

Analyzing Optimal Reward Systems for Maintaining Book Donations



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Abstract

123 Library, a web-based book sharing company, wants an incentive system to encourage book donations. Through an interview, a focus group, and two surveys, our team collects data regarding Chinese people's willingness to donate books, and which incentive systems they find most appealing. Our study concludes that college students and parents of primary school students are willing to donate, and that they prefer free shipping and level systems. Using these data, our team recommends that 123 Library incorporates a level-based system that rewards users with free shipping for their book donations on the website.

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Executive Summary

123 Library is a web-based book sharing company incorporated into the National Library of China. Users donate their books on 123 Library's website, and buyers receive books for free, only paying the cost of shipping. Professor Yang Suhong, 123 Library's founder, wants to provide incentives for people to donate books on their website. We perform studies on reward programs and book donation culture in China, providing information on a successful incentive system for 123 Library.

Goal, Objectives, and Methods

Our goal is to analyze our background research and survey data to suggest a reward program for 123 Library. Our studies provide information on incentive systems that would encourage book donations on 123 Library's website. We focus on four objectives:

- Understand incentive programs companies use.
- Understand Chinese culture surrounding book donations.
- Identify the reward systems that appeal to students and parents.
- Determine reward systems suitable for 123 Library.

Understand Incentive Programs Companies use

In order to create an effective reward system for 123 Library, we need to understand existing incentive programs. We perform background research on gamification, reward systems, and companies' incentive programs using online articles, research papers, and company websites. The analysis of our research assists us in understanding incentive programs and their effectiveness.

Understand Chinese Culture Surrounding Book Donations

Two demographics 123 Library markets to are college students and parents of primary school students. Our surveys gauge these demographics' views towards book donations and assesses donation frequency and quantity. This helps our team understand the book donation habits of both groups and how it affects potential reward options. We distribute the surveys in person, to Hangzhou Dianzi University (HDU) students and parents of primary school students. In our focus group, HDU students elaborate on reasons students donate books.

Identify the Reward Systems That Appeal to Students and Parents

Our team considers the preferences of students and parents while creating potential reward options. Our surveys ask these demographics for their preferences toward five potential reward systems for 123 Library. The participants rate each reward system and our team analyzes the data to find the level of appeal of each reward system. The focus group elaborates on reasons HDU students find certain reward systems appealing and others unappealing.

Determine Reward Systems Suitable for 123 Library

Our team identifies fitting reward systems for 123 Library by analyzing the data from the surveys alongside Professor Yang Suhong's reward system requirements. We analyze the data using a Pugh analysis. During the interview with Professor Yang Suhong, our team ranks the importance of each design requirement, and the total score equates to the requirement's weight in the decision matrix. Taking into account the weights, we assess the reward systems against the requirements and produce a total score for each reward system. The reward system with the highest score fulfills the design requirements the best. Our team uses the Pugh analysis to propose reward systems suitable for 123 Library.

Results and Recommendations

We determine five potential reward systems for 123 Library to consider. Using the analysis of the data from the focus group and surveys, we conclude that the majority of college students and parents of primary school students would be willing to donate books. We also conclude that college students currently either do not know where to donate books or find it inconvenient. Both demographics find the free shipping and level system appealing reward options. We conclude that college students find the free shipping reward appealing because book donors tend to enjoy reading and would appreciate a new book after donating several of their books. The level system appeals to the college students because it tracks progress and provides a sense of fulfillment and satisfaction.

We determine that the free shipping reward suites 123 Library's design requirements best, of the five options we provide. The level system adds inexpensive gamification elements to the task of donating books. Our team recommends a reward program incorporating both the free shipping and level system reward. This optimizes popular interest and provides a cheat-proof

system. Combining both systems allows 123 Library the flexibility to adapt the reward with additional monetary and virtual rewards.

Our team delivers a prototype for the reward system we propose. The prototype contains a potential reward design for 123 Library's website. The design includes gamification elements and monetary and tangible prizes that 123 Library can alter to better fit its desires.

Authorship

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2.1 Gamification	Sam	Jackie, Jess
2.2 Reward programs	Jackie, Jess	All
2.3 Reward Systems Implemented by Various Companies	Jess	All
2.4 123 Library	Jess	Jackie, Jess
3 Methodology	All	All
3.1 Understand Incentive Programs Companies use	Jess	All
3.2 Understand Chinese Culture Surrounding Book Donations	Jackie	All
3.3 Identify Reward Systems That Appeal to Students and Parents	Jess	All
3.4 Determine Reward Systems Suitable for 123 Library	Sam	Jackie, Jess
4 Results and Analysis	All	All
4.1 Incentive Programs of Other Companies	Jackie	Jess
4.2 Chinese Book Donation Culture	Jackie	All
4.3 Reward Systems Appealing to Potential Users	Jackie	All
4.4 Assessing Potential Reward Systems Using a Pugh Analysis	Jackie	Jackie, Jess
5 Conclusions and Recommendations	All	All
5.1 Donation Habits	Jackie, Sam	Jess
5.2 Free Shipping and Level System	Jackie, Sam	Jess
5.3 Most Fitting Reward System for 123 Library’s Design Requirements	Jackie, Jess	All
5.4 Limitations in our Research	Jackie, Jess	All
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1 Introduction

123 Library, a web-based book sharing company founded by Professor Yang Suhong, is part of the National Library of China. 123 Library provides books to users for free through book donations. Donors place their book on 123 Library's website and customers only pay for the cost of shipping.

123 Library's business model does not pay donors for their books. Professor Yang Suhong wants our team to propose a reward system to give users additional incentive to donate books. A reward system offers users motivation to donate books, rather than paying users for selling their books. Professor Yang Suhong wants the reward system for 123 Library to be fun, simple, and cheat-proof.

We gather knowledge through background research, an interview, a focus group and two surveys. An interview with Professor Yang Suhong provides us with information on the resources available and his requirements for a reward system. Using the focus group and surveys, our team develops an understanding of the culture surrounding book donations. College students and parents of primary school students provide input on their desires for elements in a reward system. We analyze background research and survey data to identify effective reward system designs.

The analysis indicates the advantages and disadvantages of each reward program. Our team proposes a fitting reward system for 123 Library to encourage and maintain book donations. We provide Professor Yang Suhong with our recommendations for a suitable reward system for 123 Library.

2 Background

We research different elements of gamification and different forms it may take. In this section, we discuss different types of reward programs and the benefits of each. Exploring the incentives various companies provide offers information on the role of reward programs in maintaining customers.

2.1 Gamification

Gamification is defined as the application of game design elements and mechanics in non-game contexts. Many examples of online gamification involve a user profile. A user's profile tracks and displays their completed actions on a company's website. In some applications, users may earn experience points, virtual points given to track progress, by performing specific actions. When a user gains enough points they level up. Levels shows the amount of user participation on the website. Adding user profiles and levels help make tasks more appealing to users, increasing their participation.

Common methods of implementing gamification consist of levels, badges, and leaderboards. Reaching new levels can unlock new features and rewards for users. Badges represent a user's achievements visually (Werbach, 2015). Users receive badges on their profile for completing specific tasks, giving them a sense of accomplishment. Leaderboards rank the user profiles and display the ranked list on the app or website. Users may be ranked based on who participates the most or has the highest experience score, among other criteria. Leaderboards allow users to compare their profile against other user profiles.

DevHub, a company that helps its users build websites and blogs, uses badges and levels on their site to improve user participation. They reward badges for completing tasks related to building websites. Users gain levels by collecting badges and completing websites. Gamifying its website increased the number of users that finish building their websites from 10% to 80% (Takahashi, 2010).

2.2 Reward Programs

Reward systems vary in form and function, providing users with monetary or virtual rewards. Monetary reward systems give users physical prizes or rebates. In this report, we define monetary rewards as rewards that are worth money. This definition includes incentives such as

discounts on other products or free shipping on products. Virtual reward systems provide users with virtual products and in-app privileges. Many monetary and virtual reward systems use gamification elements as incentives for consumers to completing tasks.

Monetary rewards entice consumers into using a site or product by giving a bonus after a fixed number of uses or purchases. A “buy two get one free” special is an example of this reward system. Other bonuses include users receiving a reward coupon by mail, free shipping on a subsequent purchase, or raffle systems. The number of entries into the raffle depends on the number of times a customer uses the site. Companies use this system as a promotional tactic to gain purchases. A prize wheel system provides users with ‘spins’ for completing certain tasks. The outcome of the wheel determines the prize the user receives. These reward systems give users an incentive to spend more to reach the reward.

Virtual rewards give customers with a user profile virtual benefits for performing tasks. With a level system, users earn ‘experience points’ for behaviors such as purchasing products or inviting friends to use the website or app. Gaining levels give users virtual products or in-app privileges as rewards. Each level, users may receive badges, profile personalization items, or virtual currency usable for purchases exclusive to the site. Higher levels tend to offer superior rewards, motivating users to level up. The level system stresses a sense of accomplishment in the user instead of providing monetary reward to them. Virtual reward systems motivate repeat customers through the satisfaction of leveling up their profile. Websites and apps implement virtual reward systems into their services because it is low maintenance, inexpensive, and enjoyable for customers.

2.3 Reward Systems Implemented by Various Companies

We investigate various companies with reward systems to understand the incentives each company provides. Domino’s Pizza, a for-profit company, uses a monetary reward system to entice customers into using their site. The American Red Cross, a non-profit organization, thrives on donations with little or no materialistic return to the donor. Snap Inc., King, and NIKE Inc. provide free downloadable apps that attract customer usage without any monetary rewards. Free Rice, a non-profit company, donates rice to people in need on behalf of its users.

2.3.1 Domino's Pizza

Domino's Pizza is a United States based, international corporation, best known for its pizza delivery. Domino's Pizza resides in 73 international markets, having an online and mobile ordering platform with an order tracker (Domino's, 2015). With 13,200 stores worldwide, Domino's Pizza attracts and keeps customers by creating new innovative methods of ordering pizza.

Domino's Pizza provides monetary rewards to customers through its "Piece of a Pie Rewards." Customers can create a profile online and earn 10 points for every online order over \$10. When the profile reaches 60 points, the customer earns a free, medium two-topping pizza coupon, redeemable online. The website includes the user's "Pizza Profile" (Figure 1), a webpage tracking previous purchases and user points (Domino's Pizza, 2015). Customers interactively track their online orders through "Domino's Tracker" (Figure 2).

