps 1-4 have been automated and user efforts in those steps are minimized. A downside is that users cannot receive items directly in their homes, but with a close enough pickup location, users would not be deterred to purchase.

In regards to a close enough pickup location, we determined that for evaluation of the interaction model, a college campus such as UMDCP is an ideal test environment. Previous research indicated that students who are in suburban areas and do not have access to a vehicle are more likely to be motivated to purchase online. The UMDCP campus in particular, is located in a suburban area with a lack of brick and mortar stores nearby, but at the same time is densely populated enough for a pickup center to be accessible from all corners of the campus.

We name this interaction model (and the accompanying prototype) CrowdShop, and hence forth reference the model as named.

4.3 Prototype System Design

Having defined CrowdShop, we built a prototype that simulates the CrowdShop model in order to evaluate user response to the novel model. In this section, we detail the architecture and how information is manipulated in the prototype system. We implemented the experience on Amazon.com due to the same concerns discussed in section 3.2.4.

4.3.1 Injected Javascript

The Google Chrome browser allows us to build a custom extension that runs custom Javascript on any designated websites. The extension consists of two parts, the injected script and the extension pop-up. When combined, these elements complete the CrowdShop experience and enable refactoring to function on any online shop.

For the injected script, we modeled this behavior after the Chrome extension Honey [19]. In order to mimic the checkout process that can be found on any website, we coded an injection script that inserts an "Add to Cart" button into the HTML of our test site that transfers information between the webpage and our service. Figure 4.2 demonstrates the "Add to Cart" button that is injected into our test page. We note that the injected "Add to Cart" will only be present on product pages where there exists the option to add to Amazon's virtual cart.

Upon pressing the injected "Add to Cart" button, the code will parse the product page for the following pieces of information: product name, price, product image, product number. The script then obtains and stores the data in JSON object format and into the local storage of the browser. The data is later accessed by the extension pop-up. The storing of data concludes the information flow on the side of the injected script of the prototype.

