

Virtual Item Purchasing Patterns in a Social Game: Differences between high and low spenders

Donghee Yvette Wohn
Michigan State University
409 Communication Arts
East Lansing, MI, USA 48824
1-517-355-8372
yvettewohn@gmail.com

Eun-Kyung Na
Samsung Electronics
416 Maetan-dong, Youngtong-gu
Suwon-si, Gyeonggi-do, South Korea
82-10-8577-7342
naccy80@gmail.com

ABSTRACT

Purchasing virtual goods, or items, is a popular practice in social games. In this study, we examined users' virtual item purchasing patterns by analyzing user behavior and virtual item sales through log data from a popular social game service in South Korea. In a dual-currency system where items could be purchased with either real money (coins) or virtual cash earned through activities (beans), we found that high spenders purchase more items with coins than beans, while low spenders invested more time and labor to purchase with beans rather than coins. Also, high spenders were buying items for decorative purposes while low spenders were buying consumable play-oriented items necessary to sustain playing the game.

Categories and Subject Descriptors

J.4 Social and Behavioral Sciences: Economics, H.5.1. Multimedia Information Systems: Artificial, augmented, and virtual realities

General Terms

Design, Economics, Human Factors.

Keywords

Virtual goods, social game, avatar, space, customization, spending patterns

1. INTRODUCTION

Though common in massively multiplayer online games and social network sites based in Asia, the microtransaction model of virtual goods sales is in an early stage of adoption in North America, primarily seen in social network games [6]. The virtual goods market, however, is rapidly growing, with the US market project to reach \$2.1 billion in 2011 [5].

Previous studies have investigated virtual item purchase motivations on a theoretical level [2,3,4]. However, most of the previous studies employed user surveys or case studies to test

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

iConference '12, February 7-10, 2012, Toronto, Ontario, Canada.
Copyright 2012 ACM 1-58113-000-0/00/0010...\$10.00.

their hypotheses. We take a different approach; we looked into the real sales data and user logs from a popular commercial social game. We were guided by two research questions:

RQ1: What is the sales pattern of virtual items according to type?

RQ2: Does the buying pattern change according to the level of expenditure?

2. METHOD

We examined virtual item purchasing behavior in PuppyRed (www.PuppyRed.com), a 3D social gaming site in South Korea. Similar to services such as Habbo Hotel or Club Penguin, the service mainly caters to young and adolescent users. PuppyRed was launched in 2003 and has 6 million registered users, providing more than 15,000 different virtual items. Users create and dress up their own avatar and play with other avatars. The site provides social functions such as visiting other users' houses or congregating in a public space. Users can also engage in mini games or tasks such as picking apples, which earn them virtual currency in the form of beans. Users can then use these beans to purchase clothes and animations for their avatar, furniture and decorations for their house, and food and accessories for their pets.

There is no membership fee, but users have the option to purchase virtual coins with real money. Beans can only be obtained through activities within the game and are separate from coins. PuppyRed designed its "shopping mall" so that most items could be purchased with beans or coins, although certain "limited edition" items could only be purchased with coins. The conversion rate was 10 beans for 1 coin.

We collaborated with TriD communication, the company that runs PuppyRed, to obtain server-level data on virtual item sales. The given data set consisted of two parts: an item sales log and transactional data of users. The item sales log was an inventory list of all items and their sales during February, which included how many items were sold, what currency was used to purchase the item, and the price of the item. It did not contain any information on who the buyers were. The user transaction data was based on a random sample of 1,295 users who spent real money (coins) during the same month. We received a log showing what items they bought and what type of currency (coin or bean) they used to purchase items.

3. PURCHASING PATTERNS

3.1 Different Patterns By Item Category

Establishing a solid taxonomy of product categories gives several managerial benefits to the service provider. The most common

way to group items into several categories is to find common characteristics or the same purposes [1]. Puppy Red has three types of items: 1) items to customize one’s avatar, 2) items to customize one’s space, and 3) consumable items required to raise pets or plant crops.

PuppyRed uses two kinds of currency in parallel: coins and beans. There were noticeable differences regarding how people spent these different currencies. In terms of the quantity of items bought with coins, users spent most coins on avatar-oriented items (69.6%), followed by space-oriented items (26.8%) and play-oriented items (12.6%). However, the order was reverse with items bought using beans: users spent most beans on play-oriented (45.8%) items, followed by space-oriented (41.7%) and avatar-oriented (12.5%) items. This suggests that users are spending real money on decorative items that enable visual customization, while items used for play elements were purchased with beans, which can be obtained through play. Play-oriented items required continuous replenishment, which may be why users were more inclined to purchase those items with beans.