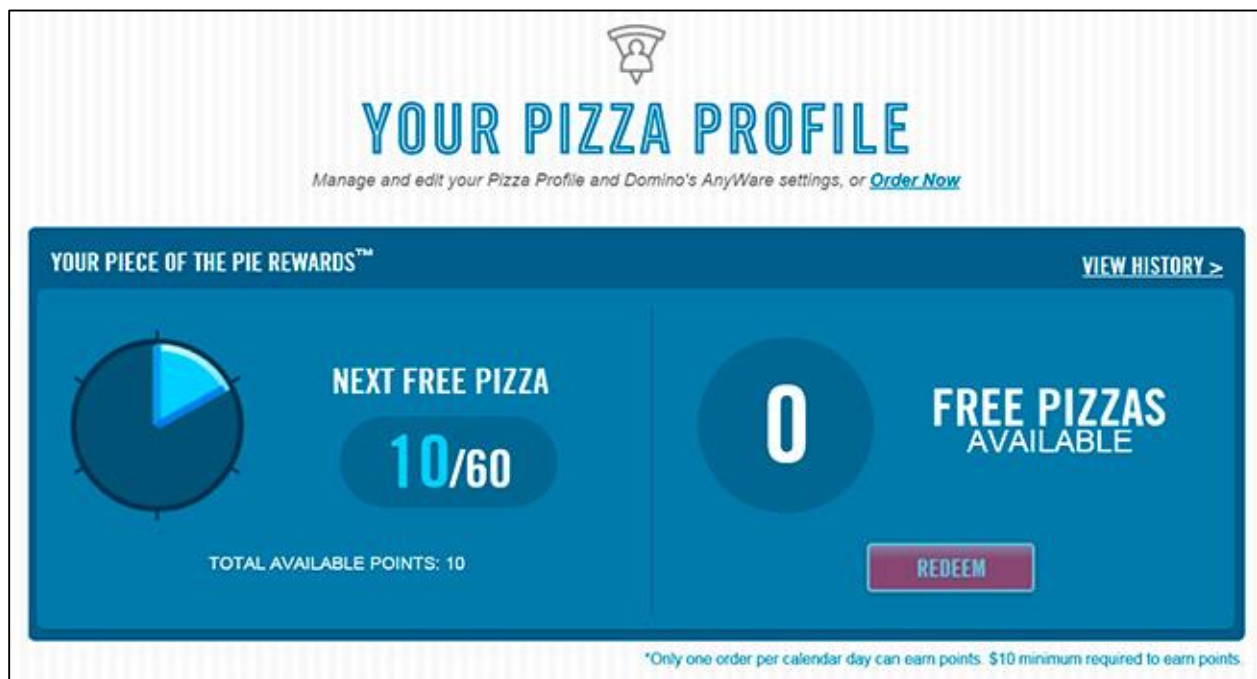


Figure 1. User Pizza Profile (Domino's, 2015)

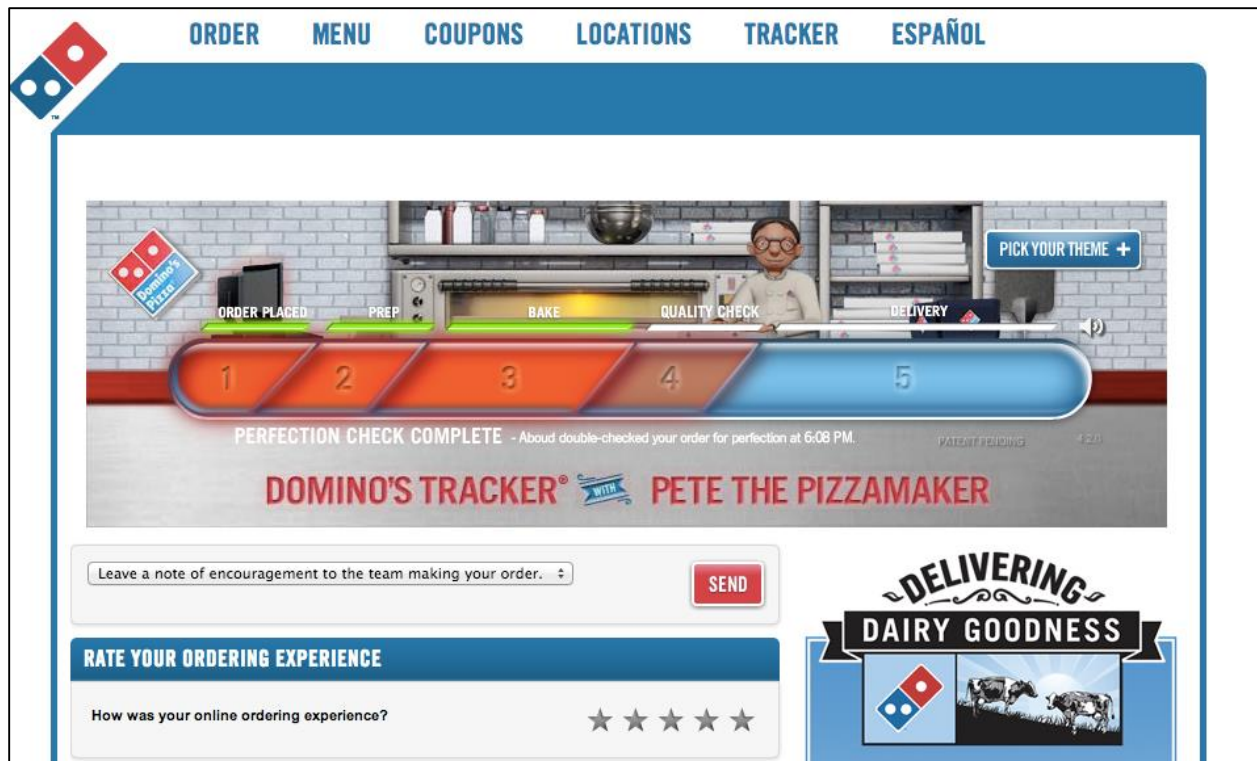


Figure 2. Domino's Tracker (Domino's, 2015)

2.3.2 American Red Cross

The American Red Cross's mission is to prevent and alleviate human suffering through the assistance of volunteers and donors. It utilizes monetary and virtual rewards to maintain both groups. At blood drives, participants receive rewards including coupons and free apparel. Participants may receive a raffle ticket for additional prizes, including sports game tickets. Donors who schedule their blood donation appointments through the American Red Cross Blood Donor app receive gift cards from the American Red Cross partner companies. The monetary rewards encourage donors to give blood.

The American Red Cross stresses the importance of donations and assures participants of the positive impact they have on the world (American Red Cross, 2016). It provides virtual and monetary rewards for donors and volunteers. The American Red Cross Blood Donor app keeps information on the processing and distribution of each users' previous blood donation (Figure 3). This app provides incentives for subsequent donations through virtual trophies, badges, and milestone achievements (Figure 4). These achievements range from taking a selfie while

donating blood to hosting a blood drive. Each blood donation brings donors closer to achieving certain rewards. The interactive app combines monetary and virtual rewards to attract donations.

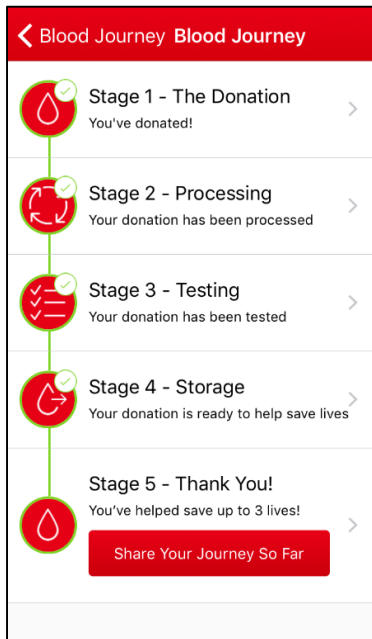


Figure 3. The processing and distribution of donated blood (American Red Cross, 2016)

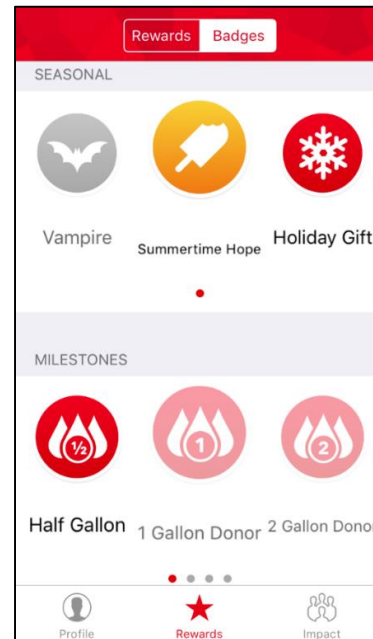


Figure 4. Trophies, badges, and milestone achievements (American Red Cross, 2016)

2.3.3 Snap Inc.

Snapchat is an easy to use social media app developed by Snap Inc. Snapchat is popular with users between 18 and 26 and it is the 3rd most used social app among millennials, their biggest demographic is users between the ages 18 and 26 (Kosoff, 2015).

People use Snapchat to send images or videos, known as Snaps, to their friends. The app offers diverse filters and Geofilters to alter the Snaps, and trophies to unlock after completing achievements (Snap Inc., 2016). Filters and Geofilters are features within the app that allow users to alter their Snaps in creative ways. Filters modify the colors of Snaps and overlay images onto them (Figure 5). Geofilters are images that appear as a filter in specific geographic locations and for specific events (Figure 6). Users receive trophies for achievements such as sending a certain amount of images, viewable in their “Trophy Case” (Figure 7). Users who frequently send Snaps to certain friends will gain emojis next to those friend’s name signifying “Snapstreak!”, “BFs”, “Besties”, “Super BFF”, and more (Figure 8). A score displays the total number of snapchats users have sent and received, encouraging users to send more snapchats to raise their score.



Figure 5. Altitude filter overlaid over Snap



Figure 6. Manhattan Geofilter at Time Square

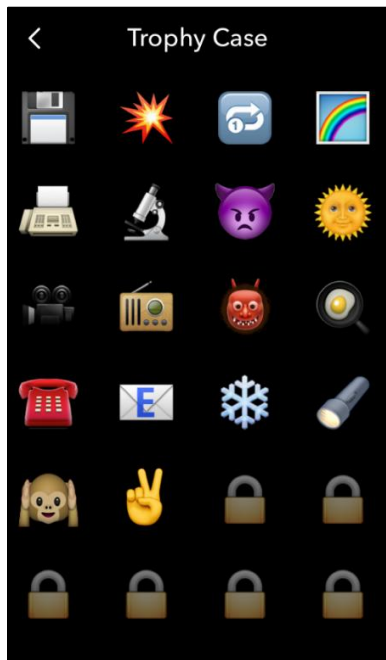


Figure 7. Trophy case of unlocked achievements (Snap Inc., 2016)

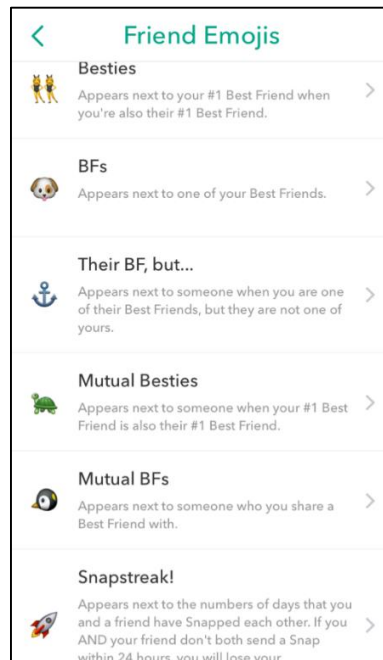


Figure 8. List of emojis users can obtain next to their friends' user names (Snap Inc., 2016)

2.3.4 King Digital Entertainment plc

King Digital Entertainment plc, known as King, is a game development company whose mission is to create free games, compatible across different devices, available for people to enjoy around the world. King's games engage players for short periods of time throughout the day, matching fast-paced lifestyles (King.com Ltd., 2016).

