Swap Pal

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ABSTRACT
Swap Pal is an online barter system platform where people within the Northeastern community exchange resources. The major challenges involved in these online bartering systems are finding the best match for exchange, management of the trades, the absence of common measure of value for the unused or used products and lack of trust between the swappers. In this paper, we have proposed a categorical search, which allows the users to search for what they would like to offer and what they want in return, improving the probability of finding a match for an exchange. Any target user can report a post for cases where there is a mismatch or unequal posts. In this paper, we aim to discuss the basic platform for a bartering system and also that bartering has great potential, but there are many challenges due to a lot of social element that can affect our application, which should be studied.

INTRODUCTION
Currently, there is no application that allows members of Northeastern University to swap items within the community. There exists a Facebook Group (Northeastern Marketplace), that deals with selling and buying items. But, so far, there isn't a system in place to swap items apart from external websites or attending meet-ups. Some of the sites and meet-ups that support swapping are: Boston Craigslist, Swap Madness, and Revere Swap N Shop. Though there are existing systems in place, the Swap Pal will address the following issues:

- **Trust**

  Since the target users are members of our university, it facilitates trust as it is a small knit community. Also, the swaps can take place on-campus as the members are familiar with the location. Furthermore, it is futile to post fake items as the swaps and purchases are done in person.

- **In the case of meet-ups, the user does not have prior knowledge of all the items available.**

  Before deciding on swapping an item, the user can browse through all the available items on the web app based on his/her needs. In the case of swap, the user is aware of what item to bring in order to make a deal.

- **The past behavior and identity of the users is unknown in Facebook groups.**

  In Swap Pal, each user is given a profile which contains a trust score that is based on the ratings given by other users on the basis of past transactions.

- **Old posts are not taken down**

  In Swap Pal, once the swapping transaction is finished by users, our system will take down the post from search list, then mark the posts as history for users.

- **Search**

  In real word, there existed two main demands for user planning to swap: what item users want to get; what item users plan to offer. According to these two demands, Swap Pal proposed a categorical search, which allow users to switch their search.

According to the new features of Swap Pal, our team need to determine whether these new functionalities would work for real production. Then our team conduct the user evaluation to research the potential usability for these new features.

PREVIOUS WORK

We reviewed some of the key aspects our website, such as cooperation and trust, barter system, design principles. Many papers have addressed the issue of generating perfect or near perfect matches while bartering goods digitally and tried to address the issue of trust and increasing the exchange of goods.

Trust plays an important role in an online bartering system as it involves two strangers trading their possessions. The concept of taking group size into consideration to resolve trust issues was introduced La Macchia ST *et al*[1]. Their journal article discusses trust in small or large groups. The authors of the article conduct seven studies to gather evidence that smaller groups are perceived to be more trustworthy than larger groups. The seven studies ask the participants to make a trust-sensitive decision that is dependent on some group. Each time, the group size is varied. For example, one of their scenarios involved a participant purchasing a laptop that was sold at a deep discount, but the participant was exposed to a scam earlier on a different website. The results from all the studies concurred with “small = trustworthy” heuristic that the authors predicted at the beginning.

We reviewed a paper authored by Evans *et al*[4]. In this paper, the researchers discussed about the principles for designing online bartering communities in low-trust environment, and a Facebook group is used as an example here. The researchers introduce suggestions like “Prominent Rule Placement”, “Tools for Tracking Offenses”, "Buyer/Seller Reviews" and “Real Name Policy” that try to solve overpriced goods, scams, and other forms of economic abuse in Venezuela.

The researchers recommend introducing "Buyer/Seller Reviews" such as Amazon[5] or eBay[6], which can enhance trade safety and increase the speed of trades. Though this as an efficient way to evaluate one's honesty, it still not a perfect solution. First, not all users prefer to write their review of their orders. Second, reviews on Amazon or eBay are only for sellers, for swapping, we would like to obtain the trust scores from both people. So, for our system, we are going to use mandatory two-way rating system like Uber[7], where we request both users to rate each other after trading and the system will provide the trust score according to users' past transaction ratings.

The researchers mentioned that Facebook Groups provides very little information about the identity and past behaviors of the community members, and they believe that "Prominent Rule Placement" is needed to improve security. The administrators of the system need to set up clear rules to guide the users to behave appropriately. The visible placement of rules will alert the new users and reduce inappropriate behaviors between the existing users as well. For our system, there will be an alert window that pops up with user agreements when a user is trying to register. Users must complete reading the agreements to finish the registration process.

The researchers also suggest Real Name Policy as a solution to help with the security issue, but they don't talk about the implementation in details. However, we have a strict restriction on user registration for our system. We'll check the email address used for registration, and only example@husky.neu.edu or example@northeastern.edu will be accepted. This method ensures that the person who is registering for our system is a real person with a real name, so users will feel much more comfortable to trade with each other when using our application.