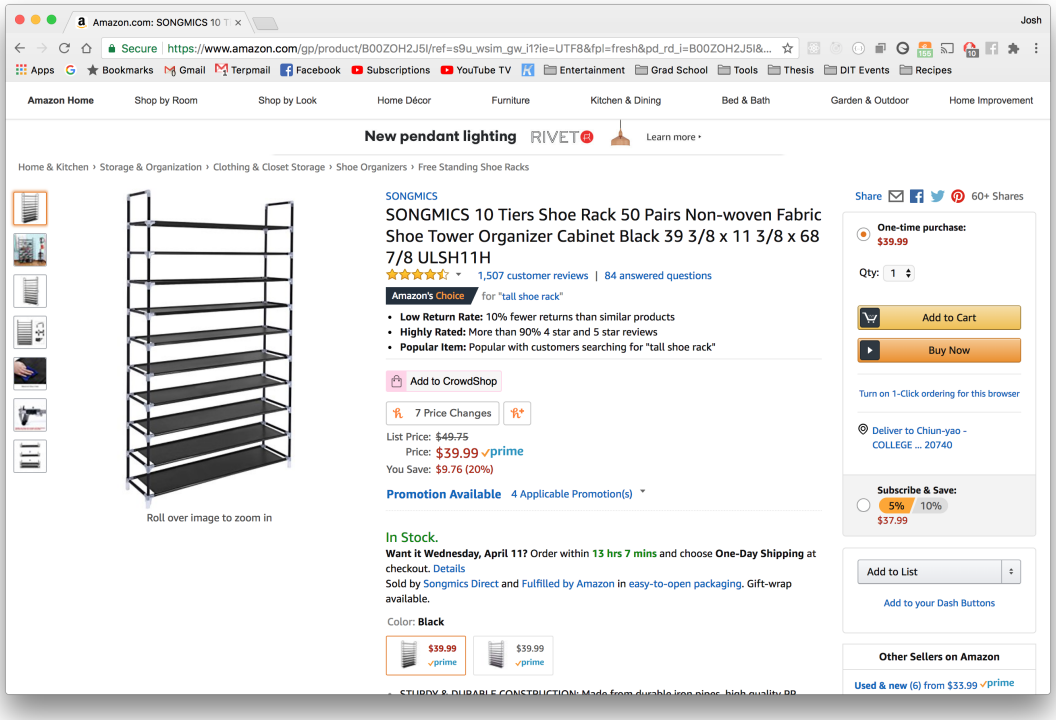

Figure 4.2: Injected "Add to CrowdShop" Button on Amazon.com

4.3.2 Extension Pop-up

On the extension pop-up side of the prototype, users are required to sign up for the service upon initial launch. The user is asked to provide their first and last name, along with their email information. A realistic service would also ask for payment information (to adhere with currency flow discussed in section 4.2.2) at this step but for our prototype we disabled these fields, as simulating the experience is sufficient for evaluation. Afterwards users are asked to confirm their location, e.g. closest pickup location, we utilize Google Maps API to simulate the geo-location experience. As our participants are all students at UMDCP, we hard code the pickup location as the Adele H. Stamp Student Union Center. This concludes the

last step of the signup experience, and at this point, users are ready to add items to the CrowdShop virtual cart to continue towards checking out.

If users have already added items via the Injected Javascript, the extension pop-up will parse the JSON data from the local storage of the browser and populate the data into the virtual cart of the Extension Pop-up. Users can then checkout on the Extension to transfer user purchase details to the backend service where the Grouping Algorithm takes place. Our prototype system consists of a React.js frontend and Node.js backend stack in conjunction with a Firebase Real-time Database to enable real-time experience of: collaboration, data transfer, grouping as well as response back to the frontend.

4.3.3 Grouping Algorithm

After users have checked out on their respective endpoints, the backend service receives each user's purchase information, including user ID and purchase subtotal, which then populates the information to the Real-time Database. Each user order is initialized in the database with a Grouping ID of -1, meaning that the user and his/her order has not yet been consolidated into a group.

It is notable that in a real world setting, orders do not come in all at once. Users would either need to specify their maximum wait time (e.g. the time between checking out on the service and giving up on finding a group order) or the system needs to dynamically process orders at a given increment of time. For prototyping purposes, we implemented neither of these solutions, instead opting for a manual

consolidation that will sufficiently simulate the end-to-end experience.

With the above note in mind, once consolidation has been triggered manually, the backend service retrieves all live entries (orders that have a Grouping ID of -1) and runs the following algorithm in grouping the orders. First, the orders are sorted by subtotal from largest to smallest amount. Next we apply Best Fit Bin-packing [20] to the subtotals with the bin capacity as the minimum shipping threshold. Using BFBP instead of a greedy algorithm (e.g. as soon as incoming subtotals exceed threshold, complete grouping) allows for a more even distribution of subtotals across all "bins", without a single order or "bin" being over-loaded ("bins" here refer to a grouping). The downside is that with BFBP, we lose some dynamic responsiveness (the same design issue as mentioned in the previous paragraph). After initial BFBP, none of the "bins" have exceeded the bin capacity or minimum threshold, therefore we start taking items out of the last "bin" and placing items into every other "bin" until all "bins" have exceed capacity. Now all users have been grouped and the backend service assigns unique ID's to each grouping and stores the data back in to the database.

4.3.4 End-to-end Information Flow

At the end of the prototype experience, users are able to close the extension and check back on the status of their grouping. Once the grouping has been made, the prototype will immediately reflect that state and alert users to expect an email confirming their purchase. This concludes the prototype flow and figure 4.3 and 4.4

visualizes the prototype that users will experience during the evaluation period.

