Slayers vs Slackers: An Examination of Users' Competitive Differences in Gamified IT Platforms Based on Hedonic Motivation System Model

Mohsen M. Jozani[1], Michele Maasberg[2(✉)], and Emmanuel Ayaburi[3]

[1] The University of Texas at San Antonio, San Antonio, TX 78249, USA
mohsen.jozani@utsa.edu
[2] Louisiana Tech University, Ruston, LA 71272, USA
maasberg@latech.edu
[3] The University of Texas at Rio Grande Valley, Edinburg, TX 78539, USA
emmanuel.ayaburi@utrgv.edu

Abstract. Competitive fitness environment platforms and technology rely on reward-based gamification, which can be traced back to customer loyalty programs started by the airline and hotel industry in the 1980's. These reward systems use basic game elements of Badges, Levels/Leaderboards, Achievements, and Points (BLAP) to invoke intrinsic motivation. Reward-based gamifications are easy to implement and the application of such systems has been proven to be successful in adaptive learning of certain types of skills or encouraging the completion of routine tasks. However, implementing reward-based game elements without designing a meaningful experience tailored to the individuals' characteristics or learning needs could lead to user boredom or disengagement over the long run. This research extends Hedonic Motivation System Model (HMSAM), which is specific system acceptance model based on cognitive absorption in a competitive fitness context, by examining the effect of users' competitive and engagement characteristics. We propose that considering individual competitive differences as well as providing a meaningful immersive experience can enhance IS platform design and have practical results regarding enhancement of competitive fitness technology design in support of improved individual user performance and safety.

Keywords: Gamification · Self-Determination Theory · Hedonic-Motivation System Model

1 Introduction

Over the past few years, the concept of gamification has received increasing attention both from industry and academia and has become a trend in information systems (IS) [1, 2]. In industry, the American information technology (IT) research and advisory firm Gartner added gamification to their Technology Hype Cycle in 2011 [3]. In addition, emerging startup firms specifically providing gamification services (Bunchball, Badgeville), augmented reality and mixed reality (Pokémon Go) have given way

to new possibilities. Gamification has affected the fitness industry as it is purported to increase participation and engagement where traditional gym membership drops off after a year by 45% [4]. Examples of gamification in the fitness industry are through applications used by wearable devices (e.g. Fitbit, Nike+) as well as platforms such as Wodify [4] and Zen Planner [5] used by competitive fitness organizations like CrossFit [6]. Competitive fitness platforms interestingly appeal to certain types of personalities who cite the gamification as evidence of their interest [7].

The purpose of the research is to understand how the gamified platform affects enjoyment and continued use for different types of user personalities, particularly whether the users are competitive or not. This research proposes a model based on Self-Determination Theory that addresses the relatedness of the competitive fitness atmosphere coupled with the hedonic elements to examine what personalities will potentially enjoy and continue to use the platform more considering current gamified elements and answer the following research questions:

RQ1: Are current IS platforms in the competitive fitness industry likely to have continued use in their current gamified form?
RQ2: How do different player personalities affect the continued use of the platform based on the current gamification?

The rise of collaborative competitive fitness environments with the associated technology platforms opens an interesting area of research to examine the gamified elements and find out how they impact the current users and if there is room for enhancement. The rest of the paper is organized as follows. First, we position our discussion of gamification and Self-Determination Theory as it relates to meaningful gamification. Next, we discuss the Hedonic-Motivation System Adoption Model. Then, we present a theoretical model supporting three propositions. Finally, we conclude with future research and concluding comments.

2 Theoretical Background and Proposition Development

2.1 Gamification and Reward Based Games

Gamification can be defined by the process of using game design elements in non-game contexts to make them more game-like [1, 8]. Gamification scholars differentiate the *game* from *gamification*, arguing that games create fantasy worlds disconnect from reality, while gamification is based on real-world and the game layer is built on actual concepts [9]. Although what is now known as reward-based gamification can be traced back to customer loyalty programs started by the airline and hotel industry in the 1980s [1], the term was coined by Nick Pelling in 2002 and gained prominence in late 2010 [9].

