Personalization and Games

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Personalizing gameful systems to each user is important because personalized interactive systems are more effective than one-size-fits-all approaches. It requires a dynamic adaptation to the user's behaviors in response to any situation. This approach offers users system-tailored content and services, developing content and functionality for each need based on the user's characteristics.

online games player preferences gamification serious games personalization

1. Introduction

Some basic elements must be taken into account before designing a personalized gameful experience: defining the user profile, the content, and the functionality, as well the interface elements. Researchers have been conducting initial studies regarding a diverse set of dimensions for personalization, such as personality [1], gender [2], persuadability [3], and player types and design elements [4]. Nevertheless, how gameful interactions can be personalized and which factors can be used in online gaming are still largely unexplored [5].

Therefore, despite the preliminary findings of these works, this scope has not been explored in depth yet. There is an open research niche regarding relationships between users and their preferences when interacting with gameful environments (in which specific game design elements are used) beyond a primary player taxonomy. To fill this gap, the objective of the present study is to gather preliminary information that will help deepen the personalization of gameful design elements in online gaming.

Researchers can find many types of online games with different characteristics. Some of the most common online games are massively multiplayer online (MMO), board, real-time strategy (RTS), simulation, first-person shooter, action and adventure, arcade, sports, puzzle, and casino games. The massively multiplayer online (MMO) games are among the most popular online games. Players use a network and interact with other players from all over the world in the virtual game room; titles include World of Warcraft, Star Wars The Old Republic, Dota, Guild Wars, and Black Desert Online. Online board games are animated versions of traditional board games such as Monopoly, Carcassonne, Catan, and Scrabble.

On the other hand, real-time strategy (RTS) or strategy games involve strategies to play and win the game, but RTS games move in real time, and players can play at once without taking turns. Examples include Starcraft, Age of Empires, Clash of Clans, and Total War. Researchers have other types of games, such as simulation games, that involve taking control of aircraft (FlyWings, Flight Simulator), ships (Ship Simulator Professional), vehicles

(Train Simulator, Euro Truck Simulator, DIRT Rally, etc.). In these games, players can learn how to control these vehicles, and the games can be used by professionals; for example, pilots can be trained using airplane simulators. In first-person shooter games, the player is the protagonist, and the game is viewed through the player's eyes. These kinds of online games are trendy. Examples include Counter-Strike, Battlefield, Halo, Quake, and Battlefront. Other types of games are action and adventure games, which generally start with a story; players know the mission and have to figure out how to complete it.

Furthermore, games can use puzzles to advance levels. Most of these adventure games are rich in animation with a strong storyline. Online action games also include fighting games, space adventure games, etc. Players have to achieve some objectives (StarBound, Path of Exile, Terraria, Castle Crashers). Another very popular type of game is the arcade games, which are very popular among all ages of people. Some popular online arcade games are Pac-Man, Space Invaders, Asteroids, and Pong. In sports games, users can play real-world sports such as soccer, basketball, and F1. The most popular sports games are usually based around specific popular sporting events. Plus, one can compete against another player, team, or the computer itself. Examples include Football Manager, F1, and NBA 2K. Puzzle games usually are brain games with no action involved for players that love to solve challenging puzzles: Mahjong, Bubble Town, and Candyland, among others. Other online games that are gaining high popularity are casino games. These replicate the games available in real casinos, involving real money transactions with real bonuses and prizes (Wheel of Fortune, Super Slots, European Roulette, American Blackjack).

2. Personalization and Games

Personalization and customization are concepts commonly used interchangeably in the literature; however, they should not be blended together. While personalization is the degree to which the system tailors the content to individual tastes (system-tailored), customization refers to the user deliberately tailoring content by choosing options and/or creating new content (user-tailored) [6]. Regarding technological environments, some authors refer to personalization as the specification of the desired web layout and content that matches the user's interests and preferences, together with tools and options that employ mechanisms to offer content and layout for each individual user [7].

