ASSOCIAÇÃO DE POLITÉCNICOS DO NORTE (APNOR)

POLYTECHNIC INSTITUTE OF PORTO

GAME ON: GAMIFICATION IN THE CONTEXT OF MARKETING

A COMPARATIVE STUDY OF BRAND COMMUNITIES AND BRAND PERSONALIZATION

Vanessa Soraia Gomes Guedes de Amorim

Dissertation submitted to Instituto Politécnico do Porto to obtain the Master's Degree in Gestão das Organizações, Ramo de Gestão de Empresas.

Orientation

Professor Óscar Bernardes, PhD.

Final Version
Includes corrections or changes suggested by the Jury.

Porto, March 2021.

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Resumo

O presente estudo tem como objetivos avaliar a gamificação num contexto de marketing e analisar as diferentes perceções: - utilidade; - facilidade de utilização; - influência social e - satisfação e o - envolvimento e a atitude perante a marca dos utilizadores de aplicações gamificadas de saúde, *fitness* e bem-estar. Investigar-se-à complementarmente, as principais tipologias de utilizadores e, consequentemente, as suas principais motivações associadas. Neste contexto, será estabelecido se as marcas devem personalizar as suas aplicações, através do recurso a elementos de conceção de jogos associados aos tipos de utilizadores mais frequentes.

A metodologia utilizada para a presente investigação associou a revisão da literatura, tendo sido posteriormente concebidos dois questionários estruturados com base em estudos pré-definidos na literatura, com o intuito de compreender as diferentes perceções e dimensões relacionadas com a gamificação, com base num modelo de investigação desenvolvido para o efeito - Investigação I e as principais tipologias de utilizadores - Investigação II. Os questionários combinaram questões de escolha múltipla com respostas predefinidas, oferecendo aos inquiridos a possibilidade de escolher e classificar várias sensibilidades, através de uma escala Likert.

Os resultados estatísticos relativos à Investigação I demonstram que a utilidade, a facilidade de utilização, a influência social e a satisfação exercem influência na perceção dos utilizadores de aplicações gamificadas. Relativamente ao envolvimento com a marca, é influenciado pelo envolvimento emocional, cognitivo e social, contudo não há qualquer associação com a perceção do utilizador. Pode-se ainda concluir que a atitude em relação à marca dos utilizadores de aplicações gamificadas no contexto da saúde, *fitness* e bem-estar, é influenciada pelo envolvimento com a marca e pela perceção global do utilizador. Complementarmente, os resultados da Investigação II demonstram que estes utilizadores têm motivações predominantemente intrínsecas no contexto da saúde, *fitness*, e bem-estar, o que significa que se trata de uma atividade baseada nas suas satisfações inerentes. Foi também possível estabelecer-se que o tipo de utilizador “espírito-livre” foi o mais reconhecido pelos participantes, o que pode estar associado à necessidade de autonomia e autoexpressão dos utilizadores. Contudo, não existe claramente uma tipologia de utilizador dominante, sendo essencial que as marcas procurem incorporar elementos de conceção de jogos que satisfaçam as necessidades globais de todos os utilizadores.

O estudo tem como valor acrescentado a possibilidade de as marcas reconhecerem as tipologias mais frequentes de utilizadores no contexto da gamificação em saúde e as dimensões mais valorizadas pelos utilizadores destas aplicações, que assumiram um papel crescente no mercado, para desenvolverem o seu marketing com enfoque nas variáveis estudadas, explorando assim o valor da marca e as suas relações com os utilizadores.

Palavras-chave: Aplicações de Saúde, Atitude perante a Marca, Envolvimento com a Marca, Gamificação, Perceções e Tipologias de Utilizadores.

Abstract

This study is intended to evaluate gamification in a marketing context and analyze the different perceptions: - usefulness; - ease-of-use; - social influence and - satisfaction and - brand engagement and brand attitude of the users of health, fitness, and well-being gamified applications. It is also intended to study the main users' and, consequently the inherent motivations. Following on from this, will be established if brands seek to customize their applications by including game design elements associated with the most frequent user types in their applications.

The methodology used for this research was a literature review. Subsequently, two structured questionnaires were designed based on pre-defined studies in the literature, with the aim of understanding the different perceptions and dimensions related to gamification, based on a research model developed for this purpose - Research I and the main typologies of users - Research II. The questionnaires combined multiple choice questions with pre-defined answers, offering respondents the possibility of selecting and ranking various sensitivities using a Likert scale.

The statistical analysis results of Research I demonstrate that usefulness, ease-of-use, social influence, and satisfaction have an influence on the gamified applications user's perception. Regarding the brand engagement, is influenced by emotional, cognitive, and social involvement, however there is no association with user's perception. Additionally, can be concluded that the brand attitude is influenced by the brand engagement and user global perception. Complementarily, the results of Research II demonstrate that users have predominantly intrinsic motivations in the context of health, fitness, and well-being, which means that is an activity based on its inherent satisfactions. In addition, it was also possible to establish that "free spirit" user type was the most recognized, which may be associated with the need for autonomy and self-expression of users. However, there is clearly no one dominant user typology, and it is essential that brands seek to incorporate game design elements that meet the overall needs of all users.

The study has as added value the possibility for brands to recognize the most frequent typology of users in the context of health gamification and the dimensions more valued by these applications users, that have assumed an increasing role in the market, to develop their marketing with a focus on these variables, thus exploring the brand value and its relations with users.

Keywords: Brand Attitude, Brand Engagement, Gamification, Health Applications, Users' Typologies and Perceptions.

Resumen

Este estudio pretende evaluar la gamificación en un contexto de marketing y analizar las diferentes percepciones - utilidad; - facilidad de uso; - influencia social y - satisfacción y - compromiso y actitud hacia la marca, de los usuarios de aplicaciones gamificadas de salud, fitness y bienestar. También se investigarán las principales tipologías de usuarios y, en consecuencia, sus principales motivaciones asociadas. A partir de ahí, se establecerá si las marcas buscan personalizar sus aplicaciones incluyendo en ellas elementos de diseño de juego asociados a los tipos de usuarios más frecuentes.

La metodología utilizada para este estudio fue una revisión de la literatura. Posteriormente, se diseñaron dos cuestionarios estructurados basados en estudios predefinidos en la literatura, con el objetivo de conocer las diferentes percepciones y dimensiones relacionadas con la gamificación, a partir de un modelo de investigación desarrollado para tal fin - Investigación I y las principales tipologías de usuarios - Investigación II. Los cuestionarios combinaban preguntas de opción múltiple con respuestas predefinidas, lo que permitía elegir y calificar diversas sensibilidades mediante una escala de Likert.

Los resultados del análisis estadístico de la investigación I demuestran que la utilidad, la facilidad de uso, la influencia social y la satisfacción influyen en la percepción de los usuarios de las aplicaciones gamificadas. En cuanto al compromiso con la marca, está influenciado por la envolvente emocional, cognitiva y social, no obstante, no hay asociación con la percepción del usuario. Además, se puede concluir que la actitud hacia la marca de los usuarios de aplicaciones gamificadas en el contexto de la salud, fitness y bienestar, está influenciada por el compromiso de marca y la percepción global del usuario. Complementariamente, los resultados del estudio II demuestran que los usuarios tienen motivaciones predominantemente intrínsecas en el contexto de la salud, fitness y bienestar, lo que significa que es una actividad basada en sus satisfacciones inherentes. Además, también se pudo establecer que el tipo de usuario de “espíritu libre” fue el más reconocido, lo que puede estar asociado a la necesidad de autonomía y autoexpresión de los usuarios. Sin embargo, no existe una clara tipología de usuario dominante, y es esencial que las marcas traten de incorporar elementos de diseño de juegos que satisfagan las necesidades generales de todos los usuarios.

El estudio tiene como valor añadido la posibilidad de que las marcas reconozcan la tipología de usuarios más frecuente en el contexto de la gamificación de la salud y las dimensiones más valoradas por los usuarios de estas aplicaciones, que han asumido un papel creciente en el mercado, para desarrollar su marketing con un enfoque en estas variables, explorando así el valor de la marca y sus relaciones con los usuarios.

Palabras clave: Actitud hacia la marca, Aplicaciones de salud, Compromiso con la marca, Gamificación, Tipologías y percepciones de los usuarios.

Acknowledgements

First, I would like to thank my research advisor, Professor Óscar Bernardes at ISCAP - Polytechnic of Porto, for the constant availability, for the excellent transmission of knowledge in the various areas of expertise, for his ability to mentorship, and for the support so that we can set ourselves to new academic challenges in such a way that the source of knowledge is an inexhaustible form of wisdom.

Moreover, I would like to thank to my family, who have always shown me the importance of dedication and effort in every objective we set ourselves, the sense of responsibility in every aspect of life, and the importance of the values that are the basis of our existence. This accomplishment would not have been possible without them.

Additionally, I would like to express my sincere appreciation to Ricardo Carvalho, Anastasiia Sliusarenko and Andreia Lourador, who step by step listened to the doubts, supported the decisions, celebrated the victories, minimized the difficulties, and walked by my side on this journey.

Finally, I would like to express my gratitude, to all the people who contributed in a direct or indirect way to the realization of this dissertation, my sincere thanks for all that they conveyed to me.

List of Abbreviations

APNOR – Associação de Politécnicos do Norte

CBE – Consumer Brand Engagement

CLV – Customer Lifetime Value

GPS – Global Positioning System

ISCAP – Instituto Superior de Contabilidade e Administração do Porto

LP – Loyalty Programs

MDA – Mechanical, Dynamics and Aesthetics

MDE – Mechanics, Dynamics and Emotions

OECD – Organisation for Economic Co-operation and Development

PBL – Points, Badges and Leaderboards

SDT – Self-Determination Theory

SG – Serious Games

TAM – Technology Acceptance Model

TRA – Theory of Reasoned Action

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I. Introduction

The definition of what constitutes the digital economy is suggested by Organisation for Economic Co-operation and Development (OECD) report as the incorporation of "all economic activity reliant on, or significantly enhanced by the use of digital inputs, including digital technologies, digital infrastructure, digital services and data. It refers to all producers and consumers, including government, that are utilising these digital inputs in their economic activities" (OECD, 2020, p. 35).

According to the study of Foote (2019) indicated in the work of Gillpatrick (2019, p. 141) “the digital economy grew 9.9 percent annually over this 20-year period - 4.3 times faster than the overall economy - and represented 6.9 percent of U.S. GDP as of 2017”. The rapid growth and impact of the digital economy is amply justified by the global spread of smartphones and increased interconnectivity, which will cause a wave of digital disruption, especially in business area (Gillpatrick, 2019).

The technological advances presented in the smartphone industry resulted in its exponential growth, where several software developers seek permanent innovation through the incorporation of new additions in smartphones, such as accelerometers, external sensors, and Global Positioning System’s (GPS), which are particularly significant and valued in many areas (Stoyanov, et al., 2015; Sardi, Idri, & Fernández-Alemán, 2017).

In the period from 2013 to 2014, the use of smartphones grew by 406 million, resulting in an overall result of 1,82 billion devices, which represents a further 5% in just one year (Stoyanov, et al., 2015). According to the authors Appiah, Ozuem, Howell, & Lancaster (2019), based on Marketline's report (2017), there was a smartphone sales volume of 1,349.6 million units in 2016, which represents 92,7% of the mobile phone industry.

Mobile applications are increasingly current, as can be seen by the millions of applications available in various application stores (Mahmood, 2020). However, health, fitness, and well-being applications represent the most sought categories by users because of their need of physical activity and health improvement (Weber, Azad, Riggs, & Cherry, 2018). The evolution of health and fitness mobile applications is verifiable through several studies that indicate that in 2016, 231.000 applications were available on the Google Play Store (Android) and App Store (Apple). According to estimates identified in the study of Frie, et al. (2017), 3.2 billion downloads were expected by the end of 2016 and it is predictable that by this year, more than 2.5 billion users will have at least one health and fitness application on their smartphone.

Gaming is increasingly present in our society and everyday lives, as a form of leisure so, we play in different contexts and situations, with the aim of gaining pleasant and single experiences for ourselves and for other people (Robson, Plangger, Kietzmann, McCarthy, & Pitt, 2015; Rapp, 2020; Hassan & Hamari, 2020). The gamification concept and its operationalization in non-gaming contexts has become a growing practice in the organizational domain, with special emphasis on marketing (Yang, Asaad, & Dwivedi, 2017).

Currently, for organizations is essential create strategies to engage their audiences through innovative game-like experiences. However, be able to increase involvement and motivation for

multiple audiences is not a simple action for organizations. It is therefore necessary to highlight the contribution of digital technologies that enable organizations to modify behaviors, motivations, attitudes, and involvement by transforming traditional processes into engaging experiences through gamified applications or services for their audiences (Robson, Plangger, Kietzmann, McCarthy, & Pitt, 2015). The social networks resources and mobile technologies web-based, has allowed the creation of interactive applications, which have changed the interaction between individuals and organizations in many ways, namely: in terms of relationship, participation, collaboration, communication, and in the alteration of any kind of experience (Kietzmann, Hermkens, McCarthy, & Silvestre, 2011).

According to Xi & Hamari (2020), gamification represents one of the greatest technological tendencies of the last decade, given the interest shown by organizations, which are progressively seeking to increase the involvement and motivation of their audiences, to promote the brands role through information and communication technologies (Kotler, Kartajaya, & Setiawan, 2017; Shen, Choi, Joppe, & Yi, 2020). The authors Xi & Hamari (2020) also point out that gamification has a clear relationship with attitude towards the brand and brand engagement.

The importance of brand equity has been widely recognized in marketing literature for at least three decades as a key intangible asset for efficient brand management (Jeon, 2017; Xi & Hamari, 2020). According to Keller (1993), the brand equity can be analyzed according to two different types of perspectives, namely: 1) from a financial point of view or 2) according to a strategic marketing perspective, focusing on an in-depth understanding of consumer behavior so that marketing managers are able to make better strategic decisions. In this sense, this study will address costumer-based brand equity, which was defined by the authors Kotler & Keller (2016, p. 324) as “the added value endowed to products and services with consumers. It may be reflected in the way consumers think, feel, and act with respect to the brand, as well as in the prices, market share, and profitability it commands”. The authors Xi & Hamari (2020) also highlight that this concept refers to a set of brand assets associated with it, being a core component in the management of an organization.

The authors Kotler, Kartajaya, & Setiawan (2017, pp. 197-198) highlight that there are several motivations for gamification to be considered a key tool when it comes to engagement, namely: "(...) gamification takes advantage of human desires to achieve higher goals and to be recognized for its actions. ", is considered "strongly accountable" and even "more importantly, gamification is aligned with the convergence of technologies in the digital economy" enabling "(...) an intelligent way to collect data on consumers, whether or not related to transactions, which are useful for customization."

Initially, the attitude towards the brand was defined as a “recipients' affective reactions toward the advertised brand (or, where desirable, attitude toward purchasing the brand)" (Lutz, MacKenzie, & Belch, 1983, para. 6). However, according to the author Hollebeek (2011a, p. 562) the brand attitude “reflects an individual’s relatively enduring evaluation of a branded object.” In this context, the studies analyzed by the authors Berger, Schlager, Sprott, & Herrmann (2018) led to the conclusion that gamified interactions have improved attitudes towards the brand, depending on the type of challenge.

Based on the literature, there is evidence to consider that brands with gamification elements can influence consumers' brand experiences and brand attitude formation (Lee & Jin, 2019).