Furthermore, the researchers mention self-interest behaviors such as fake items, elevated prices would break solidarity values of groups, and a "Tools for Tracking Offenses" allowing administrators and moderators to track and sanction offensive behavior will solve this issue. However, authors don't provide how bad behaviors are documented and what sanctions would apply to user. In our web app, users can flag a post with fake information or extravagant price. After a certain number of flags, that post will be hidden, and the seller will be notified to reduce the price or update information to make their post visible again.

We reviewed a paper authored by Zhu and Yan[3]. The paper introduces the basic knowledge of E-commerce trust and propose the criteria to evaluate the performance of trust evaluation. The researcher talks about different type of E-commerce participants, such as Business-to-Customer (B2C), Business-to-Business (B2B), Peer-to-Peer (P2P), Customer-to-Customer (C2C), and Government-to-Customer (G2C). I'm only going to focus on the C2C model because our Swap Pal application is C2C only.

Researcher proposed an evaluation model which considered the effect of different users in different situations. The evaluation made by a user with multiple transaction experiences is more convincing than that made by a user without any transaction experiences. The evaluation made by the user with large transactions is more influential than that made by the user with small transactions. If a buyer has ever traded with multiple sellers, then the evaluation made by the buyer is more convincing than that made by the user who has only ever traded with one seller.

Researcher also suggested to give an initial trust value for both buyer and seller instead of giving 0 when they first registered to the system. The initial credit value of the seller is related to the third-party services the seller adopts, and the value is the sum of the scores that the seller gets in conducting various third-party service authentications. So, the initial credit value is completely determined by the third-party service, and the more all-rounded the third-party services are, the higher his initial credit value is. When the buyer completed a transaction with the seller, the seller's credit value is based on the evaluation made by the buyer. Currently, the proportion of the initial credit value is becoming smaller and smaller.

The two suggestions above both sound promising, but they both have some disadvantages in my point of view. The first evaluation model is interesting but it's not compatible with our application, because giving powers to user who has more transactions than the user who has little transactions may cause unfair advantages and abuse of power. Users with more transactions may threat their swap partner to give them good reviews, otherwise they will use the power they have to give very bad reviews. In our implementation we treated our user equally, so new user also has the rights to review their swap partner and would feel more confident to search for a match. The second suggestion from this paper is trying to solve the problem that the new user has 0 credit score which makes the buyer fail to make a judgment of the difference of the seller's credit rating. However, the researcher didn't consider usability, because it'll request the user to take a lot of third-party service to generate an initial score which is not user friendly. Trust evaluation should consider trustor's subjective opinion and follow a user-centered design.

METHODS

The intention of the study was to analyze the user experience with our new feature on Swap Pal.

Environment setting

In study, we devised three scenarios in which the participants can walk through our platform. In each scenario, we provided Swap Pal website to participants. After briefing and providing demo of tasks, we observed and took note of user's behavior. During each task, there was one team member who served as a facilitator to help our participant finish these tasks.

Participants

A total of 10 users were recruited for user testing and 3 evaluators were assigned for heuristic evaluation for our web site. Users for user testing were recruited based on a profile that was a representative sample of the user population, namely students of Northeastern University. These users were non-experts and non-power users, which means they have not had any web evaluation experiences but have some experience in surfing the web.

Experts were assigned for performing heuristic analysis. For this study an expert was defined as one who had graduate/undergraduate level coursework in human computer interaction and who had already been educated and participated in at least one heuristic web evaluation project. This is consistent with the notion that expert evaluators should be used for heuristic evaluation, as they provide better results.

Scenarios

Typically, user testing is driven by scenarios-based tasks that users need to perform, while heuristic analysis is driven by the exploration and evaluation of the web sites by evaluators as they see fit.

The Heuristic analysis evaluators analyzed the tasks given and evaluated the website. A total of 3 scenarios that represented typical site usage situations in real life were given to both the users and evaluators. The following list illustrates a sample scenario list for one web site:

- **Creating a Post**

  You are Anna. You need an airbed and you are willing to swap your blender for the airbed. Your task is to use a new website “Swap Pal” to achieve this goal.

- **Searching & Contact**

  You are Ed. You urgently need a blender. You have an airbed. Your task is to obtain a blender using a new website, ‘Swap Pal’ to achieve this goal, without creating a post

- **Finish transaction and review**

  You're Anna. You are happy with the airbed you got, now take down your post

These scenarios for user testing detailed the task that all users were required to perform. Additionally, some users were asked to use Swap Pal in an open-ended manner to simulate the usage of our website in real world.

Procedure

The experiment included three sessions: the briefing session, the testing session, and the interview session. During the briefing session, the facilitator explained what was expected from the users and asked the users to spend some time on the landing page and review the How It Works section. The post-evaluation questionnaire dealt with users’ general impression of the web site, usage, search, and trust. During the testing, problems and feedbacks from users were recorded. In the interview session, users were given the opportunity to provide feedback and opinion regarding problems that they had faced during the test. It also served as an opportunity for the observers to clarify any doubts that they might have had during the test with regard to the observations made.