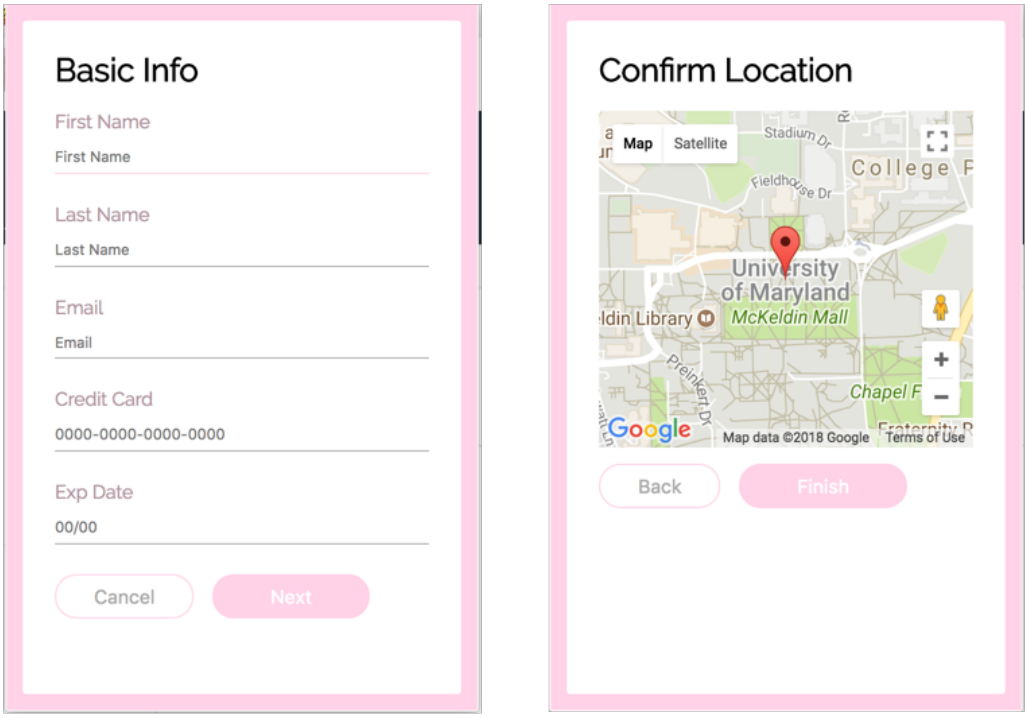

Figure 4.3: Left: Basic Information. Right: Geo-location Confirmation

4.4 Methodology

4.4.1 Recruitment

For the evaluation of CrowdShop, we decided to hold user testing sessions in a group format. We recruited 20 users, split into two 10-people groups, and primarily through online recruitment flyers and listserv emails. Specifically, we posted sign-up forms on Facebook and delivered emails to the HCIM/HCIL listserv to recruit users. Our participants were all filtered on the condition of being enrolled students and we

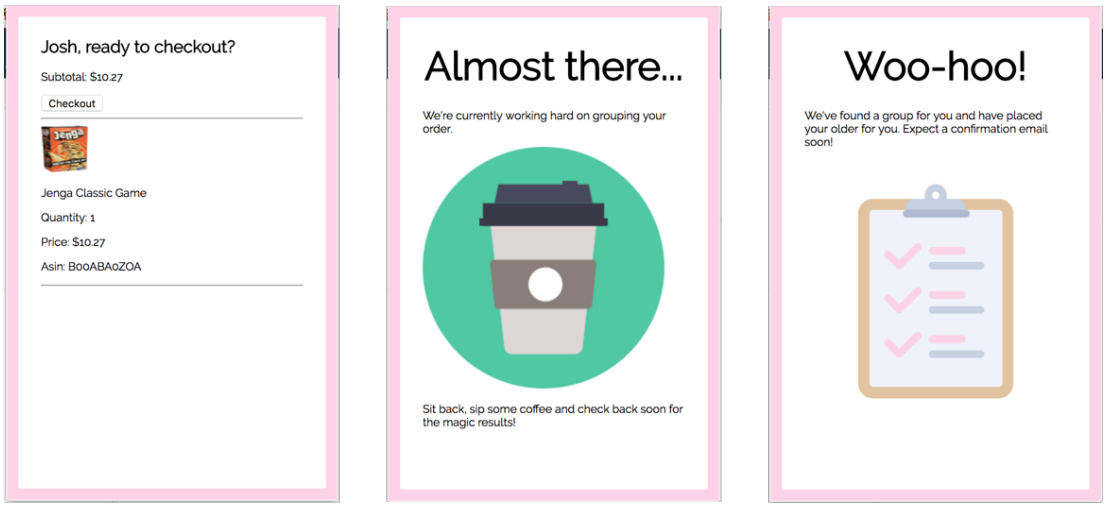

Figure 4.4: Left: CrowdShop Virtual Cart. Middle: User Pending Grouping. Right: Grouping Found

had a one-to-one ratio of male to female participants.

4.4.2 Eligibility and Enrollment

Participants were screened for the focus group based on two criteria: 1) users must have experience shopping online and 2) users must be students of the University of Maryland, College Park.

4.4.3 Initial Procedure

Due to minimal risk in this part of the study, we only required a signature of consent through the standard consent form. Survey takers were informed of the nature of our study, information that will be recorded, and a walk through of confidentiality measures. Survey takers were required to physically sign the consent

form at the beginning of the session.