3.2 High and Low Spenders of Real Money

Users were categorized into three groups depending on their level of spending real money: high spenders, low spenders, and non-spenders. Non-spenders did not spend real money to buy virtual items; they only used beans.

We looked at users who had logged into the game at least once in the past three months and had spent real money at least once during that time. In this population, we found that users had spent real money on virtual items ranging from 50 to 241,310 Korean Won (\$.05 to \$210), with the mean amount at 10,376 Won (\$9). We defined high and low spenders in this user sample by sorting the users by the amount they spent during the sampled period and then drawing a boundary that equates the aggregate sum of money spent between the high and low spenders; in other words, 89.7% (low spenders) cumulatively spent as much as the other 10.3% (high spenders).

	Low spenders (N=1162)	High spenders (N=133)	Mean Difference (p-value)
Avatar	28.6%	48.4%	-0.20 (.000)
Space	22.8%	44.8%	-0.22 (.000)
Play	48.6%	6.8%	0.42 (.000)
	100%	100%	

Table 1. Comparing high and low spenders

We tested how item-buying patterns differ according to class. We calculated the percent of money spent on each category of items then tested how significant the difference was between the two classes. As shown in Table 1, low spenders used real money on items in the order of “play”, “avatar” and “space” with 50% of their money being spent on play-oriented items. In contrast, the upper class users preferred to spend on avatar-oriented and space-oriented items. In the avatar subcategories, significant difference is observed in beauty and apparel items, and in the space-oriented item subcategories, group difference is evident on all categories, especially land and house. Here, a buying pattern similar to Engel’s law was observed in that as the ratio of money spent on the necessities such as “rearing” item increased, the level of spending dropped.

4. CONCLUSION

Based on log data of a popular 3D social game service, we investigated what type of virtual items are sold, and how the item-purchase behavior patterns differ according to the level of spending. We categorized the virtual items in social games into three categories: (1) avatar-oriented, (2) space-oriented and (3) play-oriented. We also found that the high spenders mostly buy avatar-oriented and space-oriented items using “coins” bought with real money, while low spenders mostly buy play-oriented items with hard-earned “beans”. This dual currency may serve the purposes of bringing in revenue and creating incentive to engage in play.

This study is based on log data of a social game service, which makes it more accurate than self-reporting surveys in terms of measuring user behavior. However, this methodology has limitations in that we do not know why the players are engaging in such behavior. The service is operated in Korea where broadband penetration rate is high, youth have high Internet usage, and various micro-payment methods are a popular practice, which should be taken into consideration when generalizing results. Also, the data set used in this study is cross-sectional, so future research should take a longitudinal approach and track the patterns of buying behavior across time.

As selling virtual items become a major revenue source for social network and social game service operators, this study helps operators understand users’ virtual item purchasing behavior. What with the growing popularity of youth-targeted social games and micropayment systems, this study may be useful for designers of such services as well as researchers studying the nature of user behavior.

5. ACKNOWLEDGMENTS

Thanks to Puppy Red founder Youngsu Lee for access to server-level data

6. REFERENCES

- [1] Castronova, E. et al. As real as real? Macroeconomic behavior in a large-scale virtual world. 2009. *New Media & Society* 11, 5, 685-707.
- [2] Guo, Y. and Barnes, S. Why people buy virtual items in virtual worlds with real money. 2007. *The DATA BASE of Advances in Information Systems* 38, 69-76.
- [3] Lehdonvirta, V. Virtual item sales as a revenue model: Identifying attributes that drive purchase decisions. 2009. *Electronic Commerce Research* 9, 97-113.
- [4] Lehdonvirta, V., Wilska, T., and Johnson, M. 2009. Virtual Consumerism: Case Habbo Hotel. *Information, Communication & Society* 12, 7, 1059-1079.
- [5] Smith, J. and Hudson, C. 2010. Inside Virtual Goods: The US Virtual Goods Market 2010-2011. Industry Report.
- [6] Wohn, D., Lee, Y., Sung, J., and Bjornrud, T. Building common ground and reciprocity in social network games. 2010. In *Proceedings of the 28th International Conference on Human Factors in Computing Systems (Atlanta, GA, April 10-15, 2010)*. CHI EA '10, ACM, New York, NY, 4423-28. DOI= [10.1145/1753846.1754164](https://doi.org/10.1145/1753846.1754164)