Gamification is a marketing tool that uses game design elements to reach different users in different parts of the world, but cannot consist only in game components, neglecting the assumptions inherent to game mechanics and dynamics (Hofacker, Ruyter, Lurie, Manchanda, & Donaldson, 2016), so it is relevant to analyze and evaluate the different perceptions - usefulness, ease-of-use, social influence, and satisfaction inherent to users.

The motivation to carry out this research arises from my formation in the health field, seeking to complement it with the learning acquired during my master's degree. In addition, the literature review shows that there are a limited number of studies that simultaneously correlate the areas of gamification and health, as corroborated by the authors Xi & Hamari (2020, p. 451) “gamification in marketing is still a relatively new area, only a few studies have investigated the relationships between gamification and brand-related variables.”

In this regard, this study is intended to evaluate gamification in a marketing context and analyze the different perceptions: - usefulness; - ease-of-use; - social influence and - satisfaction and - brand engagement and brand attitude of the users of health, fitness, and well-being gamified applications. It is also intended to study the main users’ and, consequently the inherent motivations. Following on from this, will be established if brands seek to customize their applications by including game design elements associated with the most frequent user types in their applications.

This research is structured into six chapters, which will be described in detail next. The current chapter is intended to present the contribution of the topic under study in the current paradigm and to identify the central research questions.

The literature review is presented in chapter II and intends to provide to the reader the current state of the art through two main topics: gamification and brand management. This chapter presents the current economic role of gamification, which justifies the relevance of the topic due to its disruptive capacity, the main definitions of gamification and the evolution of the concept from the perspective of the main authors who have contributed to the field. This is followed by the existing types of gamification, the game elements and the most relevant frameworks, the types of users of gamified experiences and their association with motivation theory, the contribution of personalization in gamification and, finally, the role of gamified applications in health, fitness, and well-being context. Regarding brand management, it will be addressed the concept of brand and the role of brand equity from the perspective of costumer-based brand equity. In this context, it will also be defined the sub-components of perception, brand engagement and brand attitude, which have a close relationship to the concept of brand equity and brand communities - where the study will take place.

The methodology used for this research is present in chapter III and will consist of a Literature Review. This study will also include quantitative methods, using scales that allow users to evaluate gamification in the dimensions under study, using questionnaire surveys previously defined in the literature.

In chapter IV there are the results of this research. Following the methodology defined for this study, the results will be subdivided into Results I - inherent to brand communities and Results II - related to user typologies.

According to the results obtained in chapter IV, they will be discussed in chapter V, through the role of gamified experiences in the domains of brand communities and the most frequent user typologies, and the subsequent possibility of brand customization, being possible to establish the points of proximity and disparity, in the context of gamified health, fitness and well-being applications.

Finally, in chapter VI, the overall conclusions arising from this study will be established, identifying possible limitations, as well as possible directions and suggestions for future research.

II. Literature Review

1. Gamification

Game definitions often includes games and video games in the same category, as most definitions were established after video games became a representative synonym of cultural strength and an innovative industry with a significantly growth (Arjoranta, 2019). According to Esposito (2005, p. 1), “a videogame is a game which we play thanks to an audiovisual apparatus and which can be based on a story”. In this sense, the concept of video game can also be defined as “a mode of interaction between a player, a machine with an electronic visual display, and possibly other players, that is mediated by a meaningful fictional context, and sustained by an emotional attachment between the player and the outcomes of her actions within this fictional context”, according to Bergonse (2017, p. 253). However, there are elements whose presence is essential to determine a game context, namely: the fictitious activity, the unpredictability, the rules existence, the temporal and spatial limits, without any mandatory character (Esposito, 2005).

The growing attractiveness in the video game market is verified through several studies and statistics which determine that a *casual* user plays on average 4.59 days - male and 2.48 days - female; the average number of hours dedicated to games per day is 2.37 hours - male and 1.98 hours - female; the average daily duration of a single game session is 79.42 minutes - male and 68.6 minutes - female and the average time spent searching for video games is 25.88 minutes - male and 24.61 minutes - female (Kapalo, Dewar, Rupp, & Szalma, 2015). Thus, games provide higher levels of engagement and intrinsic motivation in their users, which also contributes to the achievement of cognitive, emotional, and social benefits (Xi & Hamari, 2019).

The success of the video game market has contributed to the application of the gamification concept in the marketing area, which has slowly incorporated the new acceptances of executives in this area, so the value of the gamification market in 2016 was expected to increase to $2.8 billion (Lucassen & Jansen, 2014), $5.5 billion in 2018 (Conaway & Garay, 2014) and $19.39 billion by 2023 (Xi & Hamari, 2019). However, regardless of the possibility of a major expected growth, the authors Lucassen & Jansen (2014) state that the expected gamification concept adoption rate is not present in the literature. The gamification concept has shown widespread adoption by the services sector recently and 70% of the organizations present in Global 2000 are expected to have at least one gamified application or service in 2014 (Conaway & Garay, 2014; Hamid & Kuppusamy, 2017). This technological novelty is the basis for an innovative change in the business environment, and it is expected that until now, approximately 70% of the world's organizations seeking original methods will use gamification, according to Gartner's projections (2011) identified in the study of Hamid & Kuppusamy (2017).

1.1 Gamification Concept

The gamification is considered a concept whose origin is associated with the digital industry and its first use was in 2008, however it has only started to be widely used from 2010 (Deterding, Dixon, Khaled, & Nacke, 2011; Huotari & Hamari, 2012; Rapp, 2020; Bai, Hew, & Huang, 2020). According to the authors Deterding, Dixon, Khaled, & Nacke (2011), the gamification is represented by a set of specific criteria, identified through the concepts: gamefulness - which represents the quality of experience and behavior; gameful interaction - resources that provide a certain quality; and gameful design - design of the elements presents in the games. It is then possible to define gamification as "the use of game design elements in non-game contexts" (Deterding, Dixon, Khaled, & Nacke, 2011, p. 9).

According to Huotari & Hamari (2012, p. 19), the gamification concept is based on "a process of enhancing a service with affordances for gameful experiences in order to support user's overall value creation". The authors state that this definition highlights the aim of a gamified application or service represented by the experiences it creates - and not the methodologies used. It is also stressed in this definition that gamification does not necessarily need to be successful and may only contribute to the creation of meaningful experiences for users, contributing to the creation of the same psychological experiences, which games generally produce.

The authors Hamari, Koivisto, & Sarsa (2014, p. 3026) complement that gamification is "a process of enhancing services with (motivational) affordances in order to invoke gameful experiences and further behavioral outcomes". It is further described in the literature that gamification represents a "process of applying elements of game design to a non-game context, where the interaction between the game mechanisms and personal disposition result in a fun and enjoyable experience" (Tobon, Ruiz-Alba, & García-Madariaga, 2020, p. 3).

In the context of defining the gamification concept, its distinction from the serious games (SG's) concept is fundamental. In this sense, it is necessary to consider first the differences between the elements of gamification and the design of games that compose each of these typologies. While gamification uses game elements in non-game contexts, SG's use various game elements to build a game for purposes unrelated to fun or entertainment, as for example for educational learning, human resources management or other fields (Georgiou & Nikolaou, 2020; Chow, et al., 2020). However, according to the literature, SG's and gamification jointly seek changes in their users' behaviors, through pleasant interactions using different levels of motivation, to offer the best overall experience to their users (Ponce, et al., 2020; Chow, et al., 2020).

1.2 Gamification Types

Accordingly, gamification definitions described above can be further divided into two main categories, based on the type of response provided by gamification or according to its constituent elements (Tobon, Ruiz-Alba, & García-Madariaga, 2020).

Gamification typologies and game design types can be categorized horizontally and vertically, respectively (figure 1 and 2). The horizontal categorization present in the figure 1 is subdivided into three main subcategories: 1) achievement/challenge; 2) immersion; and 3) social-based. According to the authors Legaki, Xi, Hamari, Karpouzis, & Assimakopoulos (2020, p. 2), the achievement/challenge "is focused on overcoming challenges, progressing and earning rewards and feeling competent". On the other hand, the immersion-based game design "attempts primarily to engulf the player or user into a story, roleplay and audiovisual richness". And lastly, the social-based game design "is commonly focused on different forms of competition and collaboration."

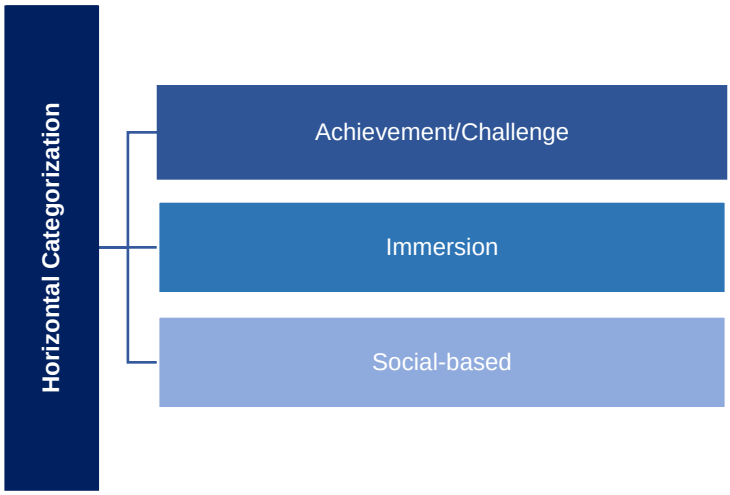

Figure 1: Horizontal categorization types.
Adapted: Legaki, Xi, Hamari, Karpouzis, & Assimakopoulos (2020).

On the other hand, in the vertical categorization present in the figure 2, the mechanical, dynamic and aesthetics (MDA) model is used, which subdivides the game design elements into mechanical, dynamic and aesthetics (Legaki, Xi, Hamari, Karpouzis, & Assimakopoulos, 2020). However, the authors Robson, Plangger, Kietzmann, McCarthy, & Pitt (2015), do not consider aesthetics in the vertical categorization, but emotions in the respective part. The differences between elements and frameworks that constitute a gamified experience will be clarified below.

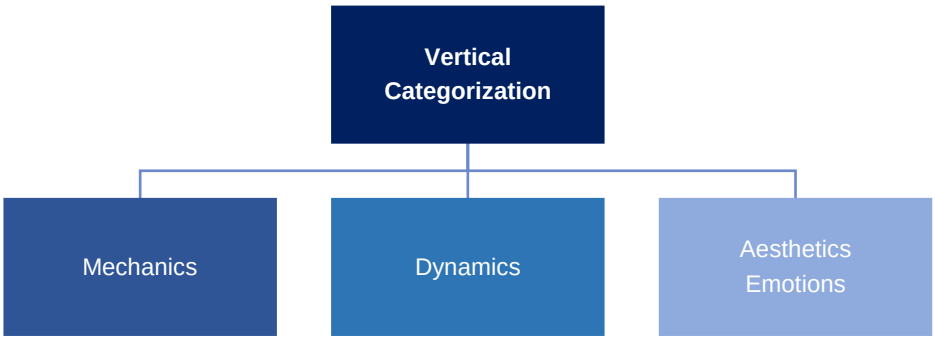

Figure 2: Vertical categorization types.
Adapted: Robson, Plangger, Kietzmann, McCarthy, & Pitt (2015);
Legaki, Xi, Hamari, Karpouzis, & Assimakopoulos (2020).

1.3 Gamification Elements

Gamification uses numerous game elements (figure 3) to obtain a response or behavior from users within a specific context in which it is applied (Klock, Gasparini, Pimenta, & Hamari, 2020). Thus, one can consider that the process of designing gamified strategies is different from the design of a game structure, given that in gamification the goal is to enhance the interaction of its users with a certain purpose or behavior, while in the gaming industry the purpose is to create fun and entertainment for its players (Nasirzadeh & Fathian, 2020). According to Zainuddin, Chu, Shujahat, & Perera (2020), the gamification elements allow for an excellent way of learning, as because it enables a better orientation to individuals objectives.

In this sequence, the gamification consists of the implementation and development of game design elements, namely: components, mechanics (internal and external), and game dynamics (Friedrich, Becker, Kramer, Wirth, & Schneider, 2020). The game components represent furthermost directly observable and tangible form of gamification, through systems that includes points, badges, content unlocking, progress bars, teams, levels, or missions. The gaming components are responsible for executing the respective gaming mechanics, through incentive-like mechanisms such as: challenges, competition, cooperation, feedback, rewards, or virtual goods. In this way, motivational dynamics are created, which corresponds to a more intangible form of gamification, as can be seen in figure 3 (Friedrich, Becker, Kramer, Wirth, & Schneider, 2020).

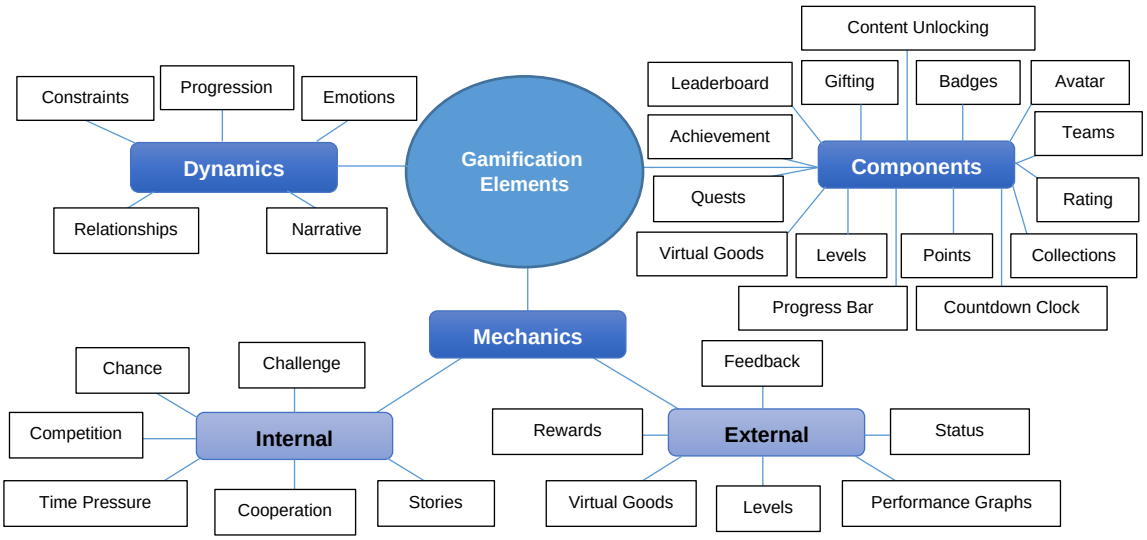

Figure 3: Gamification aspects.
Source: Friedrich, Becker, Kramer, Wirth, & Schneider (2020, p. 347).

However, according to the authors Sailer, Hense, Mandl, & Klevers (2013) and Tobon, Ruiz-Alba, & García-Madariaga (2020), in a gamified experiment, the game components represent a major importance, as they are responsible for describing the specificities and characteristics of games.

According to the authors Tobon, Ruiz-Alba and García-Madariaga (2020), it is recommended that gamified applications contain one or more of the following elements: points, levels, leaderboards,

badges, meaningful stories, and avatars. So, typical elements of gamified applications are present in table 1, each fulfilling a distinct function (Sailer, Hense, Mandl, & Klevers, 2013).

Table 1: Types of components used in gamification.