Personalization is a term initially coined by marketing professionals during the past century. The original idea was tailoring an offering to better suit a certain customer group through segmentation [8], which is considered the basis of a good marketing strategy. Through segmentation, campaign design was more effective in identifying users and selecting a good target market. Personalization provides value to the customers of a company, and customization enables users to explore different possibilities in their products or services. Therefore, it is a highly relevant topic in marketing and segmentation. The definition of user "personas" is expected to define the ideal profile of a potential buyer or user in marketing and sales. A persona definition clarifies these characteristics, behaviors, and relevant needs of the target users [9].

Accordingly, personality, conceived as an inner tendency or predisposition for a person to act in a certain way, is a relevant topic that should be studied to help understand users of interactive technologies from the perspective of motivation, i.e., how users interact with the system or how they can be segmented according to their behavior. In this regard, Myers [10] provides the Myers–Briggs Type Indicator (MBTI) based on eight scales (Extraversion vs. Introversion, Sensing vs. Intuition, Thinking vs. Feeling, and Judging vs. Perceiving), where an individual will be paired with four of them. It was considered a useful personality scale years ago, designed to help a person identify some of their most important personal preferences. A player satisfaction model, BrainHex [11], provides a comparison between MBTI and diverse playing style preferences. This model presents seven player archetypes: Seeker, Survivor, Daredevil, Mastermind, Conqueror, Socializer, and Achiever [12].

In recent years, the five-factor model (FFM) of personality, commonly known as the Big Five [13], posits that the perception of personality is formed by five broad factors or dimensions of personality: factor O (openness or openness to new experiences), factor C (conscientiousness or liability), factor E (extraversion or extroversion), factor A (agreeableness or kindness), and factor N (neuroticism or emotional instability). The recent literature agrees that the FFM model is a more accurate representation of an individual's personality than the MBTI model; therefore, it is a preferred representation for understanding potential personalization factors.

Deepening the perspective of user modeling as the base of any type of personalization, researchers have made a great effort to "simplify" this complex labor by creating player taxonomies. This allows researchers and designers to work with models that can be easy to handle within the complexity and individuality of each user. However, Hamari and Tuunanen [14] suggest that the topic of player typologies (how players play or how they can be segmented according to their behavior) has not been exhaustively studied yet. They reviewed the existing player type models and synthesized their commonalities into five key dimensions of player motivations: Achievement, Exploration, Sociability, Domination, and Immersion.

These dimensions broadly fit with the most used taxonomy in gameful design literature, Bartle's Player Types [15] (Player, Socializers, Killers, and Achievers), an observation that is corroborated by a review on gamification design frameworks [16]. However, it was explicitly created for multiuser dungeons (MUDs), and it should not be generalized to a gameful design. Kim [17] argues that, in practice, the four types defined by Bartle do not work in the case of social and casual gaming. She developed an alternative taxonomy about playing styles based on Bartle's model, showing new motivational patterns focusing exclusively on casual games and social gender. At the same time, Yee [18] proposed a set of elements that complement Bartle's model on the basis that player types could be highly correlated with each other. Therefore it would be challenging to use Bartle's model practically. He updated the model considering the following dimensions: achievement (advancement, mechanics, and competition), social (socializing, relationship, teamwork), and immersion (discovery, role-playing, customization, and escapism). However, demographic issues have not been considered. There are several works (e.g., [19][20]) that have assessed players' typologies relying on demographic factors (e.g., age, gender, education).

Another model is the Hexad User Types [10], which defines the following player types:

- Socializers: They are motivated by relatedness. They want to interact with others and create social connections.

- Free Spirits: They are motivated by autonomy and self-expression. They want to create and explore.

- Achievers: They are motivated by mastery. They are looking to learn new things and improve themselves. They want challenges to be overcome.

- Philanthropists: They are motivated by purpose and meaning. This group is altruistic and enjoys giving to other people and enriching the lives of others in some way with no expectation of reward.

- Players: They are motivated by rewards. They will do what is needed to collect rewards from a system.

- Disruptors: They are motivated by change. They want to disrupt the system, either directly or through other users, to force positive or negative change.