Within the domain of IS, gamification falls under Human-Computer Interaction stream of research and its early antecedents could be found in the work of Webster and Martocchio [10] where they provided evidence of construct validity for a measure of microcomputer playfulness, reflecting the degree of cognitive spontaneity in computer interactions. Gamification has been widely used in marketing (Coca-Cola's Shake It), education (Khan Academy, StackOverflow), insurance (Mindbloom), Enterprise

Information Systems (Enterprise platforms such as SAP HANA, Badgeville, Gamef-fective, Bunchball and Mumbo), crowdsourcing platforms (ESP game, Eterna), finance (mint.com), and fitness industries (Fitbit, Nike + , Health Month), the focus of this study (competitive fitness) [11].

Early designs of gamification systems were focused on (intangible) rewards. These reward systems sought to invoke extrinsic motivation and were presented in the form of Badges, Levels/Leaderboards, Achievements, and Points; hence the acronym BLAP gamification [3]. The application of BLAP systems has proven to be successful in numerous industries [12, 13] and is particularly appropriate in the following: (1) sud-den and short-term attraction (e.g. marketing campaigns); (2) educating useful real-life skills (learning the alphabet); and (3) where a chore has to be done and invoking intrinsic motivation in the participants is difficult (e.g., answering phone calls).

Based on Hyperbolic Discounting Theory, people prefer smaller short-term rewards to larger long-term ones (e.g. overeating vs going on diet, watching TV instead of doing homework, etc.). Reward-based gamification provides short term incentives and therefore has been shown to be effective in health and fitness domain where acquiring the actual rewards of exercising is a long-term process. fitness trackers and the related applications can be viewed as an attempt to break down long-term rewards into daily ones by incorporating game mechanics [14].

Reward based gamification, conceptually different from serious games (i.e., video games that belong to the family of virtual simulators [15] and Games With a Purpose (GWAP), also known as human-based computation games [16], which are easy to implement in competitive fitness environments. However, there are concerns about using them. Behavior in such systems becomes extrinsic reward dependent and studies suggest that where there is intrinsic motivation to do a certain task, introducing rewards could undermine the intrinsic motivation [3, 17]. Other studies have found that reward-based game elements that fail to deliver a meaningful experience can lead to user annoyance and users might not perceive the task as serious or important [18, 19]. Therefore, addressing reward based gamification deficiencies on competitive fitness platforms is important to ensure that users continue to enjoy the experience and con-tinue to use the platform for business viability.

2.2   Meaningful Gamification and Self-Determination Theory

To address the problems of reward-based systems and harness intrinsic motivation, the concept of meaningful gamification is introduced [20]. The concept of meaningful gamification integrates user-centered game elements into non-game contexts [20]. This concept draws on Self-Determination Theory (SDT), an incorporation that puts the user at the center of the gamification effort.

Self-Determination Theory (SDT) explains human motivations and revolves around three major needs for autonomy, competence, and relatedness [21]. According to SDT, meeting these needs contributes significantly to the feeling of enjoyment and satis-faction regardless of content, complexity or genre of the activity [22].

Meaningful gamification includes following the elements play, exposition, choice, information, reflection, and engagement [20]. Engagement is derived from relatedness in SDT and refers to the state introduced by the peer group of participants and

contributes to positive well-being on the same gamified experience. The gamified experience is manifested through game mechanics, or the design elements used to create the game mechanics (setup, rules, and progression) [23–25] as well as game dynamics, which refer to user's interaction and behavior with the system (e.g. competition, cooperation, cheating) and therefore they depend on user's personality as well as the context where gamification is implemented [24, 25].

With engagement/relatedness, the player has the opportunity to socialize and connect with and each stage of the process, task difficulty is designed to match user skill level. Too easy or too difficult tasks lead to boredom and anxiety respectively. Therefore, tasks should be challenging enough to fully utilize user skills and put the player in the state of flow where they the mere activity of problem solving regardless of other factors [3, 26].

Design and use of gamified IS systems were studied from a motivational perspective by Zhang [27]. Motivational affordances are described as properties in a system that support and satisfy psychological, cognitive, social and emotional needs and therefore the design of IS can and must support these needs [27]. Though ten IS design principles based primarily on SDT and Flow Theory have been advanced, IS designs are context specific and not all ten principles are appropriate for every system [27]. The principles that address user's needs for autonomy, competence and relatedness from are SDT are discussed in the literature and recent studies suggest that utilizing these design principles can lead to continuous engagement [29] and enhanced user performance [30].