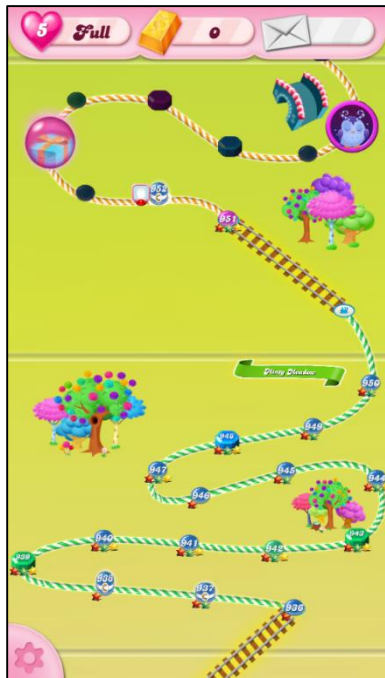


Figure 9. Candy Crush Saga levels (King.com Ltd., 2016)

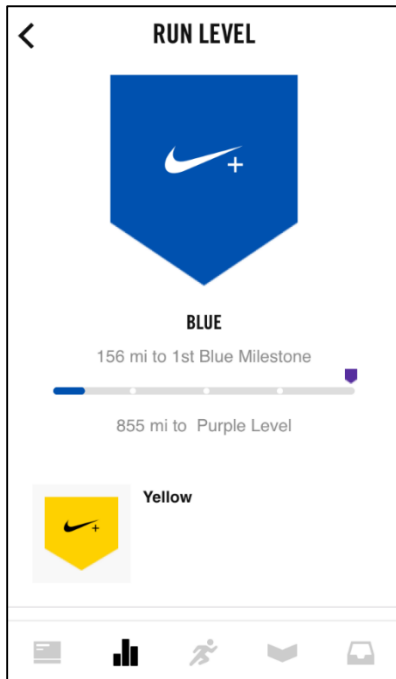
Candy Crush Saga is a free mobile game developed by King. It consists of a series of levels within episodes that players can complete (King.com Ltd., 2016). Completing all the levels in an episode brings the player to the next episode (Figure 9). A player unlocks new episodes by beating three difficult levels in a row, receiving endorsements from three other users, or using in-game currency. Candy Crush Saga incorporates reoccurring characters with challenging levels, providing a simple and entertaining game for users. The social aspect of the game allows users to interact with friends by sending virtual gifts to each other within the game and seeing what level others are on. Players receive boosters to assist in completing levels by playing the game on consecutive days. The virtual rewards and gamification elements aim to maintain users.

2.3.5 NIKE Inc.

NIKE Inc., originally known as Blue Ribbon Sports, promotes the development of athletic products and services and inspire athletes worldwide through their innovative technology (NIKE Inc., 2016). NIKE Inc. produced Nike+ Run Club, a service that tracks user exercise, provides athletic advice, and connects runners within a community. The Nike+ Run Club focuses on guiding runners, from novices to experts, through tailored coaching and training recommendations.

The Nike+ Run Club tracks users' activity throughout the day. NikeFuel, incorporates a user's age, weight, height, and gender to calculate the amount of energy expended during all activities and converts it into a number (Broussard, 2016). NikeFuel allows users to compare

their statistics to other users' statistics regardless of their age or the activities they engage in, encouraging competition between users.



The Nike+ Run Club has a level tracking system for running and walking. Levels and milestones depict the number of miles traveled. A different color represents each level and within each level are additional milestones (Figure 10). The user's profile displays user's earned trophies along with personal records (Figure 11). The user profile keeps this information to provide users with self-satisfaction and motivation to continue exercising. Statistics compare a user's running data with other runners' data within the same age range and gender, fostering competition. The service only provides virtual rewards but continues to attract new users while maintaining current users.

Figure 10. A user's current level and miles until the next

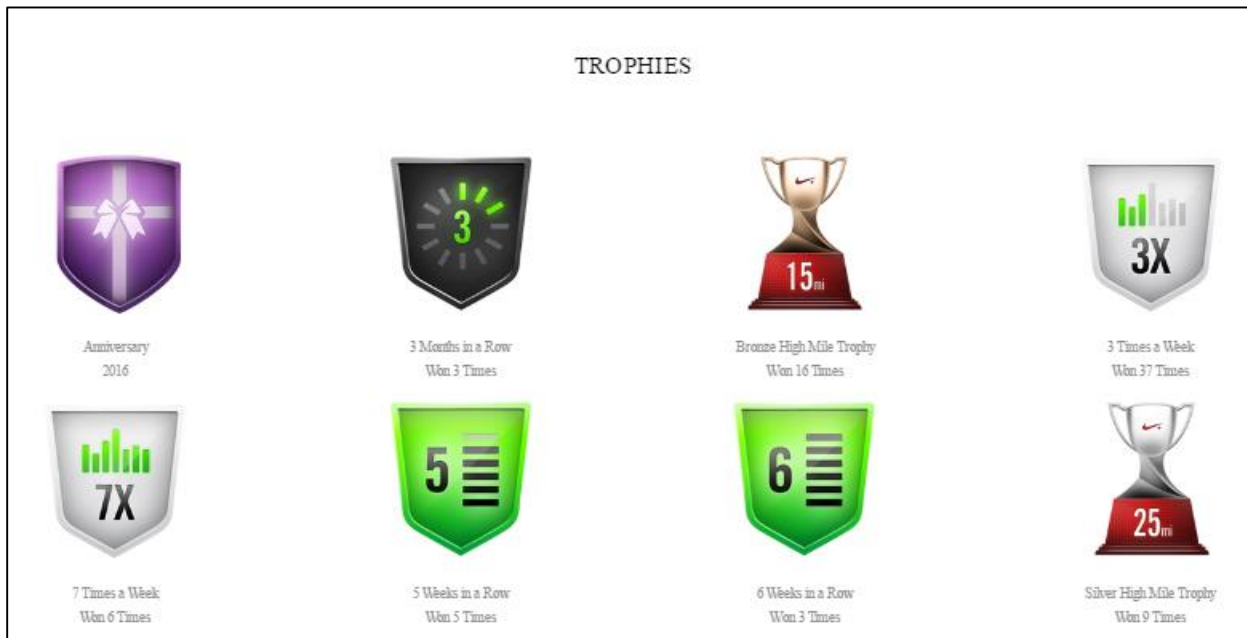


Figure 11. A user's run statistics and earned trophies (NIKE Inc., 2016)

2.3.6 Freerice

Freerice, a non-profit website owned by the United Nations World Food Programme, was established in 2007. Its goal is to provide free education to everyone and give food to those in need. Freerice offers questions in subjects such as foreign languages, geography and algebra. For each multiple-choice question players answer correctly, Freerice donates 10 grains of rice to people in need.

Freerice uses virtual rewards and gamification elements to maintain players and donations. The website displays players' activities and ranking through a leaderboard, showing players and groups with the largest amount of rice donations. Gamifying quizzes produces an entertaining method for players to learn (Freerice, 2016).

2.4 123 Library

123 Library, a part of the National Library of China, is a non-profit, web-based book sharing company founded by Professor Yang Suhong. 123 Library's mission is to provide affordable books and spread knowledge to everyone. In the process of reusing and exchanging books, it hopes to assist in the environmental efforts to prevent deforestation (123 Tushuguan, n.d.).

123 Library provides free books to the users, promoting information sharing. Users upload a picture of each book that they are willing to donate, and users can ask donors for the books. The users pay for the shipping of the book, but the book itself is free. 123 Library relies on book donations to maintain a library of books available on their website for users to buy. This company model promotes the reuse of books and decreases the need for new books, in efforts to protect the environment. 123 Library is assessing if providing rewards for donors would entice users to donate books.

3 Methodology

Our team's main goal is to recommend attributes for a reward system for 123 Library. The conclusions we draw from our research helps us suggest a suitable system for 123 Library to implement. In order to achieve this goal, we identify the following project objectives:

Objective 1: Understand incentive programs companies use.

Objective 2: Understand Chinese culture surrounding book donations.

Objective 3: Identify the reward systems that appeal to students and parents.

Objective 4: Determine reward systems suitable for 123 Library.

3.1 Understand Incentive Programs Companies use

Our team wants to understand existing and effective reward programs. To comprehend how successful incentive systems function, our team researches reward programs other companies use. We read articles and access companies' websites to understand reward systems that engage customers. Our team's research, on various companies, helps us determine effective reward systems for 123 Library.

The companies we examine include Domino's Pizza, the American Red Cross, Snap Inc., King, NIKE Inc., and Freerice. These companies provide different rewards and incentives to their users. We gather information on the strengths and weaknesses of each reward system and the findings from this information contributes to our recommendations of reward systems for 123 Library.

Our team assesses gamification to understand the incorporation of game elements into reward systems. Examining research articles provides an understanding of effective aspects of gamification. Using this research, we assess gamification elements that are useful for designing incentive programs. Using knowledge from our background research, we create a list of possible reward systems for 123 Library.

3.2 Understand Chinese Culture Surrounding Book Donations

Understanding the donation habits of 123 Library's target demographics helps our team create recommendations for effective reward systems. Our team learns about book donation habits and culture in China to design a fitting incentive for encouraging book donation. Two of 123 Library's user demographics are college students and parents of primary school students. In order to survey these demographics, we choose students of Hangzhou Dianzi University (HDU) and parents of students attending The First Primary School of Xiasha Hangzhou to understand their willingness to donate books (Appendices B&D). The groups we survey are not necessarily users of 123 Library, and were chosen because of their proximity to us. The surveys also gauge how often they would donate and how many books they would donate at one time. Professor Yang Suhong requests the inclusion of the last two questions on the parent survey which do not pertain to our project objectives and are not factors in our team's recommendations (Appendix D). Our HDU student partners translate the surveys into Chinese to make them readable for participants.

Professor Yang Suhong provides our team with HDU students to take part in a focus group (Appendix C). We conduct the focus group in Chinese with the help of our HDU student partners. The participants provide their insight regarding book donations in more detail than the answers from the surveys can provide. Our team analyzes the information from the focus group to understand how students view book donations. Factoring in college students' opinions our team makes suggestions for a reward system. Participants in the focus group and both the surveys have minimal knowledge of English and mistranslations or misunderstandings can influence data. The translation may introduce inaccuracies in our data.

3.3 Identify Reward Systems That Appeal to Students and Parents

Our team wants to know what reward systems captivate users' interest. Utilizing the two demographics important to 123 Library, we determine the most popular reward systems of the five options we propose. Our surveys ask the participants to assess five potential reward systems on their level of appeal (Appendices B&D). We use box and whisker plots to display the data from the surveys. Analyzing these data, we incorporate the groups' preferences into our reward system recommendations.

Our team asks the participants in the focus group their opinions on the five potential reward systems. This add insight on why they prefer some rewards over others (Appendix C). Analyzing opinions from the focus group, we learn HDU students' reward preferences and factor them into our recommendation to 123 Library.