Component	Description
Points	Accumulated through the development of different activities. Numerical representation of a player's progress.
Status	Status is represented by people's need for recognition, through the cultivation of fame and prestige, which allows them to gain the esteem and respect of other people.
Badges	Visual representations of achievements won in the gamification environment.
Leaderboards	Lists that include the totality of users, classified according to the level of success, and determine the user who performs best in each gamified activity. Leaderboards represent competitive indicators of progress.
Progress Bar	Information about the status of a user in relation to a specific objective.
Performance Graphs	Information about a user's performance in relation to previous.
Self-Expression	Self-expression allows individuals to differentiate themselves using creativity and autonomy.
Missions	Small tasks accomplished within a game.
Meaningful Stories	Allows users of gamified experiences to attribute meaning to the context in which they are framed, not valuing points or badges.
Competition	When a user can compare his results with others, the competitive factor of each individual is stimulated, through the satisfaction obtained with the levels of performance achieved.
Avatar	Visual representation selected by a user.
Profile Development	Development of avatars and their respective attitudes.
Visible Status	User daily/weekly/monthly progress.
Content Unlocking	Markers with performance prerequisites.
Levels	Progress indicators.

Adapted: Sailer, Hense, Mandl, & Klevers (2013); Herbert, Charles, Moore, & Charles (2014); Barbosa & Rodrigues (2020).

The authors Murillo-Zamorano, Sánchez, & Muñoz (2020) identified in the literature that the Points-Badges-Leaderboards (PBL) triad (figure 4) is a recurring structure in gamified experiences. It is composed of previously identified game elements, namely: points, badges, and leaderboards. However, the authors Rodríguez, Puig, Tellols, & Samsó (2020) refer that PBL structure has limitations in terms of reaching the emotional component of users as well as the modifications of their habits and routines.

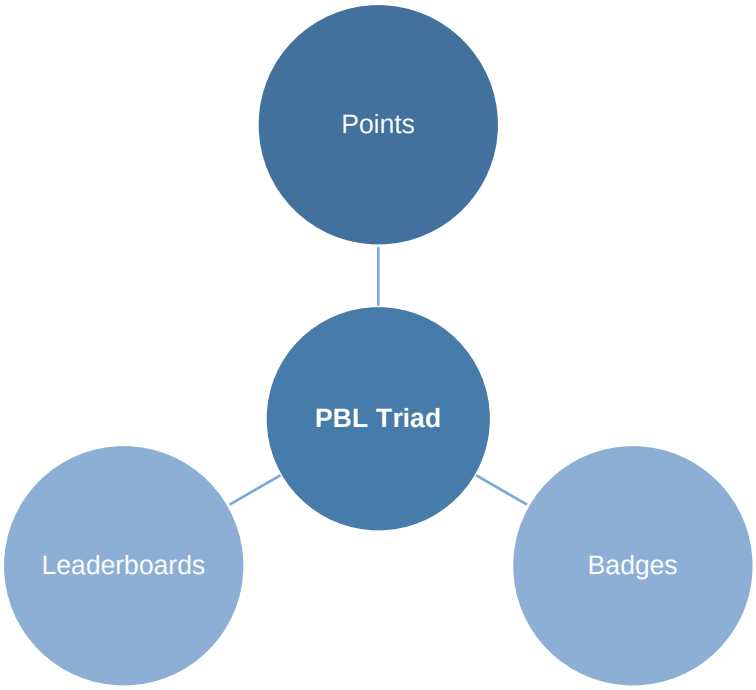

Figure 4: PBL Triad.
Adapted: Murillo-Zamorano, Sánchez, & Muñoz (2020).

1.3.1 Mechanics-Dynamics-Aesthetics Framework

Game designers prepare the design of gamified experiences based on frameworks developed and studied by various authors that allow them to have a greater overall understanding of the strengths and weaknesses that can determine the success of a given gamified system (Kusuma, Wigati, Utomo, & Suryapranata, 2018). The frameworks also enable the design and development of a gamified system, considering the entire project life cycle between planning, designing, and marketing (Briciu & Filip, 2018).

The MDA framework was firstly introduced at the Game Developers Conference, San Jose, 2001-2004. This structure is composed by three components defined by Hunicke, LeBlanc, & Zubek (2004, p. 2), namely:

1) Mechanics: “describes the particular components of the game, at the level of data representation and algorithms.”

2) Dynamics: “describes the run-time behavior of the mechanics acting on player inputs and each other’s outputs over time.”

3) Aesthetics: “describes the desirable emotional responses evoked in the player, when she interacts with the game system.”

These jointly interconnected components improve the user experience, using better functionalities and hedonistic values (Xu, Buhalis, & Weber, 2017). However, this framework highlights two distinct but interdependent perspectives in terms of game vision, namely: the designer's perspective and the user's perspective, as it is possible to observe in the figure 5, below.

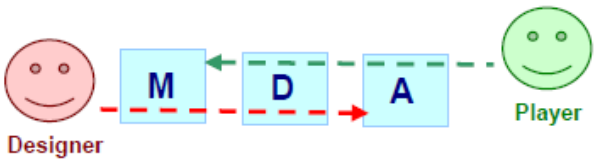

Figure 5: Designers' and users' perspective on an MDA framework.
Source: Hunicke, LeBlanc, & Zubek (2004, p. 2).

In the context of the figure 5 presented it is possible to observe that the game experience for the users is initiated from the aesthetic point of view, which in turn is influenced by the game dynamics, through the existing mechanics. On the other hand, according to the designers' perspective the game design is initiated through the game mechanics, responsible for the dynamics that in turn generate the aesthetic experience (Hunicke, LeBlanc, & Zubek, 2004; Xu, Buhalis, & Weber, 2017).

The authors Hunicke, LeBlanc, & Zubek (2004) also point out that the aesthetic component is broader than the meaning provided by the words "fun" or "gameplay". To this end, the same authors have listed the concepts and definitions identified in figure 6, to provide a better understanding of the aesthetics component.

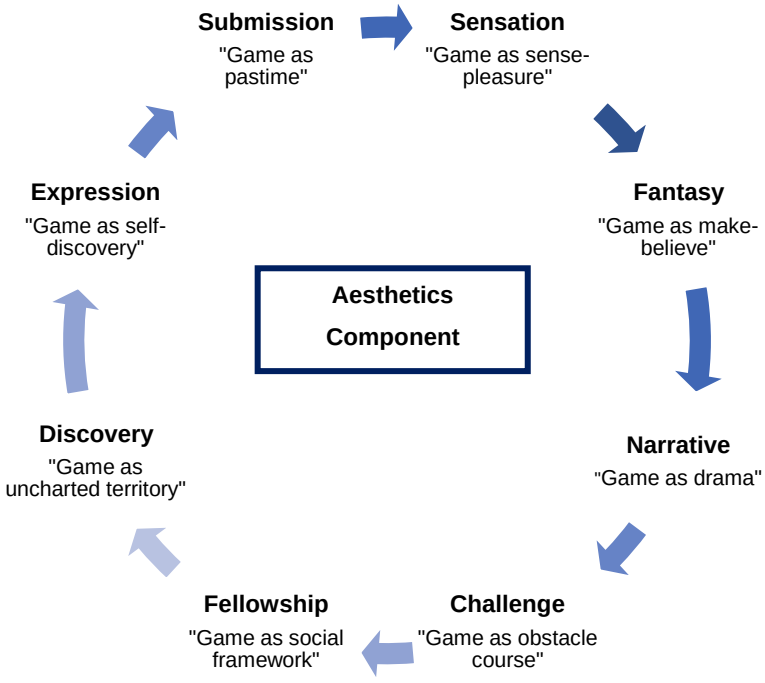

Figure 6: Concepts and definitions of aesthetics component.
Source: Hunicke, LeBlanc, & Zubek (2004, p. 2).

1.3.2 Mechanics-Dynamics-Emotions Framework

The authors Robson, Plangger, Kietzmann, McCarthy, & Pitt (2015), based on the data from the gaming literature consider the following as relevant principles of gamification:

1) Mechanics: represented by objectives, rules, settings, contexts, limits, and rewards.

2) Dynamics: how users perform mechanics.

3) Emotions: how users feel about the gamified experience.

The elements established by these authors constitute the Mechanics-Dynamics-Emotions (MDE) framework. The authors Robson, Plangger, Kietzmann, McCarthy, & Pitt (2015, p. 413) reinforce in their research that the aesthetic component of the MDA framework, should be replaced by the emotion component, because in practice the aesthetic component represents "the desirable emotional responses (…) evoked in players when they interact with the game". In figure 7 it can be seen that the components proposed by the authors Robson, Plangger, Kietzmann, McCarthy, & Pitt (2015) are interdependent in the creation of gamified experiences.

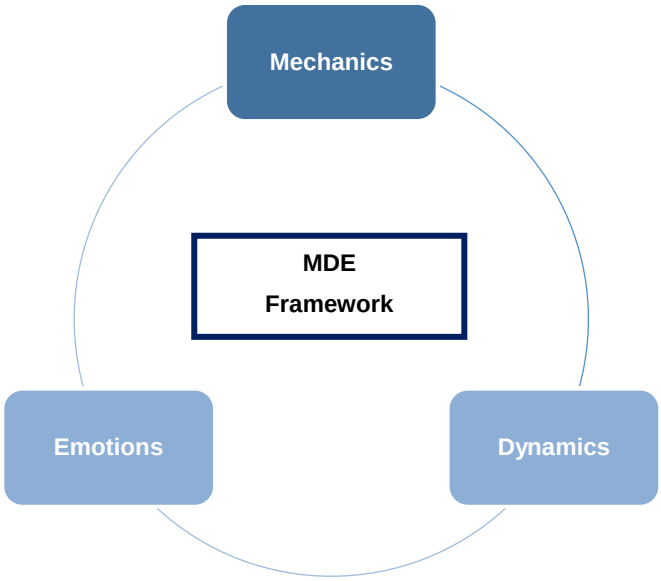

Figure 7: Components of the MDE framework.
Adapted: Robson, Plangger, Kietzmann, McCarthy, & Pitt (2015).

Additionally, the structure proposed by the authors Robson, Plangger, Kietzmann, McCarthy, & Pitt (2015) is identified in the study of Mullins & Sabherwal (2020), as the only framework that objectively establishes that emotion is a key success factor in gamified experiences. Mullins & Sabherwal (2020) also state that the MDE framework emphasizes the importance of the emotional component in human behavior which enhances user engagement, however, MDE can trigger mixed emotions of a positive or negative nature.

1.4 Gamification User Types

1.4.1 Bartle's User Typologies

In gamified experiments, users can be described based on two dimensions derived from Bartle's work (1996), namely guidance and competitiveness (Robson, Plangger, Kietzmann, McCarthy, & Pitt, 2016). While guidance describes whether the player is predominantly orientated towards other players or towards himself, competitiveness describes the extent to which the individual engages in competitive behavior (Robson, Plangger, Kietzmann, McCarthy, & Pitt, 2016). In the table 2 are defined the types of users in gamified systems according to Bartle's pioneering research (1996).

Table 2: Types of users in gamified systems.

User Type	Description	Attribute
Achiever	This typology of user seeks action in the game environment. The possibility of interaction with other people adds reality to the game environment and provides an element of competition. These users aim to dominate the game and thus obtain a status as they progress in the game hierarchy in reduced time.	Diamonds
Explorer	This typology of user seeks the surprise factor and interaction in the game environment. They do not attempt only to accumulate victories to reach the top of the game hierarchy, because they consider that a one-dimensional behavior, without associated intellectuality. These users take pride in their knowledge of the game and search for new users to consider them a source of knowledge.	Spades
Socializer	The goal of these users is the interaction with other users. This typology of users seeks contacts, friendships and exert their influence.	Hearts
Killer	This type of users tries to interfere and act on other users, even without their consent. They try to demonstrate their superiority in the gaming environment, even if it is wrong, and they take a high pride in their reputation.	Clubs

Adapted: Bartle (1996).

1.4.2 Hexad Model

Hexad represents an evolutionary model for the classification of users of gamified experiences, allowing distinguishing them through intrinsic and extrinsic motivational factors (Marczewski, 2015; Barbosa & Rodrigues, 2020). The model is composed by six types of users, namely: - socializers; - free spirits; - achievers; - philanthropists; - disruptors; and - players.

The typology of users who are willing to interact in a gamified experience is dependent on the problem that gamification seeks to solve. However, it is essential to create opportunities for all possible users to develop their interactions, considering that different motivations attract individuals to different degrees (Marczewski, 2015). In the table 3 below, it is possible to analyze the different types and subtypes of users established in the Hexad model, as well as the associated motivations.

Table 3: Types and subtypes of users according to Hexad model.

<table>
<tr><th colspan="2">User Type</th><th colspan="4">Description</th></tr>
<tr><td>Socializers</td><td rowspan="4">Intrinsic Motivation</td><td colspan="4">- Motivated by relatedness. Purpose: interact with others and create social connections.</td></tr>
<tr><td>Free Spirits</td><td colspan="4">- Motivated by autonomy and self-expression. Purpose: create and explore.</td></tr>
<tr><td>Achievers</td><td colspan="4">- Motivated by dominance. Purpose: acquire knowledge, learn new skills, improve themselves and seek challenges to be overcome.</td></tr>
<tr><td>Philanthropists</td><td colspan="4">- Motivated by a sense of purpose and meaning. Purpose: enrich other people's lives in some way - with no expectation of reward.</td></tr>
<tr><td colspan="2">Disruptors</td><td colspan="4">- Motivated by change. Purpose: interrupt the system, directly or through other users, to force positive or negative changes.</td></tr>
<tr><td rowspan="3">Players</td><td rowspan="3">Extrinsic Motivation</td><td colspan="4">- Motivated solely by extrinsic rewards.
- This user typology can be subdivided into the subtypes below.</td></tr>
<tr><td colspan="4">Subtypes</td></tr>
<tr><td>Self-Seeker</td><td>Consumer</td><td>Networker</td><td>Exploiter</td></tr>
<tr><td></td><td></td><td>- They have similarities with philanthropists. Purpose: respond positively to questions, share knowledge and usefulness - but with an associated reward.</td><td>They change their behavior for rewards. Purpose: if necessary, they develop new skills or face challenges, like an Achiever. They represent those who only participate in competitions for the prize.</td><td>They're looking for useful contacts to get something. Purpose: follow the great influencers, as they expect this to be noticed, increasing their influence, in order to obtain the reward.</td><td>They look for the limits of the system, where they can go and what they can do. Purpose: new ways to reward.</td></tr>
</table>

Adapted: Marczewski (2015).

1.4.2.1 Motivation and Self-Determination Theory

The intrinsic and extrinsic motivations influence the types of users present in gamified experiences. However, motivation cannot be considered an isolated act since different individuals have different levels and orientations related to motivation. Motivation is representative of the underlying attitudes and goals that give rise to a given action, with direction and intensity (Kotler & Keller, 2016). However, there are different types of motivation based on the different objectives inherent to an action, which leads us to the concepts of intrinsic motivation and extrinsic motivation (Ryan & Deci, 2000).

Intrinsic motivation “is defined as the doing of an activity for its inherent satisfactions rather than for some separable consequence. When intrinsically motivated a person is moved to act for the fun or challenge entailed rather than because of external prods, pressures, or rewards” (Ryan & Deci, 2000, p. 56). On the other hand, extrinsic motivation “is a construct that pertains whenever an activity is done in order to attain some separable outcome. Extrinsic motivation thus contrasts with intrinsic motivation, which refers to doing an activity simply for the enjoyment of the activity itself, rather than its instrumental value” (Ryan & Deci, 2000, p. 60). Thus, the importance of successful gamification

experiences is highlighted, which provide positive emotional results by stimulating motivational mechanisms (Robson, Plangger, Kietzmann, McCarthy, & Pitt, 2015).