The design principles associated with relatedness closely match the IS platform environment encountered in competitive fitness environments such as Wodify [4] and Zen Planner [5] with the objective of addressing social needs of the users by creating a special community in which the users can interact with others and enable them to represent their social bonds. Competitive fitness platforms implement these design principles through leaderboards, badges, direct messaging, and other social features [31]. Based on SDT predicting a response motivation extended to information, communication, technology (ICT) environment where when using ICT satisfies motivational needs (specifically, motivational affordance of relatedness), enjoyment is expected to ensue, we propose that:

P1: The presence of design factors that support users' need for perceived relatedness in an online competitive fitness environment influences the enjoyment of the platform.

2.3 Meaningful Gamification and the Hedonic-Motivation System Adoption Model

The Hedonic-Motivation-System Adoption Model (HSMAM) developed by Lowry et al. [32] explains the role of intrinsic motivation in IS and the adoption of Hedonic-Motivation Systems (HMS). Use of HSMAM interfaces with meaningful gamification with the harness of intrinsic motivation. In the theory development of HSMAM, heightened enjoyment is a predictor of intention to use derived from Flow Theory although second order factor cognitive absorption was empirically shown to

predict the behavioral intention. Heightened enjoyment is used based on its element of motivation and allows interface with SDT motivation and its extension to IS gamified platforms [27]. The behavioral intention to use is extended to the behavioral intention to continue to use [33]. A relationship between enjoyment and continued use is also supported by empirical evidence from Hamari and Koivisto [32] study showing that the hedonic factor of enjoyment positively influenced the continued use of gamification services. Therefore, we propose that:

> P2: The presence of design factors that support users' enjoyment in an online competitive fitness environment influences the intention to continue to use the platform.

2.4   Meaningful Gamification and Player Personality

Gamification researchers have called for research into the effects of personality differences and player types on behaviors related to gamification [34–36]. With the knowledge that different game mechanics invoke different human desires, and that game dynamics are potentially affected by personality and context, we examine the different personality types of players on gamified platforms in competitive fitness.

By examining individual characteristics and mapping them on Self Determination Theory, recent gamification studies have identified several player types [36, 37]. [36] introduced the Hexad Model proposing six user types of Philanthropists, Socializers, Free Spirits, Achievers, Players and Disruptors. Based on an earlier research by Bartle [9], Robson [37] defined four types of player personalities and advised gamification designers to take into account these differences. The player types are categorized as Strivers, Slayers, Scholars, and Socialites, and are based on individual orientation and competitiveness. Striver is a competitive personality that engages in personal development, and for whom personal best is important. Slayer or achiever is a competitive personality and relative standing, or winning, is important. Socialite or Socializer plays to interact with others, network and create social connections. Scholars are non-competitive and have a desire to learn about the game. Figure 1 shows the player personalities on the individual orientation and competitiveness continuums.

Considering the two typologies we propose that only the three player types of Slayer, Striver and Socialite are relevant in the context of competitive fitness environments.

Based on Mekler et al. [2] call for further research into individual factors such as competitiveness among users and suggesting that they may potentially be moderating factors on motivation and behavior on gamified applications, we propose that the competitive and non-competitive nature of the player personalities should moderate the relationship between relatedness the motivational factor of enjoyment, particularly as socialites have been theorized to be motivated by relatedness [36]. Moderating effects found by Song et al. [38] suggesting that competitive context provided positive exergame experience to competitive individuals also suggests that the competitive and non-competitive nature of the personality types might have moderating effects. Thus, we propose:
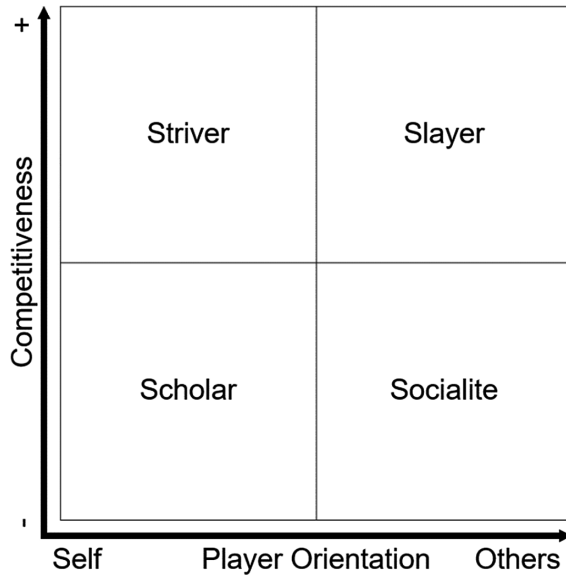
Fig. 1. Player personalities [37]