To begin the user study itself, we briefly shared our findings from the first part of the thesis and how our findings drove us to design CrowdShop. We emphasized that although the study will be exploring the prototype, users should focus on evaluating the interaction model, CrowdShop, that the prototype represents. We then gave a demo on how the system works and instructed users on how to install the program in their browser.

Prior to letting users test out the interaction model (e.g. prototype), we set out an imaginary scenario for the users to better visualize the experience. The scenario given is as follows: the user wants to buy an item that is about $20 to $25 dollars but the minimum threshold for free shipping is $100 and without reaching the threshold, the flat rate shipping fee is $5 dollars. Users were directed to utilize CrowdShop to reach the minimum threshold.

4.4.4 Questionnaire Design

After the user had completed the testing scenario, we directed users to complete an exit survey in response to CrowdShop which consisted of a mix of qualitative and quantitative questions. The questionnaire was designed to first evaluate quantitative responses to CrowdShop and then further explore the reasoning behind the responses.

To start off, we asked the users to evaluate CrowdShop in these four categories: ease of use, sense of security, clarity of directions, and interface consistency. Users

were given 5 options scaled from Strongly Disagree to Strongly Agree, in reference to their experience using CrowdShop. Next, we prompted users to state whether or not the removal of shipping fees influence their decision to purchase (on a scale of Definitely No to Definitely Yes) and provide reasoning for their decision. The last question directly related to the study asked users if they would consider using a service similar to CrowdShop if it were to exist in the market. In addition, users were asked for any concerns they had regarding a service similar to CrowdShop.

To round off the survey, we asked users two questions that pertain to future direction. The first question asked whether or not social motivation would convince users to complete the purchase (e.g. their peers use the service). Secondly, users were asked to determine an acceptable distance for centralized pick-up via CrowdShop.

4.5 Analysis

After collecting our data consisting of 20 data points, we again proceed to perform qualitative coding and quantitative statistical analysis. The results are discussed below.

4.5.1 Quantitative Analysis

Overall, a majority of users reported favorably regarding the four evaluation categories discussed in 4.4.4, with more than 90% of users being on the Strongly Agree to Agree spectrum in most categories. The only category that received less favorable responses was the Sense of Security of CrowdShop. Having used CrowdShop,

users reported that the removal of shipping fees Probably to Definitely influenced the user's decision to complete the purchase. Lastly, users responded favorably in their consideration to utilize a service such as CrowdShop to collaborate on shopping orders; 64.71% users responded firmly with Yes while 29.41% users responded with Maybe. A Chi-squared test revealed that our data significant differed from our expected data of an even distribution, $x^2 = 0.004296305$). We conclude that users generally gravitated more to the positive spectrum of responses.

Regarding the two future direction questions, there was an even spread across the Probably Not to Definitely Yes to social integration in a collaborative purchase service. This reveals the potential to further evaluate whether or not peer influence will significantly affect the collaborative process. Regarding a potential pick-up location, users responded that a 10 to 15 minute round-trip walk would be a reasonable distance to retrieve their orders.

4.5.2 Qualitative Analysis

Having explored CrowdShop, users were asked to respond to whether or not the removal of shipping fees (via CrowdShop) influenced their decision to complete the purchase. We again employed a Grounded Theory Approach to thematically code the responses to the two questions evaluate the question "Did CrowdShop influence your purchase decision?" and "What are user's concerns regarding CrowdShop?". We utilized one coder, Chiun-yao, to first utilize a open coding process to label concepts, define and develop categories and afterwards we finalized the coding with

another pass through of the data. We primarily coded based on keywords that relate to sentiment and categorized those first, then synthesized a more encompassing theme as a finalization. As we worked through the data we noticed that there were both positive and negative responses regarding certain codes, therefore we separate and discuss the responses more broadly as positive versus negative sentiments.

4.5.2.1 Q1: Did CrowdShop influence your purchase decision?

Users revealed the foremost limitation with CrowdShop as its inability to guarantee rush orders or process orders by a particular date. CrowdShop is currently designed to only overcome the minimum subtotal required to reach free standard shipping and with no consideration of the time required to reach a quota. We also observe that sites which incentivize with a minimum free shipping subtotal do not apply the incentive towards expedited shipping options.