3.4 Determine Reward Systems Suitable for 123 Library

Our team interviews Professor Yang Suhong, the founder of 123 Library, to understand the criteria he finds important for an incentive system (Appendix E). Our HDU student partners help us translate the interview.

To find the best fitting reward system for 123 Library, we analyze our data using a Pugh analysis. Our team assesses the requirements for the reward system and ranks them in order of importance, using information from the interview with Professor Yang Suhong. The total score of each requirement represents its weight in the final decision matrix of the Pugh analysis.

Our team compiles the data on reward systems from student and parent surveys. We use the compiled data as factors in the decision matrix. We evaluate each reward system using the design requirements. Our team assesses the score each reward system receives and utilizes the information to assist in producing our recommendations for a reward system.

4 Results and Analysis

In this section, our team analyzes the data we collect through background research, a focus group, an interview, and two surveys to find data trends. We interpret the quantitative data pertaining to reward systems in a Pugh analysis to assess each system's suitability for 123 Library. From our analysis, we identify book donation habits and reward systems appealing to college students and parents of primary school students in China. We assess the features of the reward system important to Professor Yang Suhong and effective for 123 Library.

4.1 Incentive Programs of Other Companies

Our team categorizes the incentive programs other companies use by the elements each system has in common with each other. We form two non-exclusive categories: systems that use progress tracking elements and systems that use monetary rewards. From our analysis, we find progress tracking features as common gamification elements in reward systems, because it provides a sense of fulfillment to users. Among the companies we analyze, those with progress tracking features do not have significant monetary rewards. We find that companies with progress trackers have successful reward programs that optimize users' interests when incorporating monetary rewards.

From the analysis of the research, discussed in the background, we find that companies use similar reward systems to each other to fit their users' interests. By adapting reward systems to incorporate into book sharing, our team produces five reward system options (Appendix F). A raffle reward system provides users with a virtual raffle ticket for each book donation. The number of tickets a user has signifies the number of times they can enter into a monthly raffle. Free shipping reward means that after donating a certain number of times, the user receives a coupon from 123 Library's site for one book with no shipping cost. For the prize wheel reward, a user receives a 'spin' each time they donate a book and receives a prize based on the result of the spin. The online game reward gives donors new levels of a video game on 123 Library's website after donating a fixed number of books. The level system reward is a progress tracker that displays a user's past donations as experience points. Each donation also provides on-site privileges.

4.2 Chinese Book Donation Culture

The surveys of college students and parents of primary school students provide data on their book donation habits. Our team produces pie charts to display these data. We analyze the charts to find that the majority of parents either keep their books or give them to friends after they finish using them. The data from the surveys of Hangzhou Dianzi University (HDU) students show similar trends but a smaller portion of students give their books to friends (Figure 12). Ninety-five percent of parent participants are willing to donate their books. Similar to parents, HDU students state that they would be willing to donate books they have finished using (Figure 13). In the focus group the HDU students say they are willing to donate books, and yet keep most of their books. Participants state they keep some of their books because of their monetary and sentimental values. HDU students do not donate the books they are willing to part with because they either do not know where to donate books or find it inconvenient to do so (Appendix C). These data show that 123 Library could receive book donations, even without an incentive program.

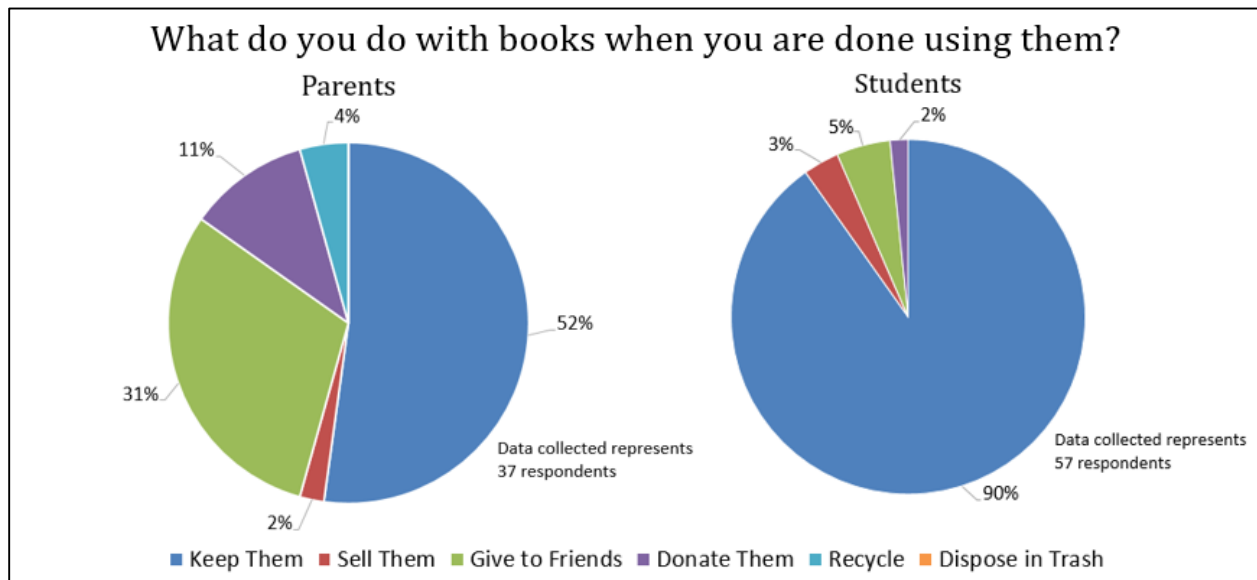


Figure 12. What parents and college students do with their used books

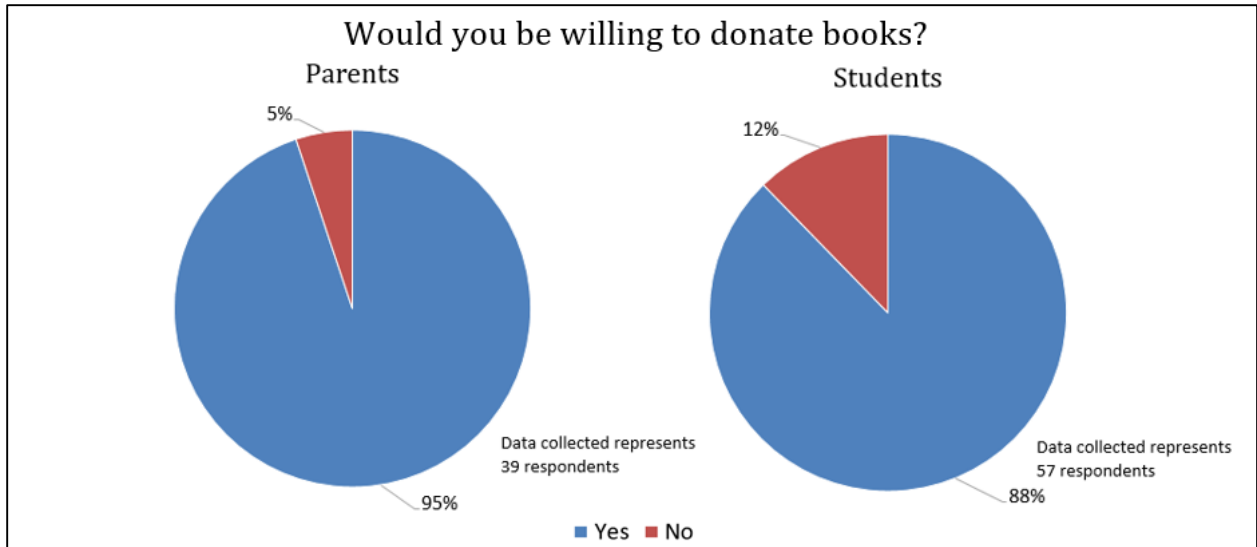


Figure 13. The willingness of parents and college students to donate their used books

The majority of both parents and HDU students state that they would donate books less than once a year (Figure 14). The amount of books most parents and students would donate at one time is between 1-3 books, however in both groups, several state they would donate 10 or more books each time they donate (Figure 15).

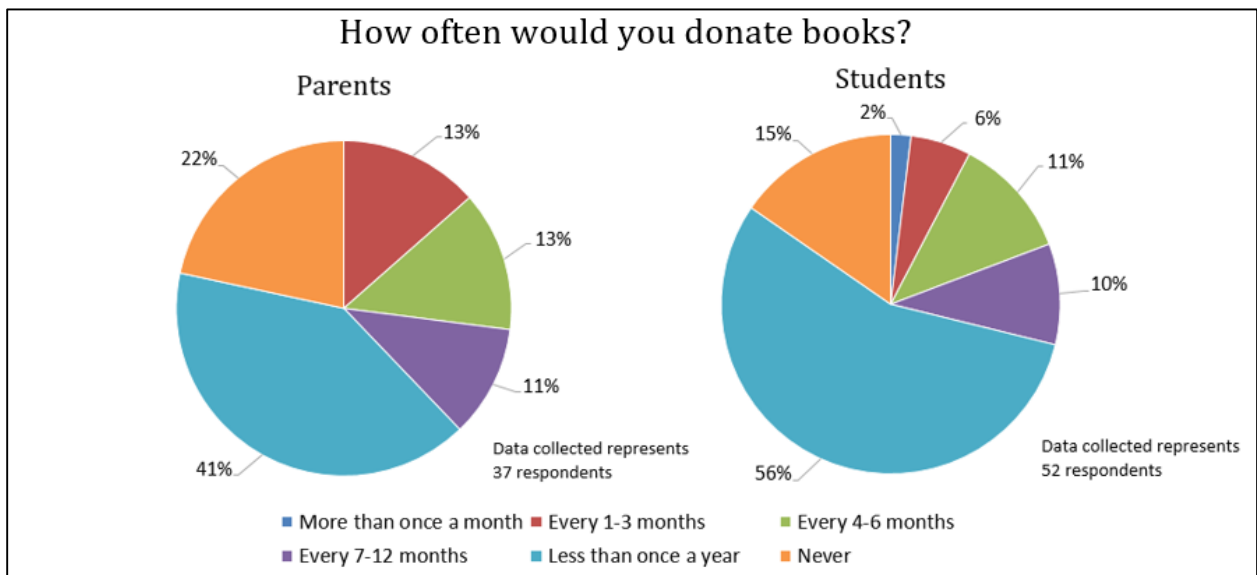


Figure 14. Frequency parents and college students would be willing to donate used books