Self-determination theory (SDT) is the result of Deci's (1971) research about the differences between intrinsic and extrinsic motivations as cited in the study of Mitchell, Schuster, & Jin (2020). The authors Mitchell, Schuster, & Jin (2020) referencing Deci & Ryan's (2002) study state that SDT allows the identification of innate psychological needs that may motivate individuals to engage in a determinate activity as:

- competence: when an individual feels challenged by something they can master effectively;
- autonomy: referring to an individual's freedom of choice based on their personal interests and values; and
- relationship: ability to interact with other individuals and capacity to belong to a community.

According to Wolf, Weiger, & Hammerschmidt (2020), SDT justifies the continuous use of gamified experiences by individuals due to their motivational character. In this sense, people use gamified experiences because its facilitates and satisfies the three basic psychological needs, namely: competence, autonomy, and relationship. In this context, Bai, Hew, & Huang (2020) stated that autonomy in a gamified system enables individuals to identify which activities they prefer to execute, which may result in greater behavioral and emotional engagement of individuals. On the other hand, if a gamified system provides greater relationship, it may motivate its users through positive feelings. Finally, gamified systems that track users' progression can increase users' sense of competence. Complementarily, SDT is fundamental to the understanding of game mechanics, as it provides insights inherent to intrinsic satisfaction, which in turn impacts the respective user engagement (Behl & Dutta, 2020).

1.5 Customization of Gamified Experiences

According to the literature, there is evidence that the customization of gamified experiences is fundamental for their effectiveness, compared to "one-size-fits all" systems, allowing to reach individuals with different motivations and thus enhancing the gamified experiences as well as the desired behavior changes (Nasirzadeh & Fathian, 2020).

It therefore becomes imperative to adapt the game elements according to the users' profile to improve and enhance their interaction and experience (Tondello, et al., 2016). In this follow-up, the customization corresponds to “any combination of information or change of strategy to reach individual needs and preferences according to one’s profile” (Klock, Gasparini, Pimenta, & Hamari, 2020, p. 1).

According to Klock, Gasparini, Pimenta, & Hamari (2020), it can be observed in the figure 8 that the customization of gamified experiences can be achieved with: - personalization; - adaptation; or recommendation.

On the other hand, the authors Nasirzadeh & Fathian (2020) describe that the personalization of gamified systems is generally due to the isolated or joint application of the following factors: - demographic information; - personality traits; or/and - user type models.

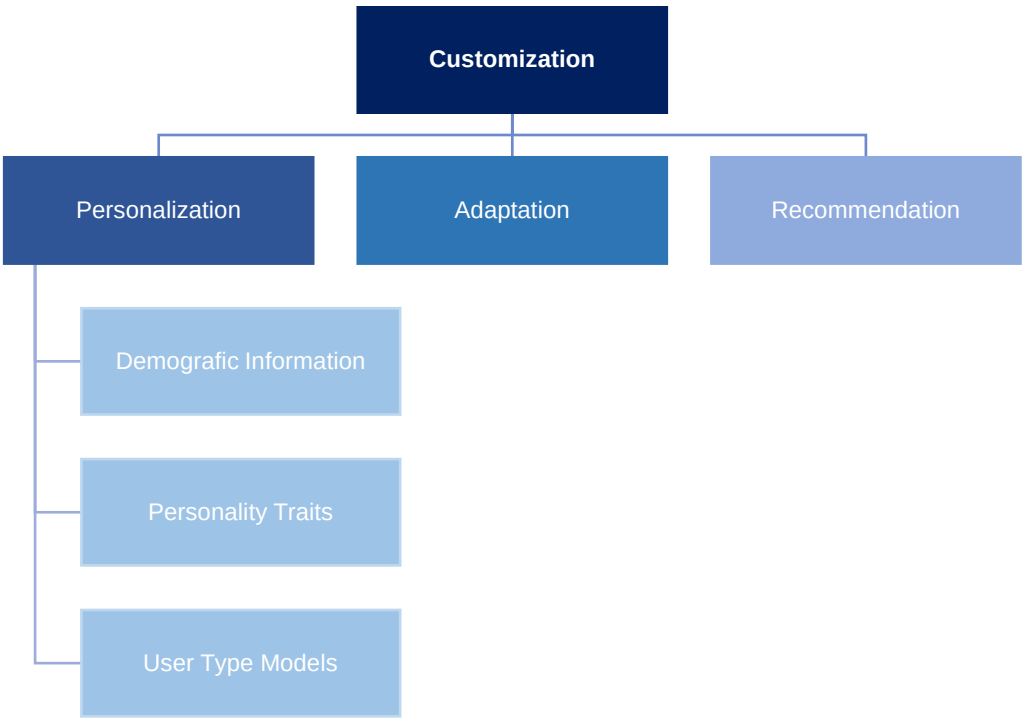

Figure 8: Types of customization of gamified experiences.
Adapted: Klock, Gasparini, Pimenta, & Hamari (2020); Nasirzadeh & Fathian (2020).

According to the objectives set for the present research, customization will be addressed and developed according to personalization approach from the prism of user typology models, namely the Hexad model developed by Marczewski (2015).

1.5.1 Hexad Model

In the Marczewski study (2015), six types of users were established that differ from each other through intrinsic or extrinsic motivation factors, as described previously. However, according to Tondello, et al. (2016), the author Marczewski (2015) did not rely on a behavioral observation model to define user typologies. The types of users presented in Marczewski study (2015) represent the intrinsic and extrinsic motivations of individuals, as described in the SDT. In the table 4 below, it is possible to verify the relationship between the user type and the game design elements.

However, according to authors Klock, Gasparini, Pimenta, & Hamari (2020), the challenges, customization, learning, and levels were game suggested elements, in greater or lesser quantity, for all types of Hexad users, as we can check in the next table 4.

Table 4: Relationship between users' typologies and possible game design elements.

User Type	Suggested Game Design Elements
Socializers	Guilds or teams, social comparison, social discovery, social networks, social competition, and social status.
Free Spirits	Nonlinear gameplay, “easter eggs”, creativity tools, unlockable, customization, and exploration.
Achievers	Certificates, quests, progression, challenges, levels, learning, social status, and unlockable.
Philanthropists	Collection, trading, knowledge sharing, administrative roles, and gifting.
Disruptors	Innovation platforms, voting mechanisms, development tools, anonymity, anarchic gameplay, and customization.
Players	Rewards, achievements, lotteries or games of chance, leaderboards, social status, badges, collections, competition, points, prizes, unlockable, and virtual economy.

Adapted: Tondello, et al. (2016); Klock, Gasparini, Pimenta, & Hamari (2020).

1.6 Gamified Applications in the Context of Health, Fitness and Well-Being

In today's digital age, the different applications allow the increase of consumer involvement with brands (Kotler, Kartajaya, & Setiawan, 2017) because “smartphones are ever present, always on” (Kotler & Armstrong, 2021, p. 43). Within this context, gamification strategy in specific health, fitness and well-being applications has become recognized and recurrent, as can be perceived by the increasing number of applications available in the most varied application stores, where a considerable number contain at least some gamification aspects (Lister, West, Cannon, Sax, & Brodegard, 2014; Tu, Hsieh, & Feng, 2019).

However, the countless mobile applications currently available are the result of their growing importance and their inseparability from the concept of connectivity. In this follow-up, the authors Kotler, Kartajaya, & Setiawan (2017, p. 46) distinguish three levels of connectivity, namely: 1) mobile - "through mobile devices", representing the most basic level, where "the Internet serves only as a communications infrastructure; 2) experiential - "where the Internet is used to communicate a superior consumer experience at points of contact between consumers and brands"; and 3) social - represented by the "connecting force in customer communities.”

According to Johnson, et al. (2016, p. 91) research, the health gamification concept is composed of three sub-components (figure 9), namely:

- persuasive technology: “revolves around the application of specific design principles or features that drive targeted behaviours and experiences”.
- serious games: “gamification aims to drive these behaviours through the intrinsically motivating qualities of well-designed games”; and

- personal informatics: “gamification usually revolves around the tracking of individual behaviours, only that these are then not only displayed to the user but enrolled in some form of goal-setting and progress feedback”.

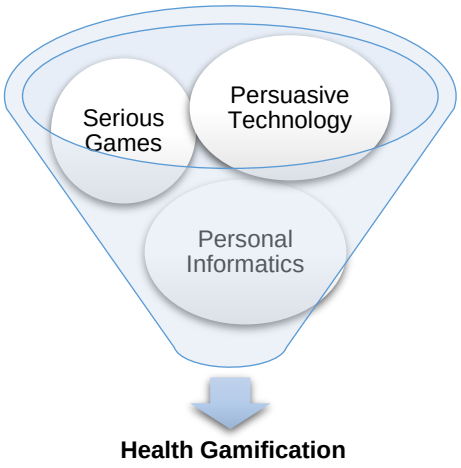

Figure 9: Schematic representation of health gamification concept.
Adapted: Johnson, et al. (2016).

Apart from the development of engagement and brand attitude, there are several motivations for the use of gamification for a change of behavior in user’s health, such as intrinsic motivation, wide availability through mobile technology and "ubiquitous" sensors, broad appeal, great applicability, cost-benefit efficiency, the possibility to fit in with individual daily life and the promotion of user-wanted well-being (Johnson, et al., 2016). These characteristics lead us to the introduction of the brand community concept, which will be developed and analyzed later.

The authors Kotler, Kartajaya, & Setiawan (2017) also highlight the strong trend introduced by the SoLoMo concept (social, location and mobile) that we are currently see-through mobile applications, which usually allow the addition of collaborative functions and social sharing, as well as location services and mobile capacity.

Most of the gamified applications developed by the brands in this context, present several communalities, namely, the objective of evaluating the performance of various aspects of daily life and promoting different activities and habits to achieve a healthy lifestyle. These applications help to create a balanced lifestyle pattern, recording a wide variety of information, through the SoLoMo concept. Some applications have also social resources that stimulate competitiveness, community physical exercise and enhances user engagement with the activities over a longer period (Tu, Hsieh, & Feng, 2019).

2. Brand Management

2.1 Brand Concept

The American Marketing Association (2021) defines a brand as “a name, term, design, symbol, or any other feature that identifies one seller’s goods or service as distinct from those of other sellers”. However, the authors Kotler & Keller (2016, p. 322) state that a brand “is thus a product or service whose dimensions differentiate it in some way from other products or services designed to satisfy the same need. These differences may be functional, rational or tangible – related to product performance of the brand. They may also be more symbolic, emotional, or intangible – related to what the brand represents or means in a more abstract sense.”

On the other hand, according to the research of Kotler & Armstrong (2021) the competition factor is added, where a brand that meets a certain set of characteristics must be distinguished from the rest of the universe of competitors.

A brand may also represent a synonym of identity and personality, through a distinctive set of features that allow it to be distinguished from others, with the aim of establishing relationships with its users (Oliveira, 2019).

2.2 Defining Brand Equity

The authors Kotler & Keller (2016, p. 324) defines the brand equity as “the added value endowed to products and services with consumers. It may be reflected in the way consumers think, feel, and act with respect to the brand, as well as in the prices, market share, and profitability it commands”. As a complement, the authors Kotler & Armstrong (2021, p. 253) add that this concept is “the differential effect that knowing the brand name has on customer response to the product or its marketing.”

There are several perspectives to evaluate brand equity, however in this study, customer-based brand equity will be addressed. The customer-based brand equity is “the differential effect brand knowledge has on consumer response to the marketing of that brand.” (Kotler & Keller, 2016, p. 324).

However, brands can have a positive or negative effect on customer-based brand equity. According to Kotler & Keller (2016, p. 324), “a brand has positive customer-based brand equity when consumers react more favorably to a product and the way it is marketed when the brand is identified than when it is not identified. A brand has negative customer-based brand equity if consumers react less favorably to marketing activity for the brand under the same circumstances.”

In this context, the authors Kotler & Keller (2016, p. 325) identified three critical factors of customer-based brand equity:

1) “Brand equity arises from differences in consumer response. If no differences occur, the brand-name product is essentially a commodity, and competition will probably be based on price.”

2) “Differences on response are a result of consumers’ brand knowledge, all the thoughts, feelings, images, experiences, and beliefs associated with the brand.”

3) “Brand Equity is reflected in perceptions, preferences, and behavior related to all aspects of the marketing of a brand.”

According to Xi & Hamari (2020) research, the brand engagement is considered as one of the most relevant elements of brand equity, in that if brand customers are disposed to invest in the brand through interaction or recommendation, the greater their engagement with the brand will be, which will be reflected in brand equity.

In the context of customer-based brand equity, the concept of perception and its four sub-dimensions: - usefulness; - ease-of-use; - social influence; and - satisfaction and the brand engagement composed by its cognitive, emotional, and social sub-components will be addressed next.

2.3 User Perception

The gamified applications are especially beneficial to reach different users in different parts of the world, however, the development of this type of applications cannot consist only in game components such as points and badges for users, neglecting the game mechanics (internal and external) and dynamics, being the major aim of this type of applications provide a similar experience to a game (Hofacker, Ruyter, Lurie, Manchanda, & Donaldson, 2016).

In this sequence, is relevant assess the perception concept that is represented by “the process by which we select, organize, and interpret information inputs to create a meaningful picture of the world” (Kotler & Keller, 2016, p. 189). Various individuals when faced with the same stimulus may form different perceptions due to three distinctive factors according to Kotler & Armstrong (2021, pp. 163-164):

1) selective attention: “ the tendency for people to screen out most of the information to which they are exposed”;

2) selective distortion: “describes the tendency of people to interpret information in a way that supports what they already believe.”

3) selective retention: “means that consumers are likely to remember good points made about a brand they favor and forget good points made about competing brands.”

As users interpret a lot of information through their senses, it is then relevant to evaluate - usefulness, ease-of-use, social influence, and satisfaction of gamified application users.

2.3.1 Usefulness

According to Davis (1989, p. 320), usefulness is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance". In this context it is also possible to add that it is an excellent predictor of the acceptance and use of technological resources (Ambalov, 2021).

Therefore, a system with a great perceived utility can be considered to show to the user that there is a positive relationship between its use and performance. However, as gamified systems have a utilitarian dimension, it is assumed that the usefulness of the system perceived by users is essential for its continuous use (Hamari & Koivisto, 2015).

2.3.2 Ease-of-Use

The ease-of-use, on the other hand, refers to “the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p. 320). The authors Rodrigues, Oliveira, & Costa (2016, p. 116), contribute with their research to the present concept, indicating that “On technology acceptance theories, the perceived ease-of-use increases the enjoyment and the attitude towards to use a certain system.”

If the gamified application or service is perceived as easy to use, it can promote the user-experience of efficiency, which is reflected in an experience of using the system without obstacles. Thus, users are more positive and more willing to remain using the service (Hamari & Koivisto, 2015).

2.3.3 Social Influence

The concept of social influence, according to various studies, exerts a significant role in the various decisions that all of us take (Hidalgo-Hidalgo, Jiménez, & López-Pintado, 2021). Social influence is the result of a “change in an individual's thoughts, feelings, communication or behavior resulting from the thoughts, feelings, communication, or behaviors of one or more people”, which may arise in a variety of ways (Kim & Hollingshead, 2015, p. 165).

