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Fiona Fui-hoon NAH

Singapore Management University, fionanah@smu.edu.sg

Lakshmi Sushma DAGGUBATI

Amith TARIGONDA

Raghu Vinay NUVVULA

Ofir TUREL

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Citation

NAH, Fiona Fui-hoon; DAGGUBATI, Lakshmi Sushma; TARIGONDA, Amith; NUVVULA, Raghu Vinay; and TUREL, Ofir. Effects of the use of points, leaderboards and badges on in-game purchases of virtual goods. (2015). *Proceedings of the 17th International Conference on Human-Computer Interaction, Los Angeles, USA, 2015 August 2-7*. 9191, 525-531.

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Effects of the Use of Points, Leaderboards and Badges on In-Game Purchases of Virtual Goods

Fiona Fui-Hoon Nah¹(✉), Lakshmi Sushma Daggubati¹,
Amith Tarigonda¹, Raghu Vinay Nuvvula¹, and Ofir Turel²

¹ Department of Business and Information Technology,
Missouri University of Science and Technology, Rolla, MO, USA
{nahf, ldz98, atvdb, nrgy5}@mst.edu

² College of Business and Economics, California State University,
Fullerton, CA, USA
oturel@fullerton.edu

Abstract. Game design elements are major factors in gamification. In this study, we seek to examine the impact of game design elements on users' in-game purchases of virtual goods. The purchase of virtual goods due to players' intrinsic motivation has been studied but little is known about the purchase of virtual goods due to the use of game design elements (i.e., Points, Leaderboards and Badges) built into the games. Extending our knowledge to this realm can help researchers to better understand gamers' behaviors, and game designers and marketers to better promote and sell virtual goods in online games.

Keywords: Virtual goods · Gamification · Points · Leaderboards · Badges · Game design elements

1 Introduction

The purchase of virtual goods is progressively turning into a typical peculiarity of online games and virtual worlds [1–4]. Global revenue on the sale of virtual goods has been rapidly growing; assessments provided by business reports indicate an estimation of virtual goods revenues of \$14.8 billion in 2012 and an expected increase at a yearly rate of 12.5 % [5]. Even though a large percentage of users will never spend money in a game, the amount of spending from users who spend money is sizeable and significant [6]. The primary objective of the free-to-play or “freemium” model is to get more players into the game and provide desirable items or features that players can purchase. This revenue model, if successfully implemented, tends to increase profits from micro-transactions and can outweigh the profits from a one-time game purchase. Understanding the game elements that may lead to purchases of virtual goods is crucial because game developers have progressively become dependent on the sales of virtual products as their principle source of income [5].

Although past studies have explored motivations for the purchase of virtual goods [7–9], we have not come across a research study that has evaluated the impacts of

specific game design elements on in-game purchases. Since Points, Leaderboards and Badges (PLBs) are rigorously deployed as game design elements in gamification, we are interested in studying their effects in the context of in-game purchases of virtual goods.

2 Research Objective

The following research question (RQ) is therefore proposed:

RQ: Does the use of PLBs have an impact on in-game purchases of virtual items?
We will examine the above question in this research.

3 Points, Leaderboards and Badges (PLBs) in Online Games

In this research, we focus on studying the effects of the following game design elements:

Points. Points are numerical values which denote a measure of the ability of a player or the expendable resources still available in the game. Players are motivated when they are progressively being rewarded for their performance in a game [10].

Leaderboards. The leaderboard is a game element that displays the performance of individual players in comparison to other players. It lists the players in the order of the points they have achieved in the game and offers a form of metrics that players may strive to accomplish by showing their scores relative to what others have accomplished [11]. It can be motivating to players as they are able to compare their scores with others.

Badges. Trophies or badges are indications of virtual achievements awarded to players for accomplishing certain tasks. At the time when achievements were included as gaming elements in Xbox Live Platform [12], there was a vast scale usage of badges in online games. Since then, badges have been broadly implemented on other gaming platforms and have demonstrated a high degree of success, resulting in higher sales revenue and higher scores in reviews [13].

4 Literature Review

We reviewed the existing literature on the role of points, leaderboards and badges in games. PLBs are three of the most fundamental game design elements [14, 15]. Players who are short of points may purchase virtual items which enable them to do better or to survive in a game. Leaderboards can motivate players by providing a comparison of their scores with others. Badges are indications of achievements in a game.