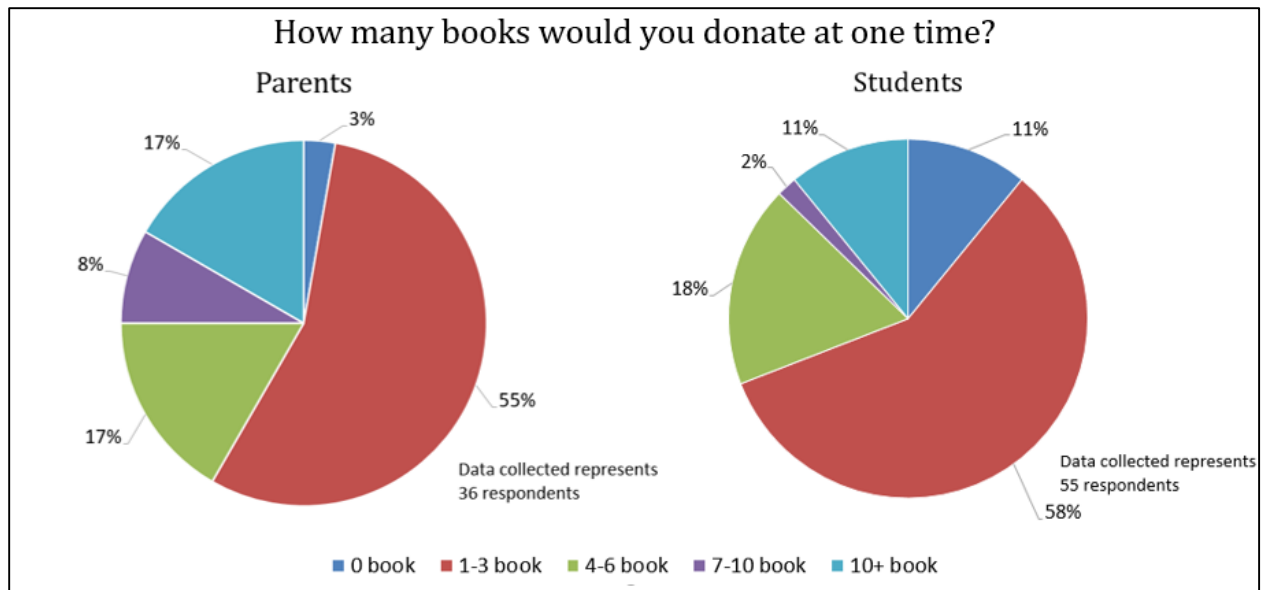


Figure 15. Quantity of books parents and college students would be willing to donate at one time

4.3 Reward Systems Appealing to Potential Customers

To find the reward systems appealing to each demographic, our team creates box and whisker plots of the data from our surveys of HDU students and the parents of primary school students. Each box and whisker plot displays a reward system and ranges from 1-5. Our team compares each boxplot's median to 3, the median score an evenly distributed reward system would receive. We analyze the boxplot to assess how appealing each reward system is on its own. We compare the boxplots against each other to find the most appealing reward systems out of the five options.

Our team compiles the data from the parent surveys to analyze how appealing they find each reward system (Figure 16). Comparing the box and whisker plots, our team finds the free shipping reward and the level system have the highest median scores. Both boxplots show a similar distribution, with 50% of the participants scoring them 4 or 5. The parents' interest in the prize wheel and online game show an even distribution of scores, both having a median of three. The raffle system's boxplot shows a similar median score of three but has a larger inter-quartile distribution, ranging from 1 to 5.

Our team analyzes each boxplot, of the data from student surveys, to assess how appealing college students find each reward system (Figure 17). The median score for the free shipping reward boxplot is five with a small inter-quartile range, signifying that a large

concentration of HDU students share the same views. Seventy-five percent of students score the free shipping reward with a 4 or 5. The median score for the level system is four, and 50% of the students gave it a score of 4 or 5. Both the raffle and prize wheel show a median score of three, but the inter-quartile range of the raffle boxplot ranges from 1.5-3 and the inter-quartile range of the prize wheel boxplot ranges from 2-4. The online game has the lowest median score, receiving a two. 50% of students rank it with a score of 1 or 2.

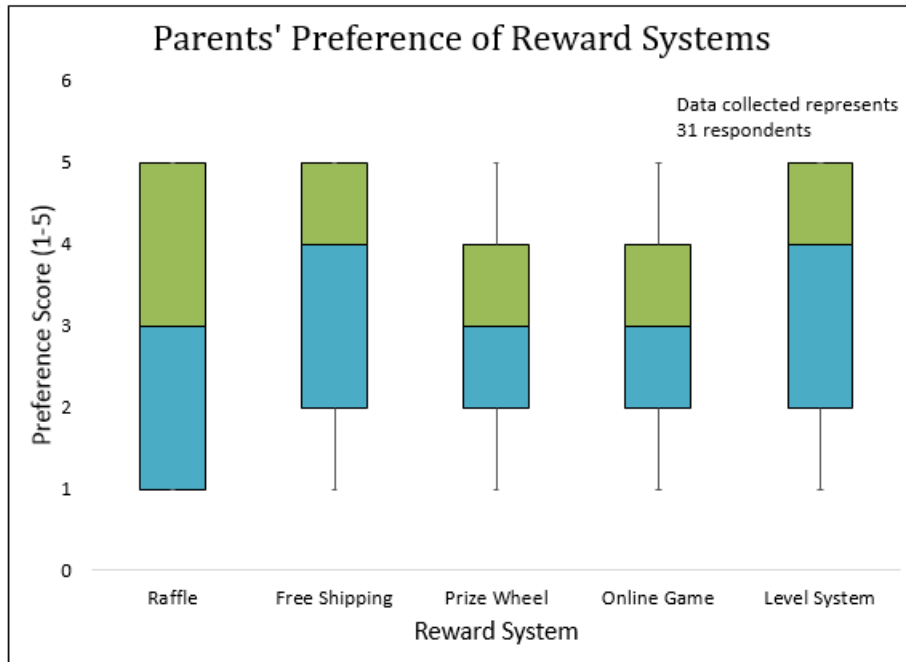


Figure 16. How appealing parents and college students find our proposed reward systems

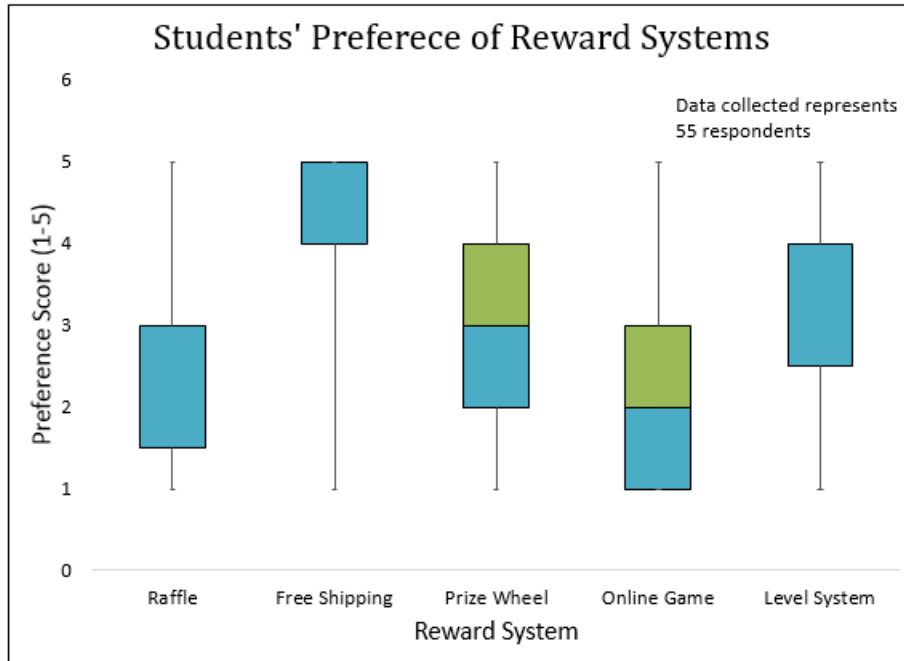


Figure 17. How appealing parents find our proposed reward systems

Through the focus group of HDU students, our team receives detailed answers about the reasons students prefer certain incentive programs (Appendix C). The students believe that the free shipping reward is appropriate because it makes the most sense to receive a free book as a reward for donating books. The other reward system the students approve of is the level system. They state that this is a satisfying method to track the users' donations. The students do not find the online game option appealing because it does not relate to book donations. The students assume that 123 Library cannot provide a game that the students want to play.

4.4 Assessing Potential Reward Systems Using a Pugh Analysis

We use our background research and the data from the surveys to conduct a Pugh analysis. From our interview with Professor Yang Suhong, we learn that he wants our team to propose a fun and simple reward system for donors. Professor Yang Suhong also wants a "cheat-proof" system to ensure users do not receive rewards without donating books. He states that 123 Library has no specific budget for the reward system and wants to keep the system inexpensive.

We define cheat-proof as how difficult it is for a user to receive a reward through false donations. Since 123 Library does not physically collect books from users, false donations could occur if donors state they have donated a book without doing so in actuality. Since none of our

proposed reward systems have an element to check if users have donated their books, we assess how many book donations it would take to receive a reward. If a reward system provides a reward after several donations, it is more cheat-proof than reward systems that provide rewards after each donation.

Our team ranks the design requirements in the first table of the Pugh analysis to produce the weight of each requirement (Table 1). Each criterion is given a 1 or a 0 depending on how important it is in comparison to the other criteria. The sum of the scores each requirement receives signifies its weight in the decision matrix.

A cheat-proof reward system is the most important criterion to Professor Yang Suhong, because if users receive rewards without donating books, 123 Library cannot sustain their business. For this reason, the cheat-proof criterion receives a score of four. During the interview, Professor Yang Suhong mentions he wants a fun reward system, appealing to users. If the reward system is not attractive to users, then it would not motivate them to donate through 123 Library’s website. For this reason, a fun reward system ranks above inexpensive, sustainable, and simple. A simple reward system is easy to understand and can be versatile between different demographics. Professor Yang Suhong believes a simple reward system would entice more users to donate books. The simple criterion, therefore, ranks above the inexpensive and sustainable criteria. Professor Yang Suhong states the reward system should be inexpensive but also mentions 123 Library receives funding from sponsors and the Chinese government. Therefore, the criterion inexpensive is only more important than sustainability.

Table 1. Ranking of importance of the design requirements

	Inexpensive	Sustainable	Fun	Cheat-proof	Simple	Total
Inexpensive	-	1	0	0	0	1
Sustainable	0	-	0	0	0	0
Fun	1	1	-	0	1	3
Cheat-proof	1	1	1	-	1	4
Simple	1	1	0	0	-	2

Our team uses the weighted requirements of the design matrix in the Pugh analysis (Table 2). The fun criterion has a weight of three, however our team divides this criterion into the requirements gamification elements and customer interest, each having a weight of 1.5. Both of these requirements are factors in assessing the entertainment level of a reward system. From the analysis of our background research, our team finds that gamification elements make tasks more entertaining, and therefore more fun and appealing to book donors. Customer interest helps us understand which reward systems users find entertaining. Our team divides customer interest into the two demographics we survey, students and parents, each receiving a weight of 0.75.

In the decision matrix, we assess each reward system with the design requirements and produce a final score for each system. The design matrix compares the criteria against each reward system, giving a -1, 0, or 1 based off of how well it accomplishes the criteria. The score each reward system receives is multiplied by the weight of the criteria and added together. The sum of each reward system's score is its final score and signifies how well it fits all the criteria. The reward systems' scores can range from -10 to 10.