On the other hand, the authors Hamari & Koivisto (2015, p. 422) state that this concept is “an individual’s perception of how important others regard the target behavior and whether they expect one to perform that behavior.” The authors Li, Sun, & Zia (2020) also point out that nowadays social influence is exercised especially through the use of social networks, where different individuals through different interactions influence the behavior and attitudes of others.

In the context of gamification, social influence is expected to be reflected in user attitudes and intentions of use, it is also considered to be a significant factor as it represents the way a user perceives the use of a service, according to the perceptions of other users (Hamari & Koivisto, 2015).

2.3.4 Satisfaction

The satisfaction concept is defined by Kotler & Keller (2016, p. 153) as “a person’s feelings of pleasure or disappointment that result from comparing a product or service’s perceived performance (or outcome) to expectations.” Thus, satisfaction can then be considered as the result between the performance of a product or service and the expectations regarding it (Kotler & Armstrong, 2021).

Satisfaction can also be considered as the result of both positive and negative assessments when building a relationship (Sousa & Alves, 2019). Knowing that in the same way that satisfaction influences the intention to use games, satisfaction will also positively impact the intentions to use a gamified service (Hamari & Koivisto, 2015).

Monitoring and management of satisfaction levels is a must for any organization as it provides insights into the factors that shape satisfaction and allows for changes in operations inherent to tactical marketing (Kotler & Keller, 2016).

2.4 Brand Engagement

Brand engagement can be defined as “the level of an individual customer’s motivational, brand-related and context-dependent state of mind characterized by specific levels of cognitive, emotional and behavioral activity in direct brand interactions” (Hollebeek, 2011b, p. 560). The engagement is also represented by “repeated interactions of a customer with an organization which strengthens emotional and psychological bonds with the organization”, to increase loyalty (Raj & Gupta, 2018, p. 1538).

The dimensionality of this concept can be evaluated in a unidimensional or multidimensional way, thus, in this study the constructs of the cognitive, emotional, and social dimension in the brand engagement will be highlighted.

The cognitive dimension is considered “a consumer's level of brand-related thought processing and elaboration in a particular consumer/brand interaction” (Hollebeek, Glynn, & Brodie, 2014, p. 154). Regarding the emotional component, it is related to the concept of affection, i.e., it is representative of “a consumer's degree of positive brand-related affect in a particular consumer/brand interaction” (Hollebeek, Glynn, & Brodie, 2014, p. 154). The social dimension of engagement can be considered as “the connection, creation, and communication of the brand's story between the firm and consumers (both existing and prospects), using brand or brand-related language, images and meanings via the firm's social networking site” (Osei-Frimpong & McLean, 2018, p. 12).

However, the authors Kotler & Armstrong (2021, p. 37) state that new marketing is based on customer-engagement marketing, “fostering direct and continuous customer involvement in shaping brand conversations, brand experiences, and brand community.” The objetive of this conception “is to make the brand a meaningful part of consumers’ conversations and lives.”

Gamification can positively affect brand engagement (Xi & Hamari, 2020; Murillo-Zamorano, Sánchez, & Muñoz, 2020) and further the consumer experience with the brand. The authors Hassan

& Hamari (2020) further reinforce that the basic principle of gamification and game culture is to provide a voluntary engagement in its users. On the other hand, gamification allows firms to collect spontaneous and valuable data on consumers' emotions and interactions (Nobre & Ferreira, 2017).

2.5 Brand Attitude

Initially, the attitude towards the brand was defined as a "recipients' affective reactions toward the advertised brand (or, where desirable, attitude toward purchasing the brand)" (Lutz, MacKenzie, & Belch, 1983, para. 6). However, according to the author Hollebeek (2011a, p. 562) the brand attitude "reflects an individual's relatively enduring evaluation of a branded object."

In the context of gamification, the studies analyzed by the authors Berger, Schlager, Sprott, & Herrmann (2018) led to the conclusion that gamified interactions improves attitudes towards the brand, depending on the game design dimension. According to the study by the authors Lee & Jin (2019), through the evidence identified in the literature, it can be stated that gamified applications contribute significantly to users' experiences with brands and to the formation of the brand attitude.

2.6 Brand Communities

According to Kotler & Keller (2016, p. 165), a brand community "is a specialized community of consumers and employees whose identification and activities focus around the brand." In this sense, the authors Kotler & Keller (2016, p. 165) highlight three characteristics that allows the identification of brand communities, namely:

1) "a consciousness of kind, or a sense of felt connection to the brand, company, product, or other community members";

2) "shared rituals, stories, and traditions that help convey the meaning of the community";

3) "a shared moral responsibility or duty to both the community as a whole and individual community members."

The concept of brand community presents many beneficial results for brands, as far as their consumers are more loyal and committed. As members of brand communities generally maintain a significant activity and exercise their advocacy, it results in greater marketing effectiveness and efficiency. This concept can also be a constant source of feedback for brands, boosting product improvement and innovation (Kotler & Keller, 2016).

The authors Kotler & Keller (2016) also highlight that brand communities allow the creation of twelve value creation practices, which are subdivided into four categories: - social networking; - impression management; - community engagement and - brand use, as it is possible to see in the table 5 below.

Table 5: Value creation practices in brand communities.

Value Creation Practices	
Social Networking	
Welcoming	"Greeting new members, beckoning them into the fold, and assisting in their brand learning and community socialization."
Empathizing	"Lending emotional and/or physical support to other members, including support for brand-related trials and/or for non-branded life issues."
Governing	"Articulating the behavioral expectations within the brand community."
Impression Management	
Evangelizing	"Sharing the brand "good news", inspiring others to use, and preaching from the mountaintop."
Justifying	"Deploying rationales generally for devoting time and effort to the brand and collectively to outsiders and marginal members in the boundary."
Community Engagement	
Staking	"Recognizing variance within the brand community membership and marking intragroup distinction and similarity."
Milestoning	"Noting seminal events in brand ownership and consumption."
Badging	"Translating milestones into symbols and artifacts."
Documenting	"Detailing the brand relationship journey in a narrative way, often anchored by and peppered with milestones."
Brand Use	
Grooming	"Cleaning, caring for, and maintaining the brand or systematizing optimal use patterns."
Customizing	"Modifying the brand to suit group-level or individual needs. This includes all efforts to change the factory specs of the product to enhance performance."
Commoditizing	"Distancing/approaching the marketplace in positive or negative ways. May be directed at other members or may be directed at the firm through explicit link or through presumed monitoring of the site."

Source: Kotler & Keller (2016, p. 167).

III. Research Methodology

3.1 Research Approach

The present dissertation was based on a two-step research approach:

- **Secondary data collection:** founded on literature review, to collect information in a credible and well-founded manner, a search was conducted based on relevant scientific articles using different databases and specific books. In order to narrow the search and direct it to the objective of this study, the following keywords were used alone or in combination: *gamification, gamification concept, gamification types, gamification elements, gamification frameworks, user types, gamification customization, marketing, brand concept, brand equity, user perceptions, usefulness, ease-of-use, social influence, satisfaction, brand engagement, brand attitude, attitude towards the brand and brand communities.* It was previously defined that the keywords indicated would be present in the abstract and/or title. The scientific articles were collected during the period between April 2020 and February 2021. The excluded articles corresponded to those that contained the selected keywords but, in their entirety, did not contribute to the objective of this research project.
- **Primary data collection:** through qualitative and quantitative research, using scales that allow users to evaluate gamification in the dimensions under study, using questionnaire surveys previously defined in the literature, as will be explained next.

Saunders, Lewis & Thornhill (2019) present three different research approaches in the model:

- **Deductive:** researchers advance a hypothesis or hypotheses based on a pre-existing theory, moving from general (theory) to particular (the research) to test the data (Silverman, 2013). Therefore, the principal propose is to confirm or refute an already existing theory by collecting new data and evaluating the propositions or hypotheses, this approach is suited to the positivist attitude, allowing the formulation of hypotheses and the statistical examination of anticipated results to an accepted level of probability (Snieder & Larner, 2009). This method is commonly used with questionnaires and other quantitative instruments, to evaluate the main theory by gather people options to confirm or refute hypotheses, still, the deductive approach can be used in and with qualitative research techniques.
- **Inductive:** is mostly exploited in qualitative research, to analyze a social phenomenon to obtain empirical patterns that operate as the start of a theory, allowing researchers to establish a theory rather than adopt a pre-existing one as in the deductive, this clearly outlines the difference in the two approaches. The inductive approach is characterized as a move from the specific to the general (Bryman & Bell, 2011), data are collected, priorly, and a theory is formed using the results of the data analysis, there is no primary framework, the research focus can thus be formed after the data has been collected, this method is commonly used for qualitative research throughout interviews, to analyze people option over a specific phenomenon and the research try to associate patterns between respondents (Flick, 2011), therefore this approach can explore a small sample. Entails generating or building new theory by collecting data to explore new phenomenon and themes to create a

conceptual framework. Lastly, the abductive approach entails theory modification or generation by using already existing theory to build new theory upon it.

- **Abductive:** is a combination of inductive and deductive, and set to address weaknesses associated with both deductive and inductive approaches.

According with Saunders, Lewis, & Thornhill (2019), there are two main research methods in social science studies, quantitative method, and qualitative method. Quantitative method - accomplishes global assumptions throughout a sizeable amount of data, using statistics and numerical selections, mostly, and is commonly used, when there is not a conventional assumption about a theme, therefore is better to analyze a large sample of data. This dissertation intended to evaluate gamification in a marketing context and analyze the different perceptions and dimensions, therefore is vital to do a more quantitative approach.

The hypotheses proposed are built upon the secondary data collection based on literature review, consequently, this dissertation will evaluate pre-existing hypotheses and theory with additional data collection for gamification in the health sector. From the previous research techniques designations, it is assumed that this research is deductive.

3.2 Research Purpose

The authors Robson & McCartan (2016) highlight three possible research purposes, namely: - descriptive; - predictive; and explanatory, as can be seen in the figure below (figure 10).

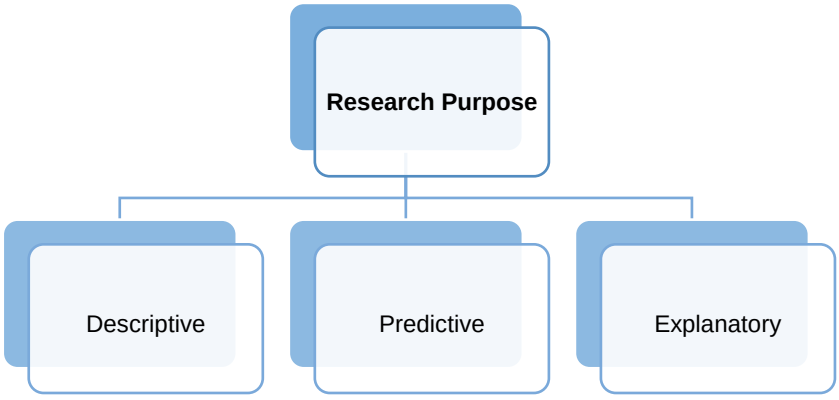

Figure 10: Types of research purposes.
Adapted: Robson & McCartan (2016).

Regarding the research purpose subtypes identified in figure 10, the authors Robson & McCartan (2016, p. 143) state:

1) Descriptive: “are primarily concerned with describing something; with documenting its characteristics.”

2) Predictive: “are primarily concerned with predicting or forecasting some event or phenomenon in the future.”

3) Explanatory: “are primarily concerned with developing or testing a theory about something; to identify the causal factors or mechanisms producing change.”

In this sequence, this study will present an explanatory purpose because it will evaluate gamification in a marketing context and analyze the different perceptions, and engagement and attitude towards the brand of the users of health, fitness, and well-being gamified applications. It is also intended to study the main users’ and, consequently the inherent motivations. Following on from this, will be established if brands seek to customize their applications by including game design elements associated with the most frequent user types in their applications. So, the present dissertation has an explanatory purpose, because it will study the mechanisms and causal factors inherent to health gamification.

3.3 Research Design

The secondary data collected through the literature review provided an overview of the framework of the topic for Research I, as well as the proposed objectives. In this sense, Research I will enable to understand and evaluate the use and behavior of the respondents in the context of gamified health, fitness, and well-being applications. Furthermore, the research model of this investigation will enable the individual results of each of the following variables under study: - perceptions: 1) usefulness; 2) ease-of-use; 3) social influence; and 4) satisfaction and - engagement and brand attitude, as well as the respective inter-connections between them, using quantitative methods defined through studies previously defined in the literature. Finally, Research I will be the information base that will allow for the continuity of the theme through the additions provided through the development of study II.

In Research II, it is intended to continue the study I using a quantitative methodology as well, based on the scale developed by Tondello, et al. (2016). The present research can be considered as a continuation study, by using the information collected through the literature review and Research I, based on the same cluster as in the Research I. Through this research it will be possible to understand and evaluate the main users' typologies and motivations associated to gamified applications in the context of health, fitness, and well-being. Following on from this, it will be established if brands seek to customize their applications by including game design elements associated with the most frequent user types in their applications.

3.4 Research Strategy

According to Saunders, Lewis, & Thornhill (2019) the research strategy can be considered a plan that allows answering the central question under study. Following on from this, the research strategies can be based on qualitative, quantitative or mixed methods. The same authors highlight eight different research strategies, namely: - experiment; - survey; - archival and documentary

research; - case study; - ethnography; - action research; - grounded strategy; and - narrative inquiry, as can be seen in figure 11.

While the experiment and survey are “principally or exclusively linked to a quantitative research design”, the archival and documentary research and case study “may involve quantitative or qualitative research, or a mixed design combining both”. Finally, the ethnography, action research, grounded strategy and narrative inquiry “are principally or exclusively linked to a qualitative research design” (Saunders, Lewis, & Thornhill, 2019, p. 190). In the following, the different research strategies will be addressed individually in order to assess which one is most suitable for the research purpose.

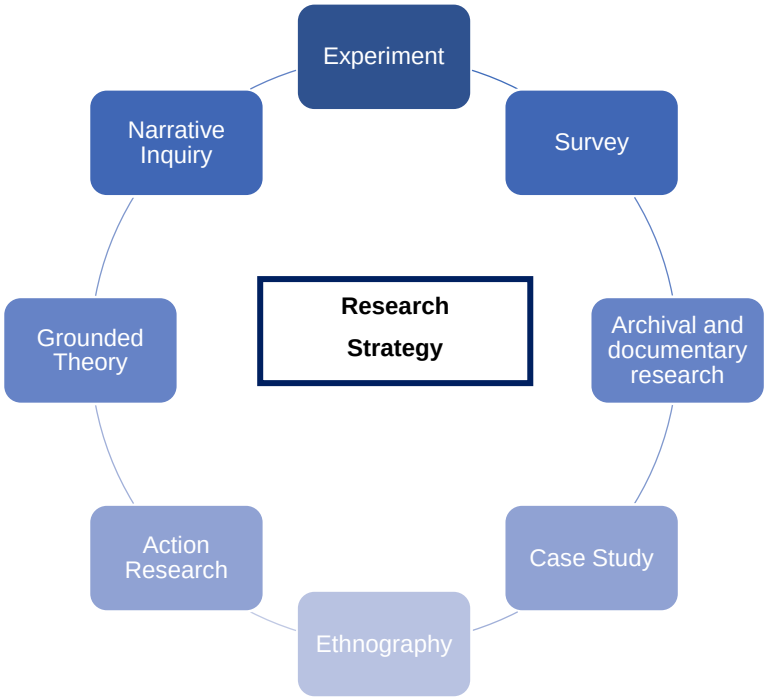

Figure 11: Types of research strategies.
Adapted: Saunders, Lewis, & Thornhill (2019).