P3: The relationship between perceived relatedness and enjoyment is moderated by competitive personality, such that the positive relationship is increased with a high level of competitiveness.

P3a: The relationship between perceived relatedness and enjoyment is moderated by competitive personality strivers, such that the positive relationship is increased with a high level of strivers.

P3b: The relationship between relatedness and enjoyment is moderated by competitive personality slayers, such that the positive relationship is increased with a high level of slayers.

P4: The relationship between relatedness and enjoyment is moderated by non-competitive personality, such that the positive relationship is decreased with a high level of non-competitiveness.

P4a: The relationship between relatedness and enjoyment is moderated by non-competitive personality socialites, such that the positive relationship is decreased with a high level of socialites.

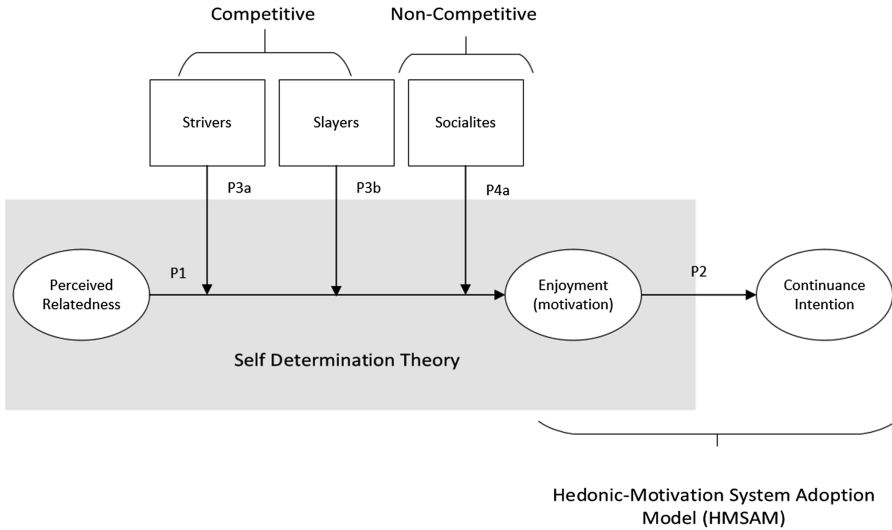Figure 2 presents the proposed theoretical model.

Fig. 2. Proposed theoretical model

3 Future Research and Concluding Comments

This paper was motivated by the growing popularity of gamified platforms in collaborative fitness environments. Building on gamification literature, SDT and HSMAM, we proposed a model explaining continued use of gamified competitive fitness platforms considering the effects of player personality type, specifically competitive and non-competitive. However, further research is needed. We propose a field experiment with an accompanying survey to determine player personality types and then analyze the data to determine the probability and viability of the model to understand continues engagement and subsequent active learning.

From the theoretical point of view, the results of the study should help to expand the literature on gamification with the inclusion of player personality types in the context of a competitive fitness environment. SDT and HSMAM are also extended to competitive fitness platforms with the consideration of player individual differences. Compared to prior works, an experimental design will also employ a more comprehensive approach toward motivational design principles. The study will allow us to compare the design principles and identify the gamification elements that contribute to user enjoyment and subsequently continued use in the competitive fitness context, considering the competitive nature of the individual player. The use of experimental research design to test the proposed model should provide a deeper and more robust understanding of the phenomenon. From a practical perspective, these findings should provide useful insight and guidance for project designers, enabling them to design more engaging competitive fitness experiences that enjoy better classifications of game participants and higher chances of success, while the industry enjoys continued use and participation.

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