Table 2. Decision matrix

Requirements	Weight	Raffle	Free Shipping	Prize Wheel	Online Game	Level System
Cheat-proof	4	0	1	-1	1	1
Gamification Elements	1.5	0	-1	0	1	1
Customer Interest-Students	0.75	-1	1	0	-1	1
Customer Interest-Parents	0.75	0	1	0	0	1
Simple	2	1	1	0	-1	-1
Inexpensive	1	0	0	-1	0	0
Sustainable	0	-1	0	-1	1	1
Final Score		1.25	6	-5	2.75	5

It is hard to assess each reward system using the inexpensive criterion because there are several variables that can change the cost of implementing and maintaining a reward system. A reward system receives a score of -1 if it has constant expenses after implementation of the reward system. A score of 0 represents a reward system with minimal expenses after implementation. This includes maintenance of the system or infrequent monetary prizes to donors. A score of 1 represents no additional costs after implementation.

Analyzing other raffle rewards, our team decides that, for our raffle reward option, users receive one raffle ticket for each book donation. Each book provides users with a reward, making cheating easier, but the probability of winning a raffle also prevents cheating. For this reason, the raffle receives a 0 score for cheat-proof. This reward system has minor gamification elements and receives a 0 for that requirement. The surveys show students find the raffle unappealing and parents have an evenly distributed opinion on it, therefore the raffle receives a -1 and 0 respectively. The raffle system gets a 1 in simplicity, because it is easy to understand and easy to implement by 123 Library. This raffle reward system occurs once a month and infrequently results in monetary prizes, receiving in a score of 0 in the inexpensive category.

Our team defines the free shipping reward as an incentive that gives users free shipping on their next book order from 123 Library after donating a fixed number of books. Since users have to donate multiple books before receiving a reward, this reward system receives a score of 1 for cheat-proof. This reward provides no gamification elements, and receives a score of -1. From the survey data, we find students and parents favor the free shipping reward, and it receives a 1 for both demographics. The free shipping reward is easy to understand, giving it a 1 for simplicity. Users only receive this reward when they reach the book donation requirement, making the monetary prize infrequent. For this reason, free shipping gets a score of 0 for inexpensive.

Our prize wheel reward system gives users a 'spin' every time they donate a book. Since users receive a prize each time they donate a book, it is easier to cheat, so this system receives a score of -1. This reward system incorporates minor elements of gamification for users during the 'spin' of the prize wheel, and receives a 0. Neither the parents nor the students have strong opinions for or against this prize, so this system receives a 0 for both groups. The prize wheel is simple to understand, but is more complicated for 123 Library to design, giving it a 0 for

simplicity. Donors receive a monetary prize for every book donation, making it an expensive reward to maintain. The prize wheel receives a -1 for the inexpensive requirement.

The online game, opens additional levels of the game after a fixed amount of book donations. It is difficult to cheat this system because users have to donate multiple books before receiving a reward and the reward does not cost 123 Library any money, giving it a score of 1. This reward system incorporates a game into donating books and receives a 1 for the gamification elements requirement. Students did not find the online game appealing, giving this system a -1. Parents did not have a strong opinion on the reward system, giving it a 0. The online game is difficult to implement and difficult to understand, so it receives a -1 for simplicity. This reward system receives a 0 for the inexpensive criterion because the online game has maintenance costs after it is implemented, but does not cost money to reward users.

The level system gives virtual rewards after users level up through a fixed number of book donations. It receives a 1 for being cheat-proof because it requires the donation of multiple books for users gain enough experience points to level up their profile. The level system utilizes several gamification elements throughout the user profile, and receives a score of 1. Both students and parents find this reward system appealing, giving it a score of 1 for both demographics. The level system is difficult to implement and understand, giving it a score of -1. There is a cost to implement and maintain a level system on 123 Library's website, however no additional monetary rewards for customers. For this reason, the level system receives a 0 for the inexpensive requirement.

5 Conclusions and Recommendations

We draw conclusions from our analysis of survey data regarding students' and parents' opinions on book donation and incentive systems. By holding a focus group and conducting surveys, we identify that students and parents find some reward systems more appealing than other ones. Using our research and analysis, our team determines which reward systems fit 123 Library's design requirements. Our team creates recommendations about effective incentive systems for 123 Library and produces a prototype illustrating a potential website design to incorporate these reward systems.

5.1 Donation Habits

Our team concludes that students and parents are likely to donate their used books. Students donate their books because it benefits others and recycling books is gratifying. Both groups keep the majority of their used books. Students are unwilling to donate some of their books depending on their monetary and sentimental value. Students would likely donate their books if it is convenient to do so.

5.2 Free Shipping and Level Systems

We conclude that the free shipping reward and level system are the most appealing system among college students and parents. The other three reward systems are less appealing. Students enjoy the free shipping option because they want to receive a book after donating their books. We conclude that the rewards should include book related prizes or daily necessities so that it would be useful to and appreciated by book donors. Student's find the level system engaging and the visible progress tracker satisfying.

5.3 Most Fitting Reward System for 123 Library's Design Requirements

123 Library places its emphasis on having a cheat-proof, fun, simple, inexpensive, and sustainable reward system. The free shipping and level system rewards are the most cheat-proof and most appealing to college students and parents. The raffle and free shipping rewards are the simplest for users to understand and the simplest for 123 Library to implement. The online game and level systems are the most sustainable for maintaining books on 123 Library's website. From the Pugh analysis, we conclude that free shipping and level system rewards are both fitting reward systems for 123 Library.

5.4 Limitations in our Research

Our research is limited by the small sample size of our surveys, with other user demographics of 123 Library not represented. Due to time constraints, we only distributed surveys to one college's students and one primary school's parents. The translation of our surveys could have misconstrued the meaning of our questions, giving us inaccurate data. Participants in our focus group spoke in Chinese, and through translation we could have misinterpreted their responses. We additionally could not research the cost to implement and maintain each reward system, due to the many factors of cost analysis. We assumed parameters on how many book donations are required before receiving a reward from each reward system. The reward systems become more cheat proof by altering the frequency donors receive a prize. This reward frequency alters our analysis on how each reward system fits the cheat-proof criterion.

5.5 Recommendations

From our findings and conclusions, our team recommends that 123 Library implement a virtual reward system with monetary elements. Incorporating a free shipping reward into a level system combines the two most fitting reward options. Supplementing a virtual reward system with monetary elements could reduce the overall cost.

Our team creates a prototype and a flow chart of the reward system we recommend to 123 Library (Appendices G&H). The illustrations serve as a visualization of our recommendation, and depicts how the combined reward system could look on 123 Library's website. The prototype includes a user profile, a badge page, and a leaderboard page. Features in the prototype include a nursery where users can grow virtual trees and track their progress, as well as a book counter indicating how many donations to the next reward. The prototype and the flow chart can be found in Appendices F and G, respectively.

123 Library needs to consider the locations and frequency it would be willing to ship books for free. If users ship the books to distant or remote locations, 123 Library will pay larger shipping costs. The company also needs to consider how often it will reward users with free shipping. The cost for 123 Library to implement the free shipping reward depends on the frequency the reward is provided and the distribution distance of the free books. Creating the

system would require a web designer, and the company may need an employee with web design skills to debug the website if problems arise later.

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Appendix A: Sponsor Description

123 Library is a book sharing organization founded by Professor Yang Suhong in February of 2011. Hangzhou Dianzi University (HDU) students told their professors about their difficulties obtaining text books and their desire to give their used textbooks to the next class. To solve these problems, Professor Yang Suhong started 123 Library.

123 Library, launched their online platform April 23, 2012. It connects book sellers with buyers, providing easy access to cheap books. The cheaper, used books allow people to purchase books that they would not have been able to afford. In October 2013, 123 Library reached 500 colleges. Updates to its online platform fixes problems due to the increase in usage (123 Tushuguan, n.d.).

In 2016, 123 Library became a part of the National Library of China. 123 Library switched to a model where users receive books for free. Donors upload a picture of their book on the website, and users that want the book message the donor. The donor delivers the book to the user by shipping it or by giving it to them in person. The recipient pays the cost of shipping the book, if necessary.

Appendix B: Student Survey

English Version

Objective: To gain a better understanding of college students' interest in book donations and reward systems.

Introduction: Hello we appreciate you taking some time to fill out our survey. We are students of Worcester Polytechnic Institute, a college in the United States, and we are performing a survey to gain a better understanding of how college students view book donations and what motivates them to donate. All of your responses will be kept anonymous, and no identifying information will be disclosed. Participation in this research is voluntary, and you do not need to answer every question and may end your participation at any time.

1. What do you do with your books when you are done using them (check all that apply)?
 - A. Keep them
 - B. Sell them
 - C. Give them to friends
 - D. Donate them
 - E. Recycle
 - F. Dispose in trash

2. Would you be willing to donate books? (Yes / No)
 - A. If yes answer questions 3 and 4
 - B. If no skip to question 5

3. How often would you donate books?
 - A. More than once a month
 - B. Once every 1-3 months
 - C. Once every 4-6 months
 - D. Once every 7-12 months
 - E. Less than once a year
 - F. Never

4. How many books would you donate at one time?

- A. 0 books
 - B. 1-3 books
 - C. 4-6 books
 - D. 7-10 books
 - E. 10+ books
5. If you do not donate books, would you if you received a reward or gift for doing so?
(Yes / No)
6. How appealing is each reward system? (Rank 1-5, 1 being your least appealing and 5 being your most appealing)
- A. Each book donated equates to a raffle ticket which is entered into a monthly raffle for prizes
(Least appealing) 1 2 3 4 5 (Most appealing)
 - B. After donating 8 books, you receive a book of your choice from the site that is free of all costs
(Least appealing) 1 2 3 4 5 (Most appealing)
 - C. Each book donated will give you a spin of a wheel on the site which determines the prize you win
(Least appealing) 1 2 3 4 5 (Most appealing)
 - D. Each book donated unlocks new levels of an online game provided by 123 Library
(Least appealing) 1 2 3 4 5 (Most appealing)
 - E. Donating books gives your profile “experience points”. Your profile will level up with enough points, and each level will have special rewards
(Least appealing) 1 2 3 4 5 (Most appealing)

Chinese Translation

调查学生：

目标：为了对大学生关于捐书和回报体系的看法有一个更好的理解

简介：您好，非常感谢您花费时间来完成我们的问卷。我们是来自美国 WPI 大学的学生，为了理解大学生是如何看待捐书和什么对他们而言是最有效的激励，我们做了这个调查。您所有的回答都是匿名的，我们也不会对外泄露您的任何个人信息。参加这个问卷调查是自愿的，你不需要回答所有的问题，你也可以随时终止答题。