1) **Experiment:** “The purpose of an experiment is to study the probability of change in an independent variable causing a change in another, dependent variable” (Saunders, Lewis, & Thornhill, 2019, p. 190).
2) **Survey:** “is usually associated with a deductive research approach. It is a popular strategy in business and management research and is most frequently used to answer ‘what’, ‘who’, ‘where’, ‘how much’ and ‘how many’ questions. It therefore tends to be used for exploratory and descriptive research (Saunders, Lewis, & Thornhill, 2019, p. 193).
3) **Archival and documentary research:** this strategy provides a “considerable scope to design a research project that capitalises on the wide range of secondary data sources” (Saunders, Lewis, & Thornhill, 2019, p. 195).

4) **Case study:** “is an in-depth inquiry into a topic or phenomenon whithin its real-life setting. The ‘case’ in case study research may refer to a person, a group, an organisation, an association, a change process, an event, as well as many other types of case subject” (Saunders, Lewis, & Thornhill, 2019, p. 196).
5) **Ethonography:** “is used to study the culture or social world of a group” and “literally means a written account of people or ethnic group” (Saunders, Lewis, & Thornhill, 2019, p. 199).
6) **Action research:** “is an emergent and iterative process of inquiry that is designed to develop solutions to real organisational problems through a participative and collaborative approach, which uses different forms of knowledge, and which will have implications for participants and the organisation beyond the research project” (Saunders, Lewis, & Thornhill, 2019, pp. 201-202).
7) **Grounded theory:** “can be used to refer to: a methodology – refers to the researcher’s choice of this strategy as a way to conduct research; a method of inquiry – refers to the data collection techniques and analytic procedures that it uses; and the result of a research process.” (…) It “may be used loosely to incorporate methodology and method but more specifically it refers to a theory that is grounded in or developed inductively from a set of data” (Saunders, Lewis, & Thornhill, 2019, p. 205).
8) **Narrative inquiry:** “has a more specific meaning and purpose. There will be research contexts where the researcher believes that the experiences of her or his participants can best be accessed by collecting and analysing these as complete stories, rather than collecting them as bits of data that flow from specific interview questions and which are then fragmented during data analysis” (Saunders, Lewis, & Thornhill, 2019, p. 209).

Accordingly, the research strategy used in this investigation will be the survey since it is generally associated with deductive research approach. In addition, surveys my “suggest possible reasons for particular relationships between variables”, which will be a contribution in the present analysis (Saunders, Lewis, & Thornhill, 2019, p. 194).

Regarding the questions in the survey, they can be adapted or adopted from other questionnaires, or it is possible to develop new questions. In the present research, the questions present in other studies identified in the literature were adapted and adopted, because this techniques are used when the replication of other studies is intended, making it possible to consider the reliability factor, which makes this technique more efficient than developing new questions.

There are several techniques for delivering and collecting the questionnaires, as shown in table 7. In this context, it was chosen to use the Internet route because according to the authors Saunders, Lewis, & Thornhill (2019) this option allows a greater access to the sample under study and a more appealing visual appearance, resulting in a possible higher response rate.

3.5 Sampling

The sampling techniques can be divided in two different types: 1) probability or representative samples: where “the chance, or probability, of each case being selected from the target population is known and is usually equal for all cases. This means it is possible to answer research questions and to achieve objectives that require you to estimate statistically the characteristics of the target population from the samples.”; and 2) non-probability samples: in which “ the probability of each case being selected from the target population is not known and it is impossible to answer research questions or to address objectives that require you to make statistical inferences about the characteristics of the population.” (Saunders, Lewis, & Thornhill, 2019, p. 296).

In accordance with the definitions of samples described above, the present investigation will use representative samples because is often associated with the survey technique and since statistical data is to be used in the presentation of the results of both investigations to meet the objectives. In the following, the different techniques associated with representative samples will be discussed in order to establish which one will be used in this study.

The authors Saunders, Lewis, & Thornhill (2019) indicated four subtypes of the representative sample typology, namely: 1) simple random; 2) systematic random; 3) stratified random; and 4) cluster, as can be seen in figure 12. Next, the characteristics of each of the subtypes indicated above will be analyzed.

1) **Simple random sampling:** “involves you selecting the sample at random from the sampling frame using a spreadsheet’s random number generator function or random number tables” (Saunders, Lewis, & Thornhill, 2019, p. 308).
2) **Systematic random sampling:** “involves you selecting the sample at regular intervals from the sampling frame” (Saunders, Lewis, & Thornhill, 2019, p. 309).
3) **Stratified random sampling:** “is a modification of random sampling in which you divide the target population into two or more relevant and significant strata based on one or a number of attributes” (Saunders, Lewis, & Thornhill, 2019, p. 311).
4) **Cluster sampling:** “is, on the surface, similar to stratified random sampling as you need to divide the target population into discrete groups prior to sampling. The groups are termed clusters in this form of sampling and can be based on naturally occurring group” (Saunders, Lewis, & Thornhill, 2019, p. 313).

According to the definitions referring to sampling techniques, in this study the cluster technique will be followed, since the surveys will be applied to a specific group, namely the physical exercise practitioners in gyms geographically located in the area of Porto.

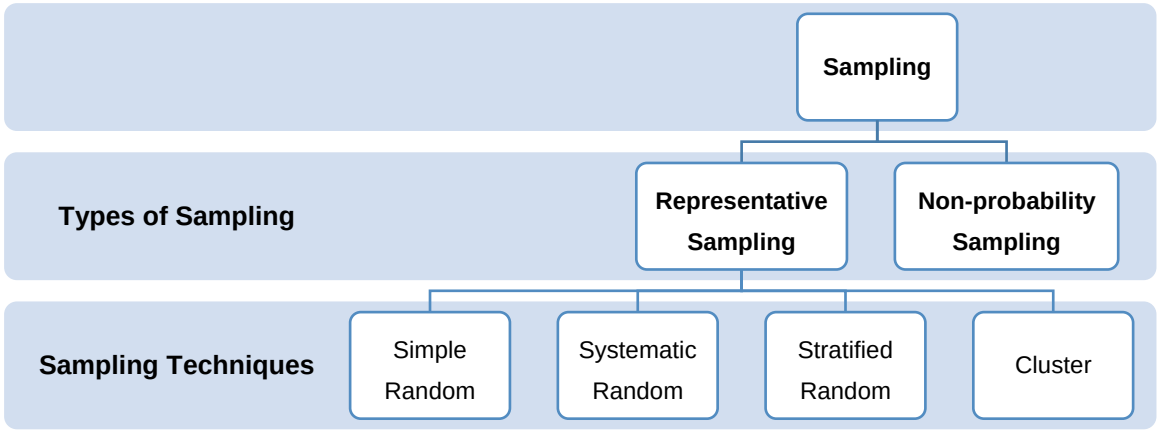

Figure 12: Sampling frame.
Adapted: Saunders, Lewis, & Thornhill (2019).

3.6 Research I – Brand Communities

3.6.1 Research Model and Hypotheses Definition

The Research I aims to evaluate gamification in a marketing context and to analyze the different perceptions - usefulness, ease-of-use, social influence and satisfaction, the brand engagement and the brand attitude of users of gamified applications of health, fitness, and well-being. Based on the analysis of the literature described above, the hypotheses and the research model for the study were formulated, as can be seen in table 6 and figure 13.

Table 6: Definition of hypotheses concerning the research model.

	Hypotheses Definition
H1	The usefulness of gamified applications influences the user's perception.
H2	The ease-of-use of gamified applications influences the user's perception.
H3	The social influence on gamified applications influences the user's perception.
H4	The satisfaction of gamified applications influences the user's perception.
H5	Perception influences brand engagement.
H6	Emotional engagement influences brand engagement.
H7	Cognitive engagement influences brand engagement.
H8	Social engagement influences brand engagement.
H9	The brand engagement influences the brand attitude.
H10	Perception influences the brand attitude.

Source: Amorim & Bernardes (2020, p. 424)

The Technology Acceptance Model (TAM) is the result of the contribution of researchers Fishbein & Ajzen (1975) through their Theory of Reasoned Action (TRA) according to Yang, Asaad, & Dwivedi (2017). The authors Yang, Asaad, & Dwivedi (2017, p. 463) state that "one's actual use of a technology system is influenced directly or indirectly by the user's behavioral intentions, attitude, perceived usefulness and perceived ease of the system." In this context, the aim was to assess the contribution and influence of the usefulness and ease-of-use of a gamified system defined by Davis (1989) on the overall perception of users (hypotheses H1 and H2 – figure 13). In the study of Yang, Asaad, & Dwivedi (2017) was reported some criticisms of TAM for not incorporating other variables into the model, as well as the non-application to a particular study context. Thus, the authors decided to incorporate social influence and enjoyment in their study. Accordingly, for the present research the same guidelines of the authors Yang, Asaad, & Dwivedi (2017) were followed and consequently the hypotheses H3 and H4 (figure 13) were established, which seek to assess the role of social influence and satisfaction in the overall perception of users, respectively.

In the research of the authors Hollebeek, Glynn, & Brodie (2014, p. 154), the concept of consumer brand engagement (CBE) was evaluated and was considered as "the core theoretical notion of 'interactive experience' underlying the 'engagement' concept." The CBE provides a better understanding and analysis of the contribution of each of the sub-dimensions inherent to brand engagement, thus constituting a metric for evaluating the performance of a given brand (Hollebeek, Glynn, & Brodie, 2014). According to authors Xi & Hamari (2020), the contribution of the sub-dimensions: - social, cognitive, and emotional, in the evaluation and conceptualization of brand engagement is reinforced in the research.

Based on Xi & Hamari's (2020) indication that only a few studies prove that gamification can effectively influence brand engagement, it was possible to establish the hypotheses H6, H7 and H8 presented in figure 13, to evaluate the contribution of each of the brand engagement sub-components in the context of gamified health, fitness, and well-being applications. It was also intended to establish the influence of users' global perception on brand engagement, in order to contribute to the theoretical conceptions inherent to the CBE concept - hypotheses H5 (figure 13).

In relation to brand attitude, in the study of Yang, Asaad, & Dwivedi (2017) is stated that is necessary to evaluate the contribution of brand engagement in the brand attitude. Thus, in the present investigation, was established the hypotheses H9 (figure 13), where the goal is to assess whether brand engagement influences brand attitude, in the context of gamified health, fitness and well-being applications.

Ultimately, in order to understand the inter-relationships between the different variables under study, it was established the contribution of the overall perception of a user of gamified health applications in its attitude towards the brand - hypothesis H10 (figure 13).

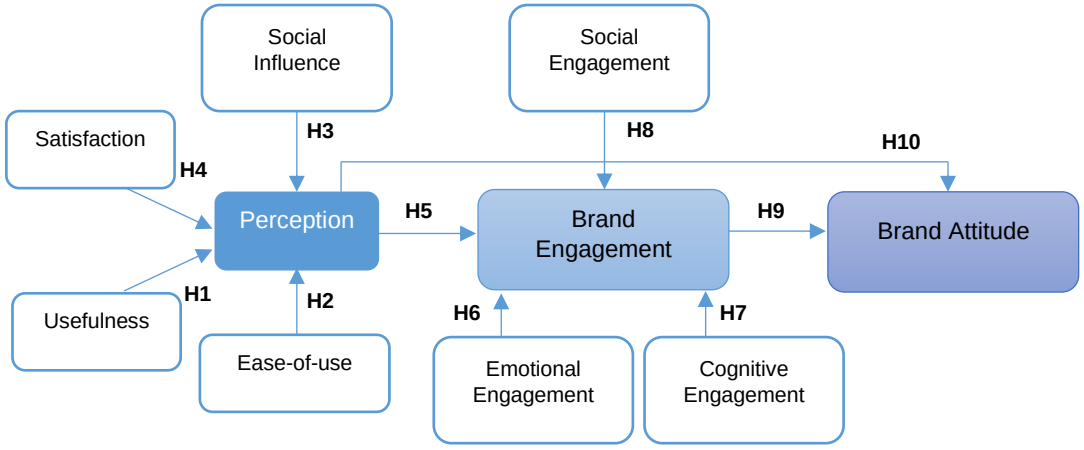

Figure 13: Research model used in the study.
Source: Amorim & Bernardes (2020, p. 424)

3.6.2 Investigation Method

The definition of the questionnaire model used to understand the different dimensions was structured from research paper defined in the literature - usefulness was based on the research by Davis (1989), in relation to the ease-of-use was used the research by Davis (1989) and Yang, Asaad, & Dwivedi (2017), social influence was based on the research by Hamari & Koivisto (2013) and satisfaction was defined according to the assumptions of the research by Yang, Asaad, & Dwivedi (2017). Regarding the brand engagement and the brand attitude, the questionnaire used by authors Xi & Hamari (2020) and Yang, Asaad & Dwivedi (2017), respectively, was adapted. However, the necessary changes have been made to the authors' research paper for the evaluation of gamification in the context of service marketing. The different dimensions and the respective items used in the questionnaire are present in Appendix A.

3.6.3 Data Collection

The pre-test of the questionnaire was composed by a group of 12 participants, with the objective of evaluating the present questions, identifying possible difficulties in their interpretation, and understanding, for the purpose of validating the items.

The survey took place between April 13th and May 1st, 2020, through a questionnaire consisting of 36 questions using the online platform Google Forms. The questionnaire used in this research is composed of three sections. The first part of the questionnaire refers to the demographic data of the participants, namely: gender, age, academic background, the number of known gamified applications and the use of gamified applications. The second section is aimed at participants who have indicated that they use gamified applications, seeking to assess perceptions - usefulness, ease-of-use, social influence, and satisfaction, as well as what health, fitness and well-being applications participants use and how often. The last section of the questionnaire aims to assess the engagement and brand attitude of users of health applications. According to the literature used for the construction of the

questionnaire, the items in the second and third section were evaluated on a Likert scale between 1 to 5, reflecting the following response options: 1 - Totally disagree; 2 - Disagree; 3 - Indifferent; 4 - Agree; 5 - Fully agree.

3.7 Research II – Brand Personalization

3.7.1 Investigation Method

The definition of the questionnaire model used to understand the different types of users in health, fitness and well-being applications was structured from the study by Tondello, et al. (2016). For this purpose, the 24 items present in the Hexad model were considered, and the necessary changes were made for the context of the present study. The different types of users and the respective items used in the questionnaire are present in the Appendix B.

3.7.2 Data Collection

Prior to the dissemination of the questionnaires for data collection, a pre-test composed of a group of 12 participants was carried out to evaluate the present questions, by identifying possible difficulties in their interpretation and understanding and to obtain possible suggestions for improvement.

The survey took place between August 20th and September 13th, 2020 through a questionnaire consisting of 31 questions, using the online platform Google Forms. The questionnaire used in this research is composed of three sections. The first part of the questionnaire refers to the demographic data of the participants, namely: gender, age, and academic background. The second part of the questionnaire concerns the use of gamified applications for health, fitness, and well-being, in particular the applications most frequently used by users and its regularity. The third section of the questionnaire aims to assess the types of users of health applications. According to the literature used for the construction of the questionnaire, the items in the third section were evaluated on a Likert scale from 1 to 7, with the extremes being subtitled as (1) "Strongly disagree" and (7) "Strongly agree".

