Abstract

The Japanese proverb “好きこそ物の上手なれ” means ”What one likes, one will do well.” Arnold J. Toynbee referred to a related issue when he said: ”The supreme ac- complishment is to blur the line between work and play”. Gamification is the strategic attempt to enhance systems, services, organizations, and activities by creating similar experiences to those experienced when playing games. Reward mechanisms are the most important part of this, with studies in animals showing that reward is associated with the activation of multiple dopamine systems and the orbitofrontal cortex. Unlike animals, hu- mans are adept at predicting how reward signals will occur, so the uncertainty associated with reward mechanisms is even more difficult for humans to control. Uncertainty about not getting a reward causes people to produce more dopamine and thus more pleasure, which leads to a more robust reinforcement of the player feedback mechanism. This effect of reward uncertainty has been suggested to explain why humans are attracted to gam- bling and games of chance. However, it is difficult to quantify this pleasure and feeling based on this uncertainty, making it difficult to apply it precisely to reward mechanisms in various fields such as gaming, education and business.

An important question that needs to be answered is how to effectively increase the comfort and motivation of players in a way that can be maintained over time. In order to accomplish this objective, it is necessary to investigate the player’s psychology and quantify the motions in mind. In the past, researchers have been able to successfully develop a model of motion in mind that is based on the motor actions that take place during play. However, additional research is required to find generalizable patterns for it.

This dissertation proposes a player satisfaction model that has been validated based primarily on variable ratio schedules with the definition of velocity in motion in mind model. It proposes to view gaming as a learning process, where players master the rules of the game by learning and adapting. The reward frequency variable is proposed in terms of the unpredictability of rewards in terms of acceleration or ’gravity’ in the mind, analogous to the acceleration of gravity on the earth. The model establishes a relationship between the effort a player must make and the level of challenge of the game and calculates the gravity associated with various games as they evolve throughout history. The difference between intuitive and real likelihood, expressed by the positive energy differential, was discovered to be the source of player incentive. This dissertation examines how game refinement theory and the motion-in-mind model can be used to analyze energy changes and energy flows between games and players. Additionally, it proposes a new approach to unlock the harmonious relationship that exists between the game and the player by balancing the weights of player satisfaction and

pleasure. The primary focus of the analysis is on applications not only in games but also in non-gaming domains such as autopilot and addiction, both of which are highly driven by the subjectivity of the player.

Keyword: game uncertainty, player psychology, game refinement theory, schedules of reinforcement, motion in mind