Zagal et al. [14] classify PLBs as goal metrics, as all of them are utilized to track and give feedback on player accomplishments in games. Farzan et al. [15] examined the capability of a point-based reward system (i.e., “status” levels and a leaderboard) to

enhance user activities on a social networking site. Although user activity was enhanced initially through the use of these features, it deteriorated back to the starting position, and after removing these game elements, the user activity dropped below what it used to be before introducing these rewards. A few users also indicated that the leaderboard has helped them to work harder toward keeping up with other users. Hence, the reward system has provided motivation to the users to keep up with the games, as after the removal of the reward system, they became less motivated and involved. While PLBs may also affect users' intrinsic motivation, we did not find any empirical studies that support this claim [16].

Virtual item purchases in online games are an emerging phenomenon that offers a unique business environment, where thousands of game users interact with one another, and they buy and sell virtual items in virtual worlds [7]. Although virtual items have no intrinsic value like physical items, virtual items satisfy users' intrinsic needs such as prestige, status, ego, uniqueness, and self-expression. Online users have the tendency or inclination to own virtual properties and rights, and can buy and sell properties [17, 18]. People not only value recognition, commendation and honor but they also command respect, show off their achievements as well as seek importance, social prestige, reputation and/or high office [19]. Hence, offering these features and opportunities in online games can satisfy users' needs in online gaming. The reward of being part of a gaming community and being recognized as a reputed name within the community is the most noticeable variation for players apart from the collaborative nature that helps in attaining shared experience [20].

The virtual world environment has generated a flood of creative virtual goods and properties which stimulated the exponential growth of virtual consumption [17]. Players are motivated to collect these virtual goods and utilize them at higher or more difficult levels when they strive harder to beat or accomplish a specific task. In a game-oriented virtual platform, virtual products are mainly used for increasing the offensive or defensive power of a character or to meet the requirements of quests. One study has demonstrated that users were extensively motivated towards multi-player online role-playing games (MORPG) because of the unique game playing experience, as well as the opportunity to earn rewards and collaborate with other players in the virtual world [20]. Reinforcement theory [21] and goal setting theory [22, 23], in similar lines, argue that positive feedback increases the likelihood of repeating a specific behavior. When reinforcement theory and goal setting theory are applied to online gaming, they suggest that positive feedback from the game and other gamers motivate users to stay engaged in the game and perform well in the game.

Game mechanics are constructs of rules or approaches intended for interaction with the game state by providing specific paths where players interact with the game. Game mechanics help users by encouraging them to explore the space available through feedback mechanisms [11]. Games are generally designed by applying game mechanics to attract users and engage them. Game mechanics can entice users to play continuously and make the game so engaging or addictive that they buy virtual goods [11, 24, 25].

Game experience and purchase of virtual items are highly dependent on the interactivity level generated by the gamers [26]. The level of interaction in a game can be enhanced by PLBs which allow players to compare their accomplishments against

others. Oh and Ryu examined how game mechanics can be used to create and sustain the demand for virtual goods [27]. Hamari and Lehdonvirta [28] identified several mechanics that drive the desirability of virtual goods and examined how different types of game mechanics based on segmentation of players can generate repeated purchases or create settings for additional virtual goods. In this research, our focus is on assessing the impact of PLBs on virtual item purchases in online games.

5 Theoretical Foundation and Hypotheses

As mentioned earlier, reinforcement theory and goal setting theory can be used to explain the effects of PLBs on players' online gaming behavior. According to reinforcement theory [21], positive feedback or reinforcement invites a behavior to be repeated by the user. Hence, as players receive more points and badges in a game, they want to continue to perform well and advance in the game. Leaderboards, on the other hand, show the performance of players in a game. By comparing one's score with those of the leaders in the game, one begins to set a goal, which is typically a high achievement goal in line with the scores of the leaders in the game. Goal setting theory [22, 23] suggests that setting a high achievement goal causes one to strive for high performance in a game.

