
Applying Game Design to Everyday Fitness Applications

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Abstract

Significant interest surrounds how technology can help encourage physical activity and healthier living. There have been several successful examples of games based on focused physical interaction, but applications that integrate into everyday life have had relatively mixed results. One potential solution is to apply proven game design patterns to the design of everyday fitness applications. We discuss our initial efforts in this space, presenting examples of game-inspired designs for the Nike+ iPod platform.

Keywords

Game design, everyday fitness, Nike+ iPod

Introduction

Although the obesity crisis faced by the United States and other developed countries is a complex issue with no single cause, the medical community agrees that physical activity and fitness are essential to addressing this epidemic. Digital games based on focused physical interaction have had several successes in converting the typically sedentary activity of video game play into a physically demanding activity, with Konami's Dance Dance Revolution being the most popular example. Several groups within the human-computer interaction community have explored applications that encourage increased levels of physical activity throughout the day, with pedometers providing appropriate sensing [1, 2].

Figure 1. An actual 100 mile challenge within the Nike+ system. While this design incorporates a person's existing social support structure, the challenge provides little motivation for the 4th place player, as the 1st place player's lead is insurmountable.



The recently-released Nike+ iPod platform combines pedometer functionality with an online challenge

system that allows groups of friends to compete in running contests. For example, Figure 1 shows a challenge between four friends to run 100 miles. An important positive in this design is that it incorporates a person's existing social support structure and so a group of friends can use challenges as motivation.



Figure 2. Three suggested runs in our proposed online matching system. Note the Heavy run is difficult for both people, as a 5-mile run is longer than the runs that either person has been making. By agreeing to this run, the players commit to each other, as they will only receive their points if they both complete the run.

Although the Nike+ challenge system and other applications in this space intend to use fun to encourage physical activity, the applications are not well developed as *games*. In the example of Figure 1, the 4th place player has little reason to be motivated by this challenge, as the current lead of the 1st place player is insurmountable. Like other applications in this space, the Nike+ challenge system is a simple fill-in-the-bar game that can provide a basis for social motivation. But there are many people for whom this does not provide a compelling experience, including people who do not already have friends that run and groups of friends with varying abilities.

In contrast to the fill-in-the-bar approach, consider the massive success enjoyed by such online games as World of Warcraft. The design of these games creates a compelling social experience that persists across sessions. Informed by analyses of the designs of these games and by Salen and Zimmerman's discussion of game design principles [3], we are exploring how the successful structuring of online games can inform the design of applications to encourage everyday fitness.

Design Examples and Discussion

Figures 2 and 3 present mock-ups of a game design informed by our analyses. Our proposed system supports both existing buddies, like the existing Nike+ iPod challenge system, but also matching with members of the community that are otherwise unknown to a runner. At a very high level, our design is based on two aspects of successful games.

First, successful online games are generally based around mini-games or other in-game subtasks. While these often occur within a larger context, the use of mini-games, subtasks, or quests is important because they provide quantifiable outcomes for periods of play. At the end of a play session (in our case, a run), a person has won, lost, or accrued quantifiable progress (such as points). Salen and Zimmerman note that this quantifiable outcome at the end of a session is fundamental to the very definition of a game [3].

Second, successful games (both online and not) put players on approximately equal initial footing. In board and card games, starting positions are approximately equal. In many online games, the notion of a level is used to match players of similar ability.

Taken together, these principles help to keep a game fresh and motivating by avoiding the scenario illustrated in Figure 1. Matching runners of similar ability helps to ensure people can win, while defining play sessions around each run ensures that runners are always starting in a position to succeed (versus being in a poor starting position due to previous failures).

Figure 2 illustrates the presentation of several potential runs to a player. In this scenario, the player is



Figure 3. Our proposed group versus system will allow groups of players to compete against other groups. In this case, a player is looking to join a contest to see which team can be the first to run a given total distance.

committing to a run on the following day, and the system is presenting opportunities to pair their run with other players. We note that this does not mean that the players need to run together, simply that they will both run the agreed upon distance during the following day. Runs of differing lengths are presented to allow the player to make a choice about what goals they want to set. Because the player is examining co-operative runs, both players need to complete the run in order for either to receive credit. This is intended to create an implicit contract and obligation between players, motivating them to follow through on the run. We also note that the notion of Heavy difficulty used here is not one where a player is paired with somebody who typically runs more than them. Rather, both players are both committing to running more than they normally do. We believe this notion of difficulty will be more appropriate for players seeking a cooperative structure.

Figure 3 illustrates a player's selection of a contest within our proposed group versus system. This approach is motivated by clan systems that allow players of persistent online games to team up and compete against other groups of players. Such designs provide both cooperative and competitive structure within a game, allowing many different approaches to play. While our illustration in Figure 3 shows a player looking to join an existing team, it is also the case that a group of friends could create a team that persists across many runs, competing against different teams over time. As discussed in the previous paragraph, this does not necessarily mean that all of the players need to be in the same physical location. For example, couples in long-distance relationships might find such group challenges to be an enjoyable approach to encouraging each other to run.

Conclusion

While we have focused on running and the Nike+ iPod platform in this initial discussion, we also believe that the ideas and approaches raised here are applicable to a variety of motivation-based problems. For example, one could imagine a healthy-eating application analogous to the designs discussed here. Such an application might use manually-entered online food diaries and could allow matched food buddies to agree that they will both have a salad for lunch today. By creating a fun environment in which players can set attainable subgoals in pursuit of larger goals like "being healthy," the application of lessons from successful game design offers to significantly improve everyday fitness applications.

We are continuing our exploration of the design possibilities surrounding games in everyday fitness applications, and we will soon begin implementing games based on the Nike+ iPod platform. We look forward to participating in this workshop and discussing our ideas with other researchers and designers.

References

- [1] Consolvo, S., Everitt, K., Smith, I., and Landay, J.A. (2006). Design Requirements for Technologies that Encourage Physical Activity. *Proceedings of the ACM Conference on Human Factors in Computing System (CHI 2006)*, pp. 457-466.
- [2] Lin, J., Mamykina, L., Lindtner, S., Delajous, G., and Strub, H. (2006). Fish'n'Steps: Encouraging Physical Activity with an Interactive Computer Game. *Proceedings of the International Conference on Ubiquitous Computing (UbiComp 2006)*, pp. 261-278.
- [3] Salen, K. and Zimmerman, E. (2003). *Rules of Play: Game Design Fundamentals*. MIT Press.