1. 当你看完一本书后你会怎么做？

- A. 保存着
- B. 卖掉
- C. 送给朋友
- D. 捐给他人
- E. 回收
- F. 当做垃圾处理

2. 你会愿意捐书吗

- A. 愿意（请回答第三题和第四题）
- B. 不愿意（请跳到第五题）

3. 你通常多久捐一次书？

- A. 多于一个月
- B. 一到三个月
- C. 四到六个月
- D. 七到十二个月
- E. 大于一年
- F. 从不

4. 你一次会捐多少书?
- A. 0 本
 - B. 1 到 3 本
 - C. 4 到 6 本
 - D. 7 到 10 本
 - E. 更多
5. 如果你本不打算捐书, 但若有礼品作为回赠或者有奖励制度, 您会愿意捐书吗?
- A. 会
 - B. 不会
6. 这些中哪一个听起来是最吸引人的奖励? (等级 1-5, 1 是你最不喜欢的, 5 是你最喜欢的)
- A. 每本书捐赠等同于买彩票, 奖品为每月抽奖
(最不喜欢) 1 2 3 4 5 (最喜欢)
 - B. 捐赠 8 本书后, 你从网站选择一本书, 是完全免费可以收到的
(最不喜欢) 1 2 3 4 5 (最喜欢)
 - C. 捐赠的每一本书都会在网站上给你个转盘旋转, 这决定了你赢的奖品
(最不喜欢) 1 2 3 4 5 (最喜欢)
 - D. 每本捐赠书开启了 123 图书馆的线上游戏的新水平
(最不喜欢) 1 2 3 4 5 (最喜欢)
 - E. 捐赠书籍给你的个人资料“经验点”。你的个人资料会有足够的积分, 每一个级别都会有特别的奖励
(最不喜欢) 1 2 3 4 5 (最喜欢)

Student Survey Results

1 What do you do with books when you are done using them?

Options	Number of responses
A Keep Them	55
B Sell Them	2
C Give to Friends	3
D Donate Them	1
E Recycle	0
F Dispose in Trash	0

2 Would you be willing to donate books?

Options	Number of responses
A Yes	50
B No	7

3 How often would you donate books?

Options	Number of responses
A More than once a month	1
B Every 1-3 months	3
C Every 4-6 months	6
D Every 7-12 months	5
E Less than once a year	29
F Never	8

4 How many books would you donate at one time?

Options	Number of responses
A 0 book	6
B 1-3 book	32
C 4-6 book	10
D 7-10 book	1
E 10+ book	6

5 If you do not donate books, would you if you received a reward?

Options	Number of responses
A Yes	22
B No	5

6 How appealing is each reward system?

(Rank 1-5, 1 being your least appealing and 5 being your most appealing)

Rank	Number of responses				
	Raffle	Free Shipping	Prize Wheel	Online Game	Level System
1	14	2	4	15	5
2	13	2	16	16	9
3	15	8	17	19	12
4	8	9	9	3	19
5	5	34	9	2	10

Appendix C: Focus Group Questions

English Version

Number of Participants: 16

Interviewers Present: *Jackie Barr, Jess Cheu, and Sam Smith*

Date of Interview: *11-29-2016*

Objective: To understand the culture behind book donations and why certain incentives are more appealing than other.

Introduction: Hello we appreciate you taking some time to be a part of this focus group. We are students of Worcester Polytechnic Institute, a college in the United States, and we are holding this focus group to gain a better understanding on how you view book donations and what motivates you to donate. All of your responses will be kept anonymous, and no identifying information will be disclosed. Participation in this research is voluntary, and you do not need to answer every question and may end your participation at any time.

1. Do you donate books, why or why not?

Will donate:

- *It benefits others*
- *It is a voluntary action*
- *If they are done using the book and it is of no use to them anymore*

Will not donate:

- *No place to donate*
- *Inconvenient and annoying to donate*
- *Will not be beneficial to others*
- *Wasted in the hands of others that don't have use for the book*
- *The receiver of the book doesn't use it for good*
- *Value of books is too great, either financially or emotionally*

2. What are the appealing and unappealing qualities of each reward systems?
- A. Each book donated equates to a raffle ticket which is entered into a monthly raffle for prizes
 - B. After donating 8 books, you receive a book of your choice from the site that is free of all costs
 - C. Each book donated will give you a spin of a wheel on the site which determines the prize you win
 - D. Each book donated unlocks new levels of an online game provided by 123 Library
 - E. Donating books gives your profile “experience points”. Your profile will level up with enough points, and each level will have special rewards
 - *The raffle and the prize wheel are similar*
 - *Like getting a book free of cost after donating 8 books because it is the most related to books*
 - *Those who donate books like books so they would like getting a free book they haven't read before*
 - *The level system will give donors satisfaction and gratification*
 - *The free game isn't appealing because*
 - *some people don't play online games*
 - *it doesn't relate to book donating*
 - *there are games on other websites*
 - *The level system will make them want to donate to the same site to get more points*
 - *Using the level system, donors will raise their score by donating and they'll have a greater sense of achievement*

3. Do you have additionally suggestions for prizes?
 - *Send tickets and coupons for popular movies or food in exchange for book donations*
 - *The prize should be related to books*
 - *Combine receiving a free book and level system into one reward*
 - *Expand on giving free books as a prize because they want books that are better and books they have never read before*
 - *Give money*
 - *Give prizes that are daily necessities i.e. umbrellas*

4. Would certain reward systems make you more willing to donate multiple times over other reward systems?
 - *Similar reward systems to a level system*
 - *If donating is convenient then they are more likely to donate*
 - *The convenience of donating is more important than the reward they receive*
 - *Would keep donating if the prize was great enough*

5. Why would these rewards keep you donating books?
 - *The satisfaction from donating*
 - *They get to recycle books which is gratifying*
 - *A level system keeps them motivated to keep donating*

Chinese Translation

焦点访谈小组问题：

参与人数：

与会人员小礼品：

访谈时间：

目标：为了了解捐书背后的文化和为什么有些激励因素更具有吸引力

简介：您好，非常感谢您花费时间来完成我们的问卷。我们是来自美国 WPI 大学的学生，为了理解大学生是如何看待捐书和什么对他们而言是最有效的激励，我们做了这个调查。您所有的回答都是匿名的，我们也不会对外泄露您的任何个人信息。参加这个问卷调查是自愿的，你不需要回答所有的问题，你也可以随时终止答题。

1. 您愿意捐赠书籍吗？为什么？
2. 以下的奖励制度分别有什么吸引人或者不足的地方？
 - A. 每捐赠一本书就能够获得一次当月抽奖的机会
 - B. 捐赠满八本书以后能够获得一次免费送书的机会
 - C. 每捐赠一本书就会获得一次转转盘获得小礼品的机会
 - D. 每捐赠一本书就能够获得本网站的在线小游戏关卡解锁机会
 - E. 捐赠书籍能够获得积分，积分具有等级制，每一个等级有不同的奖励
3. 对于抽奖或奖励制度中的奖品，您还有什么建议吗？
4. 什么样的奖励制度会让你愿意捐赠更多的书籍吗？
5. 为什么这些奖励制度能够让您保持捐赠呢？

Appendix D: Parent Survey

English Version

Objective: To gain a better understanding of primary school students' parents' opinions toward book donations and reward systems

Introduction: Hello we appreciate you taking some time to fill out our survey. We are students of Worcester Polytechnic Institute, a college in the United States, and we are performing a survey to gain a better understanding of how college students view book donations and what motivates them to donate. All of your responses will be kept anonymous, and no identifying information will be disclosed. Participation in this research is voluntary, and you do not need to answer every question and may end your participation at any time.

1. What do you do with your books when you are done using them (check all that apply)?
 - A. Keep them
 - B. Sell them
 - C. Give them to friends
 - D. Donate them

2. Would you be willing to donate books?
 - A. Yes
 - B. No

3. How often do you donate books?
 - A. More than once a month
 - B. Once every 1-3 months
 - C. Once every 4-6 months
 - D. Once every 7-12 months
 - E. Less than once a year
 - F. Never

4. How many books do you donate at one time?
- A. 0 books
 - B. 1-3 books
 - C. 4-6 books
 - D. 7-10 books
 - E. 10+ books
5. If you don't donate books, would you with an incentive?
- A. Yes
 - B. No
6. How appealing is each reward system? (Rank 1-5, 1 being your least appealing and 5 being your most appealing)
- A. Each book donated equates to a raffle ticket which is entered into a monthly raffle for prizes
(Least appealing) 1 2 3 4 5 (Most appealing)
 - B. After donating 8 books, you receive a book of your choice from the site that is free of all costs
(Least appealing) 1 2 3 4 5 (Most appealing)
 - C. Each book donated will give you a spin of a wheel on the site which determines the prize you win
(Least appealing) 1 2 3 4 5 (Most appealing)
 - D. Each book donated unlocks new levels of an online game provided by 123 Library
(Least appealing) 1 2 3 4 5 (Most appealing)
 - E. Donating books gives your profile "experience points". Your profile will level up with enough points, and each level will have special rewards
(Least appealing) 1 2 3 4 5 (Most appealing)
7. Would you be interested in letting your children participate in a reading competition? You would film them reading a book and upload the file to the judges. The child that has the best reading ability would win the competition.

8. Would you be interested in letting your children participate in a singing competition?
You would film them singing any song and upload the file to the judges. The child that has the best singing ability would win the competition.

Chinese Translation

受访家长：

调查目的：为了更好地了解小学生家长对图书捐赠和奖励制度的看法。

简介：您好，感谢您抽空填写我们的调查问卷！我们是美国伍斯特理工学院的学生。我们最近正在进行一项研究：大学生们如何看待书籍捐赠以及他们捐赠书籍的初衷。问卷以匿名的方式进行，不会泄露个人信息。本次调查遵循自愿的原则，您可以自由填写。

1. 当你看完一本书后你会怎么做？（请看完所有选项后再做选择）

- A. 保存着
- B. 卖掉
- C. 送给朋友
- D. 捐给他人
- E. 回收
- F. 当做垃圾处理

2. 你会愿意捐书吗

- A. 愿意（请回答第三题和第四题）
- B. 不愿意（请跳到第五题）

3. 你通常多久捐一次书？

- A. 多于一个月
- B. 一到三个月
- C. 四到六个月
- D. 七到十二个月
- E. 大于一年
- F. 从不

4. 你一次会捐多少书?
- A. 0 本
 - B. 1 到 3 本
 - C. 4 到 6 本
 - D. 7 到 10 本
 - E. 更多
5. 如果你本不打算捐书, 但若有礼品作为回赠或者有奖励制度, 您会愿意捐书吗?
- A. 会
 - B. 不会
6. 这些中哪一个听起来是最吸引人的奖励? (等级 1-5, 1 是你最不喜欢的, 5 是你最喜欢的)
- A. 每本书捐赠等同于买彩票, 奖品为每月抽奖
(最不喜欢) 1 2 3 4 5 (最喜欢)
 - B. 捐赠 8 本书后, 你从网站选择一本书, 是完全免费可以收到的
(最不喜欢) 1 2 3 4 5 (最喜欢)
 - C. 捐赠的每一本书都会在网站上给你个转盘旋转, 这决定了你赢的奖品
(最不喜欢) 1 2 3 4 5 (最喜欢)
 - D. 每本捐赠书开启了 123 图书馆的线上游戏的新水平
(最不喜欢) 1 2 3 4 5 (最喜欢)
 - E. 捐赠书籍给你的个人资料“经验点”。你的个人资料会有足够的积分, 每一个级别都会有特别的奖励
(最不喜欢) 1 2 3 4 5 (最喜欢)