Points. Reinforcement theory [21] suggests that the use of points in online games serves as a form of positive feedback that reinforces one's game playing behavior. Feedback enables players to be aware of their progression or relapse, and makes it easier for players to assess the amount of effort needed to achieve the goal [29]. Points serve as a feedback mechanism in games by enabling players to maintain their commitment toward a goal. Goal setting theory [22, 23] suggests that the use of points can motivate a player to achieve a high goal in a game. In order to attain higher scores in a game to satisfy one's goal, players can purchase virtual items to increase their gameplay. Based on reinforcement theory, the use of points increases players' motivation to continue playing the game and increases their motivation to spend money on virtual items to progress faster in the game. Owning virtual goods allows players to enhance their points which help them to level up in the game in order to increase their progression in the game and achieve the goal they have set for themselves. Thus, we propose the following hypothesis:

H1: The use of the point system increases in-game purchases of virtual goods.

Leaderboards. Leaderboards offer various metrics for comparisons among players including other players' scores, leaderboard positions, and the number of levels that one has progressed relative to others. Hence, leaderboards can incentivize a player to set a higher goal in the game through comparing one's score with those of the leaders in the game. According to goal setting theory [22, 23], the use of leaderboards encourages a player to set higher goals in a game, which further increases their intention to perform well in the game. Players who want to be listed at the top of a leaderboard may purchase virtual items to improve their gameplay. Hence, players are motivated to

make virtual item purchases to further strengthen their positions in the game. Thus, we propose the following hypothesis:

H2: The use of the leaderboard system increases in-game purchases of virtual goods.

Badges. Badges are offered to players as a means to showcase their accomplishments and achievements in a game. By offering badges to players for showcasing, it provides them the opportunity to set high goals for themselves in the game, such as to attain more badges or higher level badges. Goal setting theory [22, 23] suggests that when players set higher goals for themselves, they are willing to invest in the game, which can include purchasing virtual items to achieve their goal. One of the methods in which badges are regularly utilized is to encourage participation by distinguishing the players. Badges also serve a developmental purpose by offering consistent feedback and in keeping track of accomplishments. Badges increase recognition and reputation and hence, offer incentives for players to purchase virtual items to help them achieve their goal. Thus, we propose the following hypothesis:

H3: The use of the badge system increases in-game purchases of virtual goods.

Figure 1 shows the research model.

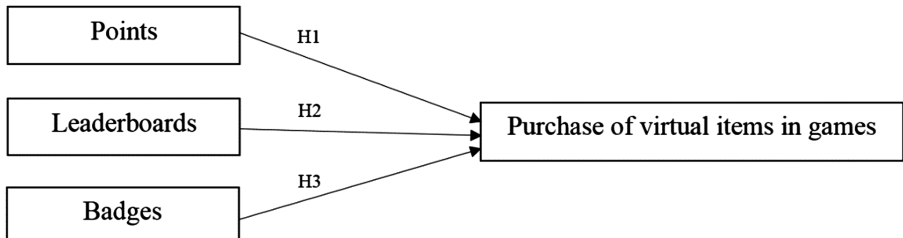


Fig. 1. Research model

6 Research Methodology

We plan to carry out both an experimental study and a questionnaire survey study to test our research model. For the experimental study, we will use a between-subject $2 \times 2 \times 2$ factorial design to assess H1, H2 and H3. Hence, the experiment will have 2 levels for points (i.e., with and without the point system), 2 levels for leaderboards (i.e., with and without the leaderboard system), and 2 levels for badges (i.e., with and without the badge system). The experiment will be conducted in a laboratory setting. The questionnaire survey study will be administered to gamers over the Internet where we will survey their purchase behaviors in online games and whether PLBs influence their purchase of virtual items in the games.

7 Expected Contributions and Conclusions

Our research examines the effects of the use of game design elements – Points, Leaderboards and Badges (PLBs) – on users’ in-game virtual item purchase behaviors. Drawing on reinforcement theory and goal setting theory, we hypothesize that PLBs will lead to users’ purchases of virtual items in online games. The proposed studies will provide insights on specific game design elements that draw users into a game and entice users to purchase virtual goods. In other words, we are interested in assessing if PLBs increase users’ in-game purchasing behavior of virtual goods.

In summary, the results of our studies will offer game designers a better understanding of the relevance and importance of game design elements in enhancing revenues through user in-game purchases of virtual goods, or more specifically, the efficacy of PLBs in doing so. Further studies will also be carried out to understand the motivations underlying users’ in-game purchasing behavior with and without the presence of game design elements.

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