Leveraging Play to Promote Sustained Health Behavior Change

Shree Durga, Magy Seif El-Nasr, Mariya Shiyko, Carmen Sceppa, Pamela Naab, Northeastern University
sh.subramanian@neu.edu, m.seifel-nasr@neu.edu, M.Shiyko@neu.edu, C.Sceppa@neu.edu, naab.p@husky.neu.edu

Abstract: Long-term health outcomes, such as obesity and diabetes are particularly challenging to manage because they require regimented behavioral changes impacting day-to-day living for a sustained amount of time. While short-term interventions remain unsustainable for the most part, games and ubiquitous health-based technologies can play a crucial role in incentivizing healthy eating and exercise behaviors in day-to-day routine and potentially motivate players to adopt some of these small behavior changes in their lives. In this poster, we present the core design and play mechanics of a health-based social media and game environment that is designed to encourage healthy eating and exercise behaviors in players.

Games and Health: Opportunities and Challenges

Rising trends in obesity and obesity-related health risks have persisted for over two decades, in the US, and over 50% of adult population do not meet even the rudimentary federal recommendations for aerobic activity or muscle strengthening (CDC, 2011). Moreover, increasing evidence from research in health and behavioral sciences suggests that longitudinal health outcomes, like obesity result from persistent unhealthy dietary choices and sedentary living, and thus, ought be managed through sustainable modifications to everyday eating and exercising behaviors (Hung, et.al., 2007;). However, longitudinal health behavior change, particularly related to chronic ailments, such as obesity, is a complex process, often affected by individuals' motivation to change, impact of constant external feedback and monitoring systems that can help individuals to track long-term goals (Consolvo, et.al., 2009). Considering the reach and popularity of health-based ubiquitous technologies — a recent Pew's survey reports that the number of people using smartphones to manage or track personal health went up up from 9% in 2010 to 29% in 2011 (Smith, 2011) — games can be compelling motivators to incentivize health behavior change. In this short paper, we briefly describe the core design mechanics of the game *Spa Play™*— a game designed to motivate players to adopt healthy eating and exercising behaviors. The game was developed using motivational strategies based upon *gamification* techniques, such as reward systems, player autonomy to set and monitor goals, sensor-tracking and prompting (Paramythis, et.al., 2010; Consolvo, et.al., 2009;). Findings from early pilot of the game indicate that the motivational tactics in the current iteration of the game work well, but also allude to some shortcomings that are to be modified to improve players' adherence (Durga, et.al., 2013). We will overview some of these preliminary findings about player acceptance of the game and chart out future directions for our work. We seek to test and validate the use of these techniques as motivational tactics, specifically to measure player adherence and retention.

Spa Play™: The Game and Core Design Principles

Spa Play™ (Figure -1) is an online health-based social media and game platform, in which players maintain a virtual island and a health spa. In order to maintain and increase spa rating, players need to do certain island-related routine activities (e.g., cleaning the running tracks, harvesting fruits from trees, unlocking the facilities, etc.). In addition, players accrue points to unlock game content by doing real-life activities related to exercise and healthy eating required by *sparks* and *quests* in the game. *Sparks* can be thought of as real-time actions in a game that entail doing short-burst gaming activities some that are related to exercise, eating and drinking, while some that are in the game world, such as solving a word puzzle. The design intent was to encourage players to develop fondness towards some of the play mechanics, in short bursts, while adding playfulness to ordinary or day-to-day physical activities, such as *walking till the next bus stop* or *taking an extra flight of stairs*. *Quests*, on the other hand, are a thematic grouping of several tasks that typically take somewhere from a few days to a week to be completed. Example quests include, beginner training for biking, or planning a healthy meal outside with your friend. Quests take longer than sparks to complete, while they also reward more experience points. Players can track progress of their quests. In short, both sparks and quests are recurrent, repetitive activities that reward players with experience points to unlock new content for the island improving the aesthetics of the resort and its rating. Upon logging in to the game, the game shows interesting statistics relevant to player activity and progress in the game, such as showing how many sparks and quests they did the past week, each day, done recently, and so on so forth. The game is designed to motivate players to track what they did in the game (Consolvo, et.al., 2009;), while creating an appealing and persistent space (the island) for players to spend time in, maintain it and improve its aesthetics and rating.
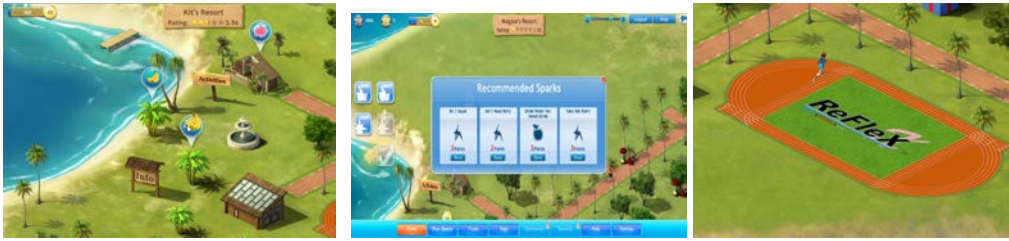
Figure 1: From left-to-right—virtual island in the game, *sparks* and player avatar motion in response to real-life pedometer activity

In February of 2013, an early pilot of Spa Play was conducted with 18 participants. In terms of design and game mechanics, our findings indicate that players were able to relate to most of the sparks and quests in the game. 18 participants completed a total of 505 quests during the 45-day length of the study. Of those quests, 19.8% were food-related, 40% were physical activity-related, and 40.19% were game-related (e.g. "harvest bananas", "clean up the island"). Similarly, of the 3,697 completed sparks, 43.68% were food-related and 56.3% were physical activity-related. From the design perspective, we found that recurrent activities related to the aesthetics of the island or the spa (e.g., keeping the resort clean, harvesting bananas, visiting the yoga studio, finding and visiting the community lounge) were successful motivators, and players felt compelled to login to the game on a regular basis to maintain the resort rating.

Conclusions and Implications for Future Work

Through our design process and early pilot of the game we identified several important themes that needed further development. One of the salient observations from the pilot was that after a couple of weeks into the game, players tended to settle on and repeat regularly a limited set of quests and spark activities (Durga et al., 2013). As such, the current version of the game had limited impact on how much it could push players to go beyond a certain set of *sparks* and *quests*. It does become apparent that in design of games that attempt to incentivize recurrent health behaviors, player adherence is affected by how well the content of the game blends with the daily fabric of participants' lives (Durga, et.al., 2013). For our next iteration, thus, we seek to incorporate and empirically validate adaptive messaging to populate profile-based game content. In broader terms, the ongoing work carries a significant potential to develop a portable, inexpensive and effective tool for addressing chronic weight gain and to impact the field of "games for health" by developing a new set of methodological tools for assessing real-time effectiveness of games and gamification techniques.

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