RESULTS

Question	**Results**
Time taken to complete task 1.	1 minute
Time taken to complete task 2.	1 minute 30 seconds
Time taken to complete task 3.	3 minutes
Create Post: numbers of user checking "swap on-campus".	1
Create Post: numbers of user who know what they want and add wishlist.	8

Question	**Yes**	**No**
Did the user complete task 1?	10	0
Did the user complete task 2?	10	0
Did the user complete task 3?	10	0
Did the user search using the two types of search?	8	2

Did user like being forced to give a rating?	6	4
Focused Search - Once the user found a swap are they willing to swap?	9	1
Generic Search - Once the user found a swap are they willing to swap?	5	0
Generic Search - Are the users able to find a match?	4	1
Generic Search - are the users willing to create a post if they do not find a match?	4	1
Generic Search - how many users search for categories?	1	9
Are the users reporting a post if they find unequal valued posts?	1	9
Are the users ignoring unequal valued posts?	10	0
Profile: Did user know the meaning of stars and number of rates?	10	0

For Formative User Testing, based on the usability metrics that we measured, we found out the following:

- All the users were able to complete their tasks.
- The users took an average of 1-3 minutes to complete their tasks.
- Most users got stuck while trying to complete the third task, which required them to send an invitation code. Many could not locate this immediately and were confused about the purpose of this.
- On an average, users took a minute to find the invitation code.
- The users were quite happy with their swaps. They did raise some points that they were concerned about while swapping (like fake items, price mismatch, etc.). But overall, our system helped them connect to other students to swap and they found it to be a less nerve-racking experience to meet other students rather than complete outsiders.

For Qualitative Evaluation, we gave the users a free reign to use the system however they want, provided that they want to make a swap or are thinking about it. We decided to go freestyle here because we wanted to see how exactly is our system used in real world. We observed that the users, more or less, followed the expected path. Some of the interesting observations that we came across were:

- Users did not report posts of unequal values. Except for two, others just chose to ignore such posts.
- None of the users cared about the on campus swap option.
- We were pretty sure that the users would be comfortable swapping within the college community. When we asked the users, many actually were comfortable to swapping because everyone belonged to the same university. Some were of the opinion that they might even be their classmates. This put them in a comfort zone.
- We were concerned about the privacy issues of displaying the email ID directly on the post details page. But, none of the users cared about that. When asked about this, they were surprised that this was even an issue as they are used to getting anyone's name or email in Northeastern's husky account in gmail. So, it was not a concern for them.
- When people were stuck with finding invitation code, for some reason, they began to use the search bar in our page. We had to explain that the search bar was to search for posts.
- Some users wanted to see the post author's past review comments. We had to explain the downfalls of showing the reviews (As expected, no one wanted the post authors to know that they had bad-mouthed them in a previous review).

DISCUSSION

Based on our initial design we came up with five hypothesis and in this section we will be comparing the initial hypothesis and the results after the complete evaluation of the project.For the first hypothesis we analyzed that limiting the target users to only the northeastern community would decrease the trust issues, as it has been stated by La Macchia ST that the trust issues are directly proportional to the group size or scope. The second hypothesis is regarding the search functionality we implemented, to let the users search by what they have and what they want would increase the probability of finding a match. For the third hypothesis, we believe our system is successful in guiding the users to create a post in cases where they did not find any results for any of their search text. The fourth hypothesis is that the users are willing to report a post for unequal values. The last hypothesis we put forward is, once the users find a match they are willing to swap based on the reviews and ratings.

During the evaluation, when the users were asked on what factors are they willing to swap, after they have found a match, all the users reported that they considered the ratings of the post author in determining if they should swap and also since the application is restricted to northeastern community they did not have any issues to go forward and request for a swap. According to these statements, the trust issues are solved to a certain extent since we are restricting the application to only a smaller community. Four out of five users, who were evaluated for the generic search, clicked on the create post button when they did not find a relevant post for their search text and hence confirming the above hypothesis that the system was successful in guiding

users to create a post when there are no results found. From our observations during the user testing, eight out of ten users searched for what they have and if they did not find any results the users also searched for what they want to find a match. We can hence say that the categorized search of what they have and what they want has increased the probability of finding a match. However, based on our observations the users were not willing to report a post in case of unequal values. Only one user reported a post and all the users said they would just ignore such posts.

CONCLUSION

In this paper, we were able to come up with a basic barter system addressing issues related to finding a match by giving the users flexibility in searching through what they are willing to offer and what they have. We came up with the two-way review and report system to address trust issues. In this paper, we also discuss that restricting the scope of the project to target only the northeastern community increases trust. As a future enhancement, we would like to implement in-app communication system instead of the concept of invitation code, which would make it easier for the users to communicate and also for the system to efficiently manage trades. Another improvement we would like to do is to allow users to search based on categories and listing out all the posts related to the particular category.

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