3.8 Global Overview of Research Methods

An overview of the previously defined research methods used for the present investigation can be observed in table 7.

Table 7: Global overview of research methods.

Research Approach	**Deduction**		Induction		Abduction			
Research Purpose	Descriptive		Predictive		**Explanatory**			
Data Collecting Techniques	Qualitative				**Quantitative**			
Research Strategies	Experiment	**Survey**	Archival/ documentary research	Case Study	Ethnography	Action research	Grounded Theory	Narrative inquiry
Collecting/ Delivering the Questionnaire	**Internet**		SMS	Face-to-Face	Postal	Delivery and Collection		Telephone
Questionnaire Design	**Adapting**		**Adopting**		Developing New			
Types of Sampling	**Probability Samples**				Non-probability Samples			
Sampling Techniques	Simple Random		Systematic Random		**Cluster**	Stratified Random		
Questions Types	**5/7-point Likert Scale – Close ended questions**							
Validity and Reliability	**Factorial Analysis**				**Cronbach Alpha**			

Adapted: Robson & McCartan (2016); Saunders, Lewis, & Thornhill (2019).

IV. Results

4.1 Research I – Brand Communities

4.1.1 Descriptive Statistics

In the present study, a sample of 164 individuals was considered. The analysis of the sample allowed us to identify that 84 male individuals were considered, which corresponds to 51.2% of the sample and 80 female individuals corresponding to 48.8%. Regarding the age groups of the participants, it was found that the 19-29 age group is the most frequent (58.5%), then the 30-39 age group (22.6%), the 40-49, 50-59 and ≤ 18 years represents the least frequent age groups, with a percentage of 10.4%, 6.7% and 1.8% respectively. The academic background variable shows that most participants have a bachelor's degree (45.7%), followed by secondary education (29.3%), master's degree (18.9%), basic education (4.9%) and PhD and postdoctoral with 0.6%, respectively. Regarding gamification, all participants know at least one gamified application. However, only 86 individuals (52.4%) state their use. The results in the table 8 below represent the distribution of the demographic characteristics of the participants.

Table 8: Descriptive statistics of the sample in terms of frequencies and percentages.

Variable	Typology	Frequency	Percentage
Gender	Male	84	51,2%
	Female	80	48,8%
Age	≤ 18 years	3	1,8%
	19 – 29 years	96	58,5%
	30 – 39 years	37	22,6%
	40 – 49 years	17	10,4%
	50 – 59 years	11	6,7%
Academic Background	Basic Education	8	4,9%
	Secondary Education	48	29,3%
	Bachelor's Degree	75	45,7%
	Master's Degree	31	18,9%
	PhD	1	0,6%
	Postdoctoral	1	0,6%
No. Gamified Applications Known	One application	45	27,4%
	From 2-4 applications	91	55,5%
	From 5-7 applications	23	14,0%
	From 8-10 applications	4	2,4%
	From 11-13 applications	1	0,7%
Gamified Applications Use	Yes	86	52,4%
	No	78	47,6%
	Total	**164**	**100%**

Source: Own study.

4.1.2 Reliability Analysis

4.1.2.1 Cronbach's Alpha

The Cronbach's Alpha is one of the measures most used for checking the internal consistency of a group of variables. The Cronbach's Alpha values in table 9 shows values greater than 0.9, which can be considered as exceptionally good in all dimensions according to the literature data.

Table 9: Reliability analysis results.

Dimension	Cronbach's Alpha	Number of Items
Perception	0,946	14
Brand Engagement	0,951	9
Brand Attitude	0,917	4
Total	0,968	27

Source: Own study.

4.1.2.2 Item Correlation

The summary of the correlations between items in the different dimensions is shown in table 10. For the correlation between items in the perception dimension, it is noted that there is a correlation deemed to be strong (0.570), the minimum value 0.24 refers to the correlation between the variables U1 and EU3 and the maximum value 0.864 refers to the correlation between S2 and S4. The correlation between the items of the brand engagement dimension can also be considered strong (0.690), the minimum value 0.565 refers to the correlation between the BEC3 and BES2 variables and the maximum value 0.866 refers to the correlation between BES2 and BES3. In the brand attitude dimension, is verified a strong correlation between items (0.734), the minimum value 0.673 is for the correlation between BA2 and BA1 variables and the maximum value 0.810 is shown in the correlation between BA3 and BA1.

Table 10: Summary of the correlations between items concerning the different dimensions.

	Dimension	Average	Minimum	Maximum	No. Items
Item Correlation	Perception	0,570	0,240	0,864	14
	Brand Engagement	0,690	0,565	0,866	9
	Brand Attitude	0,734	0,673	0,810	4

Source: Own study.

The corrected total item correlation indicates the Pearson correlation coefficient of each of the dimension items with the total value. In table 11, it is possible to verify that no item presents a value below the minimum described by the literature.

To check the effect of each variable on the internal consistency of the factor, it is necessary observe the Cronbach's Alpha if the item is excluded and compare it with the Cronbach's Alpha value for each

dimension, if it is greater the item should be removed. By analyzing table 11, no variable should be excluded from this study.

Table 11: Summary of item-total statistics for the different dimensions.

Dimension	Items	Scale average if the item is excluded	Corrected total item correlation	Cronbach's Alpha if the item is excluded
Perception	U1	49,8488	0,610	0,945
	U2	49,4884	0,726	0,942
	U3	49,4651	0,751	0,941
	U4	49,5116	0,754	0,941
	EU1	49,3140	0,770	0,941
	EU2	49,9651	0,698	0,943
	EU3	49,2442	0,675	0,943
	SI1	50,2674	0,686	0,944
	SI2	50,5116	0,636	0,945
	SI3	50,5349	0,601	0,946
	S1	49,6628	0,817	0,940
	S2	49,3953	0,820	0,940
	S3	49,3721	0,835	0,940
	S4	49,5233	0,883	0,938
Brand Engagement	BEE1	30,9302	0,784	0,946
	BEE2	30,7326	0,871	0,942
	BEE3	30,9186	0,765	0,948
	BEC1	31,0698	0,755	0,948
	BEC2	31,1860	0,811	0,945
	BEC3	31,5349	0,791	0,946
	BES1	30,9186	0,859	0,943
	BES2	30,7791	0,795	0,946
	BES3	30,7209	0,844	0,943
Brand Attitude	BA1	12,1628	0,818	0,889
	BA2	12,1163	0,792	0,898
	BA3	12,2442	0,862	0,874
	BA4	11,9651	0,770	0,906

Source: Own study.

4.1.3 Correlation between Principal Components

Pearson's correlation coefficient measures the intensity and direction of the linear type association between two continuous variables with bivariate normal distribution. Given that normality was not rejected through the analysis of the p-value significance of the Kolmogorov-Smirnov Test, it is possible to assume the Pearson's correlation coefficient. According to table 12, all Pearson's coefficients were considered statistically significant, for a significance level of 0.01.

Regarding the correlation coefficient with the total score, it can be seen that it is present in the brand attitude component, which reinforces the importance of this dimension for the participants and, consequently, for the different brands that use gamified applications.

Each of the components directly and individually influences the total score, with each component presenting different and simultaneously interrelated variables, as they exert a non-exclusive influence on each other. Table 12 shows that perception and brand engagement present the lowest correlation among the components, however the brand engagement and the brand attitude are the components with the highest relationship among themselves.

Table 12: Pearson's correlations between the different components.

Component	Perception	Brand Engagement	Brand Attitude	Total Score
Perception	1,000			
Brand Engagement	0,679*	1,000		
Brand Attitude	0,716*	0,839*	1,000	
Total Score	0,867*	0,927*	0,938*	1,000
***The correlation is significant at 0.01 level.**				

Source: Own study.

4.1.4 Factorial Analysis

In this study, three factorial analyzes were carried out in isolation to check the unidimensionality of the dimensions, i.e. whether all items in an instrument are related to a single construct (Laros, 2012, p. 163). The total sample is composed of 164 participants, however for the respective statistical analysis, only 86 participants were considered due to the use of gamified applications.

4.1.4.1 Perception

First, a factorial analysis to the 14 items that integrate the perception was performed. Kaiser Meyer Olkin's Measure (KMO) is a method that compares the simple correlations with the observed partial correlations, as well as indicates the proportion of variability that is common to the variables. For this purpose, it was used the analysis of table 13 which resulted in a value of KMO = 0.908 (90.8%), which represents an excellent result of factorial analysis.

Then, Barlett's Sphericity Test was performed, which was shown to be relevant for the present factorial analysis, since $p=0.000<0.05$, then the null hypothesis was rejected. One can then consider that the matrix of population correlations is different from the identity matrix, that is, there is correlation between the different variables.

Regarding the Factors Extraction, the Principal Components Method was used in the SPSS software. For the Factors Extraction different criteria can be used, having chosen the Kaiser Criteria, where the main components or factors with higher than average own values (of all the obtained own values) are used, which resulted in the retention of 3 factors, which explain 78.146% of the variance. For interpretation purposes, the axes were rotated using the Varimax Extraction Method with Kaiser Normalization - Rotating Component Matrix.

The perception components in the table 13 presents the factor loadings rotated for each variable in each factor. The items grouped in the same components suggest that component 1 refers to ease-of-use and satisfaction, component 2 represents usefulness and component 3 refers to social influence.

Table 13: Principal Components Factorial Analysis (Perception).

Items	Factor Loadings			KMO	Cumulative initial eigenvalues (%)
Component				0,908	78,146
	1	**2**	**3**		
U1 - Increases my productivity.		,886			
U2 - Improves my performance.		,790			
U3 - Enhances my efficiency.		,803			
U4 - It is useful for my daily life.		,539			
EU1 - I consider applications flexible.	,769				
EU2 - It is accessible to compete with another person.	,451				
EU3 - Applications are easy to operate.	,810				
SI1 - If the people who influence me use it, I will use it too.			,745		
SI2 - People encourage me to use gamified applications.			,868		
SI3 - For my friends it is pertinent to use gamified applications.			,857		
S1 - Applications integrate my free time.	,806				
S2 - I am satisfied with the applications.	,791				
S3 - I find the applications interesting.	,798				
S4 - I feel pleasantly involved.	,779				

Source: Own study.

4.1.4.2 Brand Engagement

The factorial analysis related to brand engagement, was made to the 9 items that integrate this measure. The KMO present in table 14 presents the value of 0.895 (89.5%), so the result of the factorial analysis is considered good. Then, Barlett's Sphericity Test was performed, which allowed the conclusion that there is correlation between the different variables.

The Factors Extraction according to the Kaiser Criteria resulted in the retention of 1 factor, which explains 72.498% of the variance. The analysis of the factor loadings of the component matrix present in table 14 permits to conclude that they are excellent since they are superior to 0.71. Therefore, the items confirm that the extracted component represents the brand engagement.

Table 14: Principal Components Factorial Analysis (Brand Engagement).

Items	Factor Loadings	KMO	Cumulative initial eigenvalues (%)
Component		0,895	72,498
BEE1 - I consider myself linked to the brand.	,828		
BEE2 - I am excited about the brand.	,903		
BEE3 - I love the brand.	,817		
BEC1 - I like to learn more about the brand.	,808		
BEC2 - Any subject related to the brand captivates my attention.	,854		
BEC3 - I think a lot about the brand.	,835		
BES1 - I like to use brand products with my friends.	,892		
BES2 - I share my experiences with the brand's products/services with other people.	,842		
BES3 - I like to recommend the brand's products/services to other people.	,880		

Source: Own study.

4.1.4.3 Brand Attitude

The third factorial analysis was carried out to test the reliability of the brand attitude, with an analysis of the 4 items related to this measure. The KMO available in table 15 resulted in the value 0.795 (79.5%), so the result of the factorial analysis is considered average. Barlett's Sphericity Test allowed considering that there is correlation between the different variables.

The Factors Extraction according to the Kaiser Criteria resulted in the retention of 1 factor, which explains 80.092% of the variance. The analysis of the factor loadings of the component matrix present in table 15 permits to conclude that they are excellent since they are superior to 0.71. Therefore, the items confirm that the extracted component represents the brand attitude.

Table 15: Principal Components Factorial Analysis (Brand Attitude).

Items	Factor Loadings	KMO	Cumulative initial eigenvalues (%)
Component		0,795	80,092
BA1 - I feel more available to buy branded products.	,900		
BA2 - The application makes me feel satisfied when selecting the brand.	,882		
BA3 - The application makes me intend to use other services/products of the brand.	,927		
BA4 - I could recommend the brand to other people.	,869		

Source: Own study.

4.1.5 Multiple Linear Regression

4.1.5.1 Perception Analysis

The first multiple linear regression performed considered perception as a dependent variable and usefulness, ease-of-use, social influence, and satisfaction as predictors. To evaluate the model's effectiveness, the summary of its details was analyzed (table 16).

Table 16: Model Summary (Dependent Variable: Perception; Predictors: Usefulness, Ease-of-Use, Social Influence and Satisfaction).

Model Summary				
R	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**Durbin-Watson**
1,000	1,000	1,000	0,00000	1,701

Source: Own study.

The R-square is related to the Coefficient of Determination, being its value in the present analysis 1,000, which means that 100% of the variation of perception is justified by the combination of the defined independent variables. The analysis to the table 17 below allows to conclude that the model is statistically significant ($p<0.05$).

Table 17: ANOVA analysis.

ANOVA				
Sum of Squares	**Df**	**Mean Square**	**Z**	**Sig.**
488,707	4	122,177	0,000	0,000

Source: Own study.

Table 18 presents the summary of the regression coefficients. The results indicate that the usefulness, ease-of-use, social influence and satisfaction of the gamified application influence the user's perception ($\beta=0.250$, $p<0.05$).

Table 18: Regression coefficients (Dependent Variable: Perception).

	Unstandardized Coefficients		**Standardized Coefficients**	**Sig.**
	B	**Std. Error**		
Constant	-2,220E-15			0,000
Usefulness	0,250	0,000	0,324	0,000
Ease-of-Use	0,250	0,000	0,214	0,000
Social Influence	0,250	0,000	0,290	0,000
Satisfaction	0,250	0,000	0,327	0,000

Source: Own study.

4.1.5.2 Brand Engagement Analysis

In the second multiple linear regression, brand engagement was considered as a dependent variable and perception and emotional, cognitive, and social engagement as predictors. The procedures previously described were considered for this analysis.

Table 19: Model Summary (Dependent Variable: Brand Engagement; Predictors: Perception, Emotional, Cognitive and Social Engagement).

Model Summary				
R	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**Durbin-Watson**
1,000	1,000	1,000	0,00000	1,044

Source: Own study.

The model summary (table 19) indicated that the R-square is 1,000, which means that 100% of the variation in brand engagement was justified by the combination of the defined predictors. The model presents statistical significance ($p<0.05$), which means that it successfully predicts brand engagement (table 20).

Table 20: ANOVA analysis.

ANOVA				
Sum of Squares	**Df**	**Mean Square**	**Z**	**Sig.**
454,337	4	113,584	0,000	0,000

Source: Own study.

The analysis of the relationships between dependent and independent variables presented in table 21 indicates that each of the variables contributes to the model, except for perception. Emotional, cognitive, and social engagement influence brand engagement ($\beta=0.333$, $p<0.05$). However, perception does not influence brand engagement ($p>0.05$).

Table 21: Regression coefficients (Dependent Variable: Brand Engagement).