In cases where a product can slightly vary in color or design, users also responded that they would order multiple items to compare and then decide on whether or not to keep the item. In this situation, users noted that it would be "better for me to purchase multiple on my own so that I can better compare the products". In such a case, minimum threshold may be easily met and collaboration is no longer necessary.

Regarding positive outlooks on CrowdShop, users reported that "having an extension that facilitates... is beneficial and makes things easier", "purchasing through a crowd funded option seems really smart and useful" and "this service could wipe

off some fees and prompt me to click the purchase button".

Some users reported that the "[removal] of shipping fee at a very small price of convenience" would not be a deterrent to purchase throughput and continues to state that the removal of shipping fees would "especially [suit] college students on a budget". In general, our participants (consisting of college students) responded positively to CrowdShop's ability to remove the standard shipping fees.

4.5.2.2 Q2: What are user's concerns regarding CrowdShop?

There were many concerns that users expressed regarding CrowdShop. Users were concerned with these notable areas: Security and Privacy, Turnaround Time, Pickup and Returns.

As with any new service, credibility must be established, and since CrowdShop ultimately deals with payment details, users were concerned about their financial security. Users pointed out that developers need to make "the directions... really well explained for me to trust the system" and that if users can "look up what the developer is using to make the process secure", their concern will be eased. Users pointed that "unless it's a well known service, I would doubt whether it's reliable". Although during the session, CrowdShop did not expose order details to collaborators, users were still hesitant about the potential of their order details being made public. To give an example, when the "product is of a more personal nature, one may want the order shipped in a way to mask what sort of product one is receiving so as not to feel judged by others".

Another facet that users were concerned with was Turnaround Time, which we noted in 4.5.2.1 as well. Users pointed out in a situation where they are "anxious to buy something online that is on sale for a limited time, but not enough people are using the service... to reach the free shipping quota". On the contrary, users also addressed the concern by stating that "as more people use the service, [CrowdShop] will have more data to provide users with an estimated wait time for the success of their shipping quota being reached".

The last category that users voiced their concerns in was regarding pickup and returns. As our prototype did not simulate the pickup end of the experience, users were unsure of the actual experience CrowdShop would offer. Some users believed that the ability "to pick up the product anytime instead of having to match someone's schedule" was the expected behavior, which is the correct assumption. While other users believed they still had to come to "an agreement on the time to get the package" with the collaborators. Lastly, users did voice that whilst having shipping fees waived is a plus, they would still prefer having the item shipped to their doorstep where an extra effort to retrieve the package is not necessary. As the scope of CrowdShop did not include the return experience, users also mentioned uncertainty regarding how returns would be processed as orders are no longer under the user's details.

4.6 Discussion and Limitations

Most significantly, as CrowdShop was represented by a prototype and not a real-world implementation, there were areas that the prototype was not able to fully simulate the experience. In particular, the areas that users do not directly interact with left the most concern on the users' minds. These areas are Security, Privacy as well as Redistribution, all areas that are either non-perceivable (Security, Privacy) or untested (redistribution). At the same time, users reported mixed opinions regarding these areas; some users were more trusting and embracing of CrowdShop while other users are more reserved; as with any user base there are bound to be differences in user mentality. If we were able to fully simulate the entire purchase experience through redistribution and user pickup, user responses may differ in this area. Our study is limited in that regards, due to financial and logistical restrictions.

However, our results indicated that users could be persuaded with proper documentation of Security and Privacy features. As with any novel systems, users required time and experience to become comfortable and confident in it's usage. CrowdShop is no different as users expressed concerns regarding their privacy as well as discomfort with collaboration with complete strangers. Furthermore, analyzed data indicated favorably that CrowdShop was able to alleviate user effort as well as improve customer shopping throughput. It is to be noted that we user tested with a specific demographic as well as geo-location area. As previous works indicated, motivations differ from suburban to urban areas and CrowdShop may need to be modified in order to suit different locales.

Chapter 5: Conclusion

Through this thesis, we initially examined how users react to shipping fees through an online survey. With the 118 data points we received in the online survey and utilizing a grounded theory approach, we were able to code user responses into themes. These categories gave us the realization that users often seek to collaborate on online shopping orders but are hindered by the efforts and inconvenience of the manual collaboration process. At the same time, we asked participants if they collaborated on orders in the past, and whether or not the collaborators were people in relative close geo-location proximity. The statistical results of this inquiry revealed that collaboration innately occurs when a shipping fee is present and that users tend to collaborate with others in close proximity. Combining the two above findings, we proposed a novel interaction model, CrowdShop. CrowdShop was designed to leverage geo-location proximity to automatically crowdsource users' orders together, in order to reach a minimum shipping threshold.