Some authors [21] suggested a table of game design elements for each user type using correlation analysis of the Hexad User Types with different game design elements. Their findings demonstrated the usefulness of the Hexad model as a measure of preferred design elements (based on a list of suitable gameful design elements for each one of the player types proposed by Marczewski [22]).

3. Game Design Elements

There are different game design elements [23][24][25], and some authors suggested other relationships between user types and gamification designs, game element preferences, and mechanics [26][27][28]. For example, researchers present six elements related to the user types proposed in the Hexad User Types: leaderboards (i.e., Players), teams (i.e., Socializers), challenges (i.e., Achievers), the voting mechanism (i.e., Disruptors), gifting (i.e., Philanthropists), and exploration (i.e., Free Spirits) [29]. In the following, researchers describe each one of these game design elements:

- Leaderboard: A leaderboard (a suggested element for Players) is a board for displaying the ranking in a competitive environment. Many minor design decisions are involved in implementing leaderboards that may influence their impact. Given the multiple ways that leaderboards can be presented and the increasing number of non-game applications that rely on them, a better understanding of the psychological implications of being placed in a particular leaderboard position is needed.

- Teams: A team (a suggested element for Socializers) is a structure that involves two or more players working together towards a shared objective. More precisely, a team is described by two or more individuals who socially interact; possess one or more common goals; are brought together to perform organizationally relevant tasks; exhibit interdependencies concerning workflow, goals, and outcomes; have different roles and responsibilities; and are together embedded in an encompassing organization.

- Challenges: A challenge (a suggested element for Achievers) is an activity that needs great effort to be completed successfully and therefore tests a person's ability. The idea is to ensure there is always a challenge for players to take. It provides users with a sense of autonomy by choosing which challenges to pursue, which may be enjoyable to Free Spirits, in contrast to challenges that must be completed in a limited amount of time.

- Voting Mechanisms: A voting mechanism (a suggested element for Disruptors) is a method by which users select between different choices. This mechanism can be designed from diverse perspectives, such as one-to-one, one-to-many, many-to-one, and many-to-many, from the more restrictive approach to the most permissive; positive/negative voting (up/down); and individual/collaborative.

- Gifting: A gift (a suggested element for Philanthropists) is an action that allows people to give or share items with other people to help them achieve their goals. This action is proposed as easily transferable virtual items or karma points, possibly a motivating strategy for Philanthropists and Players, who aim to help others with items gained in the form of rewards, or it could be enjoyable for Socializers.

- Exploration: Exploration (a suggested element for Free Spirits) is the freedom to try different things in the system and accomplish tasks in other ways, which are not mandatory to play but can be re-entered any time later.

The primary game dynamics involved in casual games are reward, status, achievement, and competition. Mechanics associated with its main game elements are Leaderboards/Competition, Challenges/Achievement, Points/Credits/Rewards, Levels/Status, Voting, and Exploration [14] (**Table 1**).

Table 1. Game elements in casual online games. Source: own elaboration.

Game Elements in Casual Online Games	Description
Leaderboards/Competition	A way to classify and order users' performance, for example, using one leaderboard or multiple leaderboards (even one for every activity), tracking different aspects of the game so everyone can compare their capability with others.
Challenges/Achievement	Missions that users can accomplish in the game. They provide a purpose and motivation for the player to reach rewards as achievements. Achievements can be easy, challenging, surprising, and motivating; they are often viewed as levels (Angry Birds), points (Pac-Man), etc.
Points/Credits/Rewards	Usually, collected points can be exchanged with rewards and challenges, shown in the user's status on leaderboards, or used to obtain virtual goods.
Levels/Status	The levels system provides milestones that players have to reach and often can be shared and shown in the user's status. It can also be points that players gain to level up, granting them access to new content, rewards, items, etc.

Game Elements in Casual Online Games	Description
Voting	The multiplayer voting element allows players to cooperate and vote on the choices in-game.
Exploration	One of the reasons why people like to play video games is the potential for exploration. Discovery of new levels, new places, new items, and new plots makes players feel more part of the game or the world.

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