7. 你对让你的孩子参加阅读比赛有兴趣吗？你可以上传你孩子看书的照片，视频，读书笔记等，在我们的网站上会通过投票选出获胜者。
- A. 愿意
 - B. 不愿意
8. 你对让你的孩子参加唱歌比赛有兴趣吗？你可以上传孩子唱歌的音频或者视频，唱的最好孩子将赢得比赛。
- A. 愿意
 - B. 不愿意

Parents of Primary School Students Survey Results

1 What do you do with books when you are done using them?

Options	Number of responses
A Keep Them	24
B Sell Them	1
C Give to Friends	14
D Donate Them	5
E Recycle	2
F Dispose in Trash	0

2 Would you be willing to donate books?

Options	Number of responses
A Yes	37
B No	2

3 How often would you donate books?

Options	Number of responses
A More than once a month	0
B Every 1-3 months	5
C Every 4-6 months	5
D Every 7-12 months	4
E Less than once a year	15
F Never	8

4 How many books would you donate at one time?

Options	Number of responses
A 0 book	1
B 1-3 book	20
C 4-6 book	6
D 7-10 book	3
E 10+ book	6

5 If you do not donate books, would you if you received a reward?

Options	Number of responses
A Yes	25
B No	12

6 How appealing is each reward system?

(Rank 1-5, 1 being your least appealing and 5 being your most appealing)

Rank	Number of responses				
	Raffle	Free Shipping	Prize Wheel	Online Game	Level System
1	9	4	5	4	5
2	5	4	6	6	3
3	8	5	9	7	6
4	1	6	5	7	9
5	8	12	6	7	8

7 Would you be interested in entering your child in a reading competition?

Options	Number of responses
A Yes	30
B No	5

8 Would you be interested in entering your child in a singing competition?

Options	Number of responses
A Yes	28
B No	8

Appendix E: Sponsor Interview

English Version

Interview: *Professor Yang Suhong*

Interviewers Present: *Jackie Barr, and Sam Smith*

Date of Interview: *11-22-2016*

Objective: To understand the parameters for possible reward systems and what restrictions 123 Library faces.

Introduction: Hello we appreciate you taking some time to interview with us. We are students of Worcester Polytechnic Institute, a college in the United States. We are researching different ways to incentivize donations and we are performing this interview to gain more knowledge of the parameters we are working within. All of your responses will be kept anonymous, no identifying information will be disclosed. Participation in this research is voluntary, you do not need to answer every question and may end your participation at any time.

1. Where/from whom are you getting sponsoring?
 - *2 methods*
 - *1: our government*
 - *2: 123 Library stake holders*
 - *4 stake holders*
2. Are you receiving other support besides money?
 - *Government gives money*
 - *No other support is received*
3. Do you need additional funding from other sponsors?
 - *Need more investors*
 - *Yes, I would like additional funding*

4. Would you be willing to run advertisements in exchange for sponsor donations?
 - *We would allow advertisements from sponsors on the sites.*

5. How much money do you have in the budget for the reward program?
 - *Reward system now is used in some activities and not all the time.*
 - *If there is a special event we can use the reward system.*
 - *If you donate a book you can read an electronic book for free online.*
 - *No specific amount of money can be estimated.*

6. Do companies/corporations donate books?
 - *Sponsors will donate books.*
 - *Main sponsors work is about books. Sharing economy.*
 - *They will have a large amount of other company's books.*

7. Do you want other donations other than books? (i.e. money, time, etc.)
 - *We would be interested.*
 - *We had not thought about this before but he likes the idea*

8. What restrictions do you have now that you are part of the National Library of China?
 - *The support is more than the limitations*
 - *CNL provides 123 Library support now*
 - *No specific regulations put on 123 Library*
 - *Social enterprise so main purposes is to better people and not make money*
 - *No specific limitations.*

9. Would you be open to collecting books from donors and storing them yourself?
 - *No we are not interested in this because of the way the system works.*

10. If so would you be open to having book drives or book drop offs around campus?
 - *N/A*

11. What design criteria are there for the reward program?

- *Make sure people donate books before they can barrow form the site.*
- *Most important to think about*
 - *Cheat proof program*
 - *Customer interest (fun)*
 - *Simplicity*
 - *Inexpensive*

Chinese Translation

受访赞助商：

采访：

采访者陈述：

采访日期：

采访目的：为了了解 123 图书馆对可能的奖励体系所面临的限制

简介：您好，感谢您百忙之中抽空接受我们的采访！我们是美国伍斯特理工学院的学生。我们最近正在进行一项研究：大学生们如何看待书籍捐赠以及他们捐赠书籍的初衷。我们的所有研究都是以匿名的方式进行，不会泄露个人信息。本次调查遵循自愿的原则，您可以根据个人意愿选择回答我们的问题。

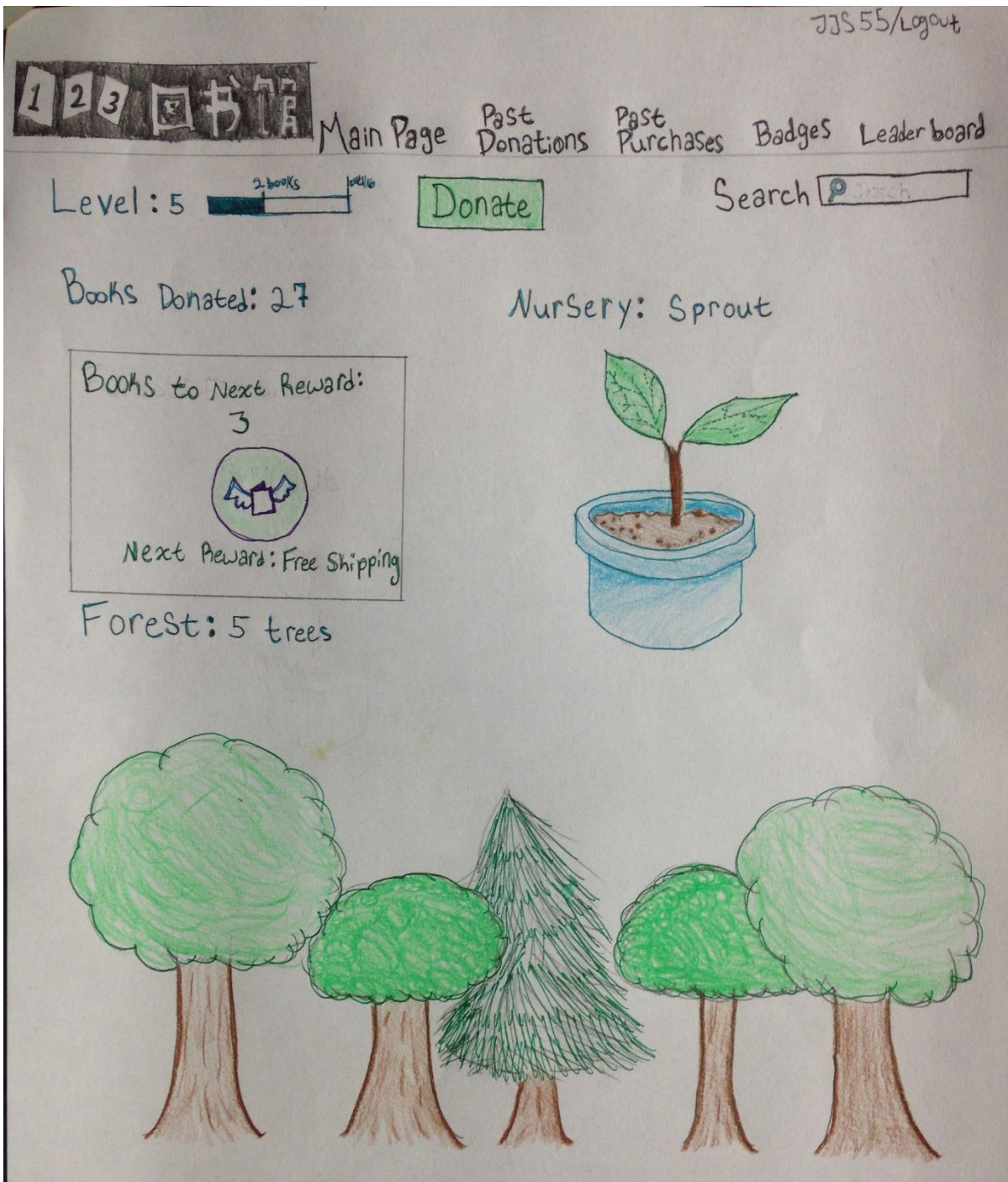
1. 您是从哪些企业/个人获得赞助的？
2. 除了钱以外还能够获得其他的物资供应吗？
3. 您还需要从其他的赞助商那里获得额外的赞助吗？
4. 您愿意为赞助商做广告宣传吗？
5. 对于奖励回馈方面，我们能获得多少钱作为资金？
6. 赞助商所在公司会捐赠书籍吗？
7. 您想要出除了书以外的其他捐赠吗？（比如：钱、时间或者其他）
8. 作为中国国家图书馆的一部分，对 123 图书馆有什么限制？
9. 你们会公开向捐书者们收集书并把这些书储存起来吗？
10. 如果会的话，你们会在学校周围放置图书回收箱吗？

Appendix F: Summary of Proposed Reward Systems

Reward	Reward Frequency	Type	Number of Book Donations Until Reward	Description
Raffle	Monthly	Monetary	1	One ticket per book donation to enter into a monthly raffle with one winner per month
Free Shipping	Cumulative	Monetary	Multiple	A coupon for free shipping on a book from 123 Library
Prize Wheel	Immediate	Monetary	1	A wheel spin determines the prize received
Online Game	Cumulative	Virtual	1	Receives new levels of an online game
Level System	Cumulative	Virtual	Multiple	Gain experience points and badges

Appendix G: Prototype

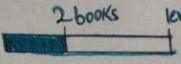
Profile Page









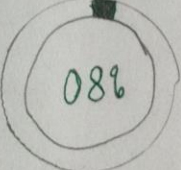
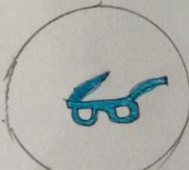


Badges Page

JJS 55/Logout

1 2 3 图书馆 Main Page Past Donations Past Purchases Profile Leaderboard

Level: 5  2 books level 6 Donate Search

Badges:

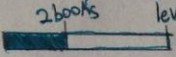
 5 Books Donated	 10 Books Donated	 20 Books Donated	 35% 40 Books Donated
 1 Tree Grown	 5 Trees Grown	 08% 10 Trees Grown	
 Text Book Donated	 Fantasy Donation	 Mystery Donation	

Leaderboard Page

JJS 55/Logout

1 2 3 图书馆

Main Page Past Donations Past Purchases Profile Badges

Level: 5  2 books level 6 Donate Search

Books Donated: 27

Leaderboard:

Rank	User Name	Books Donated
1	Book boss 37	239
2	Rockn Reader	188
3	Bookaneers	185
4	Page Turner 888	123
5	TSG93	108
6	GivingTree 3	95
7	Donationation	87
8	Dandilion 123	82

Appendix H: Flow Chart