Having designed and implemented the CrowdShop model into a working prototype, we set out to evaluate user perception as well as identify concerns. We recruited 20 participants that were students of the University of Maryland, College Park to simulate an on-campus purchase experience with a pickup center preset as

the Adele H. Stamp Student Union Center. The participants were split into two groups of 10 participants each, and we ran the groups through a focus group session. Overall, we found that users were excited about the potential of CrowdShop, with reservations toward Security, Privacy and the Pickup/Redistribution process. However, users suggested that if CrowdShop potentially tackled these reservations that users could become more comfortable in utilizing CrowdShop.

Overall the two contributions of our thesis are summarized as follows:

1. Categorize and model user's psychological approach when encountered with additional shipping fees on e-commerce sites

2. Propose and evaluate a novel interaction model, CrowdShop, that positively improved user purchase throughput

In a real world setting, CrowdShop would be able to fitted to work on any website as the code itself allows for extension injection to any website. More interestingly, however, retailers may respond to a service such as CrowdShop negatively. There exists a potential space for mutual benefit through channels of partnership promotions or advertisement. As the technology proposed here is not difficult to implement, companies may also choose to integrate the service into their repertoire as well. Lastly, CrowdShop would require a means to sustain the service as a product, and a source of revenue would be to deliver market data that consists of purchase motivation as well as demographics on a regional scale. Retailers may be able to in turn utilize the provided market data to better tailor their advertisements and products to customers on a regional level.

Chapter 6: Future Direction

The aforementioned results provide a number of different avenues to which CrowdShop can pursue. The first of which is to examine social influence on purchase decisions within CrowdShop, and whether or not automated collaboration with friends would further improve purchase throughput. For example: if users utilized social media accounts as a login method, CrowdShop can potentially display whether or not user's nearby friends are shopping as well. CrowdShop can then provide visual notification for the aforementioned scenario, a view which incites purchase motivation in both parties.

The second direction toward which CrowdShop can be expanded upon is the logistics side of redistribution. As users detailed in our responses, there still exists significant doubt and uncertainty of how a pick-up location would function. Specifically, we can further evaluate user sentiment towards picking up a purchased item as well as design the pickup interaction (e.g. automated pickup or with store clerks).

Lastly, CrowdShop's scope only extends to the redistribution of purchased items. Users also expressed interest in how CrowdShop would potentially handle the return of purchased items, as returned items may only be a portion of the larger grouping that CrowdShop automated. Furthermore, returns are even less likely to

be free of additional charges. There exists a continued purchase experience that we could potentially dive into and redesign in the future.

Appendix A: Part 1 Survey

Consent Form

This research is being conducted by Chiun-yao Chang at the University of Maryland, College Park. We are inviting you to participate in this research project because you are an enrolled student at UMDCP. The purpose of this research project is to obtain a better grasp on psychological thought on shipping fees as well as evaluate models of overcoming shipping fees.

The procedures involved are as follows: participants will be asked to answer a series of questions (open and closed ended). Prior to the actual questionnaire, participants will be screened based on age (18 years or older) and online shopping experience. Afterwards, participants will proceed to answer the series of questions relating to their shopping behavior regarding shipping fees. The survey will take no longer than 10 minutes.

There are minimal risks from participating in this research study. Participants may skip any question or stop participating if they feel discomfort and they may take breaks if necessary.

There are no direct benefits from participating in this research. Overall benefits to be gained from this research include new knowledge on pricing models as well as application of known techniques to improve upon a pre-existing field (e.g. improving practices).

Any potential loss of confidentiality will be minimized by storing data in a secure location such as: locked office, locked cabinet, password protected computer, etc. If we write a report or article about this research project, your identity will be protected to the maximum extent possible. Your information may be shared with representatives of the University of Maryland, College Park or governmental authorities if you or someone else is in danger or if we are required to do so by law.

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any

time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.

If you decide to stop taking part in the study, if you have questions, concerns, or complaints, or if you need to report an injury related to the research, please contact the investigator:

Chiun-yao Chang
jcychang@terpmail.umd.edu
217-979-7771

If you have questions about your rights as a research participant or wish to report a research-related injury, please contact:

University of Maryland College Park
Institutional Review Board Office
1204 Marie Mount Hall
College Park, Maryland, 20742
E-mail: irb@umd.edu
Telephone: 301-405-0678

This research has been reviewed according to the University of Maryland, College Park IRB procedures for research involving human subjects.

Your agreement indicates that you are at least 18 years of age; you have read this consent form or have had it read to you; your questions have been answered to your satisfaction and you voluntarily agree to participate in this research study. You will receive a copy of this signed consent form (by copying and printing this form, or printing the webpage, you may also contact the investigator at jcychang@terpmail.umd.edu to obtain a copy).

If you agree to participate, please sign below. If not, you may exit the form.

SIGN HERE

Basic Information

Gender

- Male
- Female
- I do not wish to identify
- Other

Age

- Under 18
- 18 - 24
- 25 - 34
- 35 - 44
- 45 - 54
- 55 - 64
- 65 - 74
- 75 - 84
- 85 or older

Education

- Less than High School
- High school graduate
- Some college

- ○ 2 year degree
- ○ 4 year degree
- ○ Professional degree
- ○ Doctorate

Please estimate the amount of times you've shopped (defined by completion of a purchase) online in the past month.

- ○ 0 Purchases
- ○ 1 - 5 Purchases
- ○ 6 - 10 Purchases
- ○ 10+ Purchases

What category of products do you shop for?

- ☐ Apparel
- ☐ Accessories (Jewelry)
- ☐ Automotive & Industry
- ☐ Cosmetics
- ☐ Electronics
- ☐ Food & Grocery
- ☐ Home, Garden and Tools
- ☐ Shoes
- ☐ Other

Have you ever asked a friend/family/co-worker to purchase products on a particular site with you to reach free shipping?

- ○ Yes
- ○ Maybe
- ○ No

If you answered yes to the question above, was your friend/family/co-worker located close to you? (In terms of geo-location, e.g. friend who is your roommate, family member who lives in the same house)

- ○ Yes
- ○ Maybe
- ○ No

Can you briefly tell us about your opinions on shipping fees?

Shipping Fees

For a cart subtotal of $0 - $25, how much shipping fee would you be willing to pay? (Note: shipping type is standard shipping)

	Shipping fee in dollars										
	0	3	5	8	10	13	15	18	20	23	25
Subtotal of $0 - $25											

For a cart subtotal of $25 - $50, how much shipping fee would you be willing to pay? (Note: shipping type is standard shipping)

	Shipping fee in dollars										
	0	5	10	15	20	25	30	35	40	45	50
Subtotal of $25 - $50											

For a cart subtotal of $50 - $100, how much shipping fee would you be willing to pay? (Note: shipping type is standard shipping)

	Shipping fee in dollars										
	0	10	20	30	40	50	60	70	80	90	100

Subtotal of $50 - $100

For a cart subtotal of $100 - $200, how much shipping fee would you be willing to pay? (Note: shipping type is standard shipping)

	Shipping fee in dollars										
	0	10	20	30	40	50	60	70	80	90	100
Subtotal of $100 - $200											

For a cart subtotal of $200+, how much shipping fee would you be willing to pay? (Note: shipping type is standard shipping)

	Shipping fee in dollars										
	0	20	40	60	80	100	120	140	160	180	200
Subtotal of $200+											

Appendix B: Part 2 Survey

Default Question Block

How would you rate your experience with the system?

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
Ease of Use	○	○	○	○	○
Sense of Security	○	○	○	○	○
Clarity of Directions	○	○	○	○	○
Consistent Interface	○	○	○	○	○

Did the removal of shipping fees influence your decision to complete the purchase?

- ○ Definitely yes
- ○ Probably yes
- ○ Might or might not
- ○ Probably not
- ○ Definitely not

Continuing the above question, why or why not?

If a service similar to this was available, would you consider this type of service to collaborate on shopping orders in the future?

- ○ Yes
- ○ Maybe
- ○ No

What are some concerns you had regarding this type of collaborative service? (e.g. information security, privacy of order, unclear directions)

Would seeing that your peers were shopping as well influence your decision to complete the purchase?

- Definitely yes
- Probably yes
- Might or might not
- Probably not
- Definitely not

If a pick-up location was offered on campus, how far away is a reasonable distance?

- 5 min walk
- 10 min walk
- 15 min walk
- 15 - 30 min walk

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