	Unstandardized Coefficients		**Standardized Coefficients**	**Sig.**
	B	**Std. Error**		
Constant	4,4409E-15			0,000
Perception	5,5698E-16	0,000	0,000	1,000
Emotional Engagement	0,333	0,000	0,325	0,000
Cognitive Engagement	0,333	0,000	0,352	0,000
Social Engagement	0,333	0,000	0,391	0,000

Source: Own study.

4.1.5.3 Brand Attitude Analysis

In the third analysis of multiple linear regression, the brand attitude was defined as a dependent variable and the perception and brand engagement as independent variables. In this analysis, the procedures previously described were also performed.

Table 22: Model Summary (Dependent Variable: Brand Attitude; Predictors: Perception and Brand Engagement).

Model Summary				
R	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**Durbin-Watson**
0,862	0,744	0,738	0,38340	1,606

Source: Own study.

The model summary (table 22) indicated that the R-square is 0.744, which means that 74.4% of the variation in the brand attitude was justified by the combination of the defined predictors. The model presents statistical significance ($p<0.05$), which means that it successfully predicts the brand attitude (table 23).

Table 23: ANOVA analysis.

ANOVA				
Sum of Squares	**Df**	**Mean Square**	**Z**	**Sig.**
35,407	2	17,704	120,438	0,000

Source: Own study.

The results in table 24 indicate that perception ($\beta=0.084$, $p<0.05$) and brand engagement ($\beta=0.212$, $p<0.05$) influence the brand attitude.

Table 24: Regression coefficients (Dependent variable: Brand Attitude).

	Unstandardized Coefficients		**Standardized Coefficients**	**Sig.**
	B	**Std. Error**		
Constant	0,445			0,000
Perception	0,084	0,024	0,270	0,001
Brand Engagement	0,212	0,024	0,656	0,000

Source: Own study.

4.1.6 Research Hypothesis Analysis

The analysis of the multiple linear regressions previously performed allows us to establish the results of the hypothesis model, as can be seen in table 25:

- The usefulness, the ease-of-use, the social influence and the satisfaction of gamified applications in the context of health, fitness and well-being, has influence on the user's perception, verifiable through the results of the hypotheses H1, H2, H3 and H4.

- The brand engagement is influenced by the emotional, cognitive, and social engagement (H6, H7 and H8 hypotheses). However, it was not possible to confirm whether overall user perception influences brand engagement (H5 hypotheses).
- In relation to brand attitude was possible to confirm that is influenced by the brand engagement and user's overall perception (H9 and H10 hypotheses).

Table 25: Results summary.

	Hypotheses Definition	Result
H1	The usefulness of gamified applications influences the user's perception.	Confirmed
H2	The ease-of-use of gamified applications influences the user's perception.	Confirmed
H3	The social influence on gamified applications influences the user's perception.	Confirmed
H4	The satisfaction of gamified applications influences the user's perception.	Confirmed
H5	Perception influences brand engagement.	Not Confirmed
H6	Emotional engagement influences brand engagement.	Confirmed
H7	Cognitive engagement influences brand engagement.	Confirmed
H8	Social engagement influences brand engagement.	Confirmed
H9	The brand engagement influences the brand attitude.	Confirmed
H10	Perception influences the brand attitude.	Confirmed

Source: Own study.

4.2 Research II – Brand Personalization

4.2.1 Descriptive Statistics

In the present study, a sample of 126 individuals was considered. The analysis of the sample allowed us to identify that 47 male individuals were considered, which corresponds to 37,3% of the sample and 79 female individuals corresponding to 62,7%. Regarding the age groups of the participants, it was found that the 18-25 age group is the most frequent (47,6%), then the 26-35 age group (25,4%), the 36-45, 46-55, 56-65, ≥ 66 years and < 18 years represents the least frequent age groups, with a percentage of 12,7%, 8,1%, 3,9%, 1,5% and 0,8% respectively. The academic background variable shows that most participants have a bachelor's degree (33,3%) or secondary education (33,3%), followed by master's degree (25,4%), basic education (7,1%) and PhD (0,9%). However, only 73 individuals (57,9%) state the use of gamification, but most users indicate daily (38,1%) or weekly use (15,9%). The results in the table 26 below represent the distribution of the demographic characteristics of the participants.

Table 26: Sample descriptive statistics (absolute and relative frequencies).

Variable			Absolute Frequency	Relative Frequency
Gender	Male		47	37,3%
	Female		79	62,7%
Age Groups	< 18 years		1	0,8%
	18 – 25 years		60	47,6%
	26 – 35 years		32	25,4%
	36 – 45 years		16	12,7%
	46 – 55 years		10	8,1%
	56 – 65 years		5	3,9%
	≥ 66 years		2	1,5%
Academic Backgrounds	Basic Education		9	7,1%
	Secondary Education		42	33,3%
	Bachelor's Degree		42	33,3%
	Master's Degree		32	25,4%
	PhD		1	0,9%
	Postdoctoral		0	0,0%
Use of Gamified Applications	Yes		73	57,9%
	Frequency of Use	Daily	48	38,1%
		Weekly	20	15,9%
		Fortnightly	2	1,6%
		Monthly	3	2,3%
	No		53	42,1%
		Total	**126**	**100%**

Source: Own study.

4.2.2 Reliability Analysis

4.2.2.1 Cronbach's Alpha

The Cronbach's Alpha values present in table 27 indicate that philanthropist, socializer, free spirit, and achiever user type are greater than 0,9, which can be considered as exceptionally good, according to the literature data. The player user type has a value considered good (between 0,8-0,9). In the context of this study, the disruptor user type has the minor value, but it can still be considered acceptable.

Table 27: Reliability analysis results.

User Type	Cronbach's Alpha	Number of Items
Philanthropist	0,903	4
Socializer	0,919	4
Free Spirit	0,901	4
Achiever	0,934	4
Disruptor	0,661	4
Player	0,860	4
Total	0,959	24

Source: Own study.

4.2.2.2 Item Correlation

The summary of the correlations between items in the different user types is shown in table 28. For the correlation between items in the philanthropist user type, it is noted that there is a correlation deemed to be strong (0,701), the minimum value 0,654 refers to the correlation between the variables P1 and P3 and the maximum value 0,761 refers to the correlation between P2 and P3. The correlation between the items of socializer user type can also be considered strong (0,740), the minimum value 0,625 refers to the correlation between the S1 and S2 variables and the maximum value 0.841 refers to the correlation between S2 and S4. In free spirit user type, is verified a strong correlation between items (0,700), the minimum value 0,592 is for the correlation between FS1 and FS2 variables and the maximum value 0,842 is shown in the correlation between FS1 and FS4. In relation to achiever user type is verified a correlation (0,786) and may be concluded that the minimum value (0,712) is present in the variables A1 and A2 and the maximum value (0,840) is noted in A1 and A3 variables. The disruptor user type has the weaker correlation between items (0,340), as can be seen in the table below, where the minimum value (0,121) is relative to D1 and D4 variables and the maximum value (0,507) is present in D3 and D4 variables. In the player user, the item correlation is good (0,607), being observable that the minimum value is noted between PR2 and PR3 variables and the maximum value is referent to PR2 and PR4 variables.

Table 28: Summary of the correlations between items concerning the different user types.

	User Type	Average	Minimum	Maximum	No. of Items
Item Correlation	Philanthropist	0,701	0,654	0,761	4
	Socializer	0,740	0,625	0,841	4
	Free Spirit	0,700	0,592	0,842	4
	Achiever	0,786	0,712	0,840	4
	Disruptor	0,340	0,121	0,507	4
	Player	0,607	0,483	0,743	4

Source: Own study.

4.2.3 Correlation between Principal Components

Initially, a normality test was performed, where the normality was rejected through the analysis of the p-value significance of the Kolmogorov-Smirnov Test, being necessary assume the Spearman's correlation coefficient. According to table 29, all Sperman's coefficients were considered statistically significant, for a significance level of 0,01.

Table 29: Sperman's correlations between the different components.

User Type	Philanthropist	Socializer	Free Spirit	Achiever	Disruptor	Player	Total Score
Philanthropist	1,000						
Socializer	0,584*	1,000					
Free Spirit	0,805*	0,638*	1,000				
Achiever	0,837*	0,366*	0,810*	1,000			
Disruptor	0,659*	0,707*	0,782*	0,580*	1,000		
Player	0,707*	0,312*	0,656*	0,786*	0,498*	1,000	
Total Score	0,894*	0,699*	0,922*	0,857*	0,822*	0,782*	1,000

***The correlation is significant at 0,01 level.**

Source: Own study.

Regarding the correlation coefficient with the total score, it is present in the free spirit (0,922), which reinforces the importance of this user type in the study context and, consequently, for the different brands that use gamified applications.

4.2.4 Factorial Analysis

The total sample is composed of 126 participants, however for the respective factorial analysis, only 73 participants were considered due to the use of gamified applications.

According to table 30, components A, C and D have the KMO value between 0.8 and 0.9, which represent good results. The KMO of components B and F indicates that their results are considered

average (0.7;0.8]. On the other hand, the KMO of component E presents the lowest result of this measure but can still be considered acceptable.

Following Barlett's Sphericity Test was performed, which was shown to be relevant for all components of factorial analysis, since p=0.000<0.05, then the null hypothesis was rejected. One can then consider that the matrix of population correlations is different from the identity matrix, that is, there is correlation between the different variables.

Regarding the Factors Extraction, the Principal Components Method was used in the SPSS software. This model generates as many factors as the number of variables included in the analysis. For the Factors Extraction different criteria can be used, having chosen the Kaiser Criteria, where the main components or factors with higher-than-average own values (of all the obtained own values) are used, which resulted in the retention of 4 factors in all components, which explain different values of variance. For interpretation purposes, the axes were rotated using the Varimax Extraction Method with Kaiser Normalization - Rotating Component Matrix.

Table 30: Factorial Analysis of the six different components under study.

Items		Factor Loadings	KMO	Cumulative initial eigenvalues (%)
Component A – Philanthropist Profile			0,837	77,581
P1	I am glad if I can help others by sharing my results in applications.	0,857		
P2	Through my experiences, I like to guide others in new challenges.	0,894		
P3	I like to share my experiences and knowledge.	0,884		
P4	The well-being of other people is important to me.	0,888		
Component B – Social Profile			0,778	80,569
S1	Interaction with other people in applications is important to me.	0,878		
S2	I like working as a team.	0,881		
S3	It is important for me to feel like an integral member of a certain community.	0,910		
S4	I like to participate in group activities.	0,921		
Component C – Free Spirit Profile			0,811	77,680
FS1	It is important for me to go my own way, without influence from other people.	0,903		
FS2	I often allow my curiosity to guide me to new experiences.	0,807		
FS3	I like to try new challenges.	0,895		
FS4	Being independent is important to me.	0,916		
Component D – Achiever Profile			0,849	83,963
A1	I like to overcome the obstacles that may arise.	0,921		
A2	It is important for me to accomplish all the tasks inherent to the challenges that exist in applications.	0,882		
A3	It is hard for me to give up a problem before I have found a solution.	0,932		
A4	I like to master tasks considered difficult.	0,930		
Component E – Disruptor Profile			0,651	51,342

D1	I like to challenge other people on applications.	0,520		
D2	I often question the current state of affairs.	0,801		
D3	I see myself as a rebel.	0,792		
D4	I do not like following rules.	0,718		
Component F – Player Profile			0,749	70,813
PR1	I like to participate in applications where I can earn rewards.	0,814		
PR2	Rewards are a good way to motivate me to achieve the goals of applications.	0,815		
PR3	It is important for me to get a return on my investment in the applications that I use.	0,792		
PR4	If there is a reward, I will do my best to achieve it.	0,937		

Source: Own study.

V. Discussion

The literature states that there are many communalities between game concepts and service marketing theory and was established by the authors Huotari & Hamari (2012, p. 19) that “game design elements can be described as services and games as service systems”. According to service marketing considerations, is the user individual perception that determines the service value (Huotari & Hamari, 2012), which reinforces the importance of individual users' perceptions in terms of usefulness, ease-of-use, social influence, and satisfaction, which consequently contribute to their overall perception, as seen through the results of this study.

Organizations continually seek innovative ways to connect with their audiences, which reinforces the role of the brand engagement dimension. Thus, authors Robson, Plangger, Kietzmann, McCarthy, & Pitt (2015, pp. 412-413) establish three recent developments that constitute unique opportunities for brand engagement:

- “new knowledge about the design and management of gaming experiences”
- “combined with the advent of social media and technology” and
- “the heightened interest in providing more engaging experiences”.

In this sense, the results highlight the importance of providing several levels of engagement, namely: emotional, cognitive, and social involvement to amplify the effect of brand engagement by users. Also noteworthy is the development of iterative engagement strategies, initiated through a certain challenge, in which a user is rewarded when he reaches an objective resulting from that challenge, which will consequently result in the allocation of a component, which will thus motivate user behavior (Harwood & Garry, 2015). The authors Xi & Hamari (2020), referring to previous studies, concluded that when the gamified application or service is interactive and challenging to users, they are largely related to brand engagement, as also found through this study. Perception was not considered as a predictor of brand engagement, this result is particularly important which means that brand engagement is reflected through its emotional, cognitive, and social components, which demonstrates that the level of the motivational mental state related to the brand is more valued than the overall perception of the application itself, which reminds us that each user evaluates a brand or service according to their own criteria.

Regarding the brand attitude is a fundamental dimension in this study, since this component translates the user's evaluations in relation to the brand, and the results have shown that the overall perception of the user in relation to the gamified application, as well as the brand engagement, have the capacity to influence the brand attitude. According to the definition of brand engagement, it is important for brands to develop activities with specific levels in relation to the emotional, cognitive, and social components to positively influence the brand attitude. Regarding the user's perception, should seek to simultaneously explore usefulness, ease-of-use, social influence, and satisfaction, so that the gamified applications correspond positively at each of these levels, seeking to consequently impact the brand attitude.

In addition, this research has highlighted the particularly significant contribution of perception and its respective sub-components, brand engagement and brand attitude on customer-based brand equity. Considering that customer-based brand equity is the differential result that knowing a certain brand

provokes in the response of its user, it is possible to highlight the favorable results in each of the study dimensions, which corroborates that the perception and brand engagement have a close connection with customer-based brand equity.

Regarding the users' typologies present in the gamified health applications under study, it was found that the highest relations with the total score are present, respectively, in the free spirit, philanthropist, and achiever user type, which brings out the importance of intrinsic motivation in these individuals, through the creation and exploration of new purposes, the need for new learnings and skills, and the search for new challenges.

In addition, the disruptor subtype shows a significant result since these gamified health applications are usually motivated by a need to change users' lives. On the other hand, the player subtype is not significant in the applications under study, since in this context users cannot be solely motivated by external rewards, and the role of satisfying intrinsic motivations must be emphasized. However, the results indicate that the socializer type presents the lowest total score, because users are not motivated globally by relatedness.

The effectiveness of gamified systems is dependent on its personalization, as different individuals have different levels of motivation. This requires customized solutions and systems with specific content and functionalities according to the individual needs of the users (Nasirzadeh & Fathian, 2020). However, the results presented in the research indicate that in the context of gamified health applications, all user typologies defined by Marczewski (2015) are present, to a greater or lesser extent, demonstrating that all users are willing to interact through mechanisms that promote encouragement and support. Thus, brands should incorporate game elements that meet the overall preferences of the users identified in the Hexad model, and not be exclusively focused on certain typologies of users.

VI. Conclusions, Limitations and Future Research Lines

This study analyzed gamification and marketing in the context of health, fitness, and well-being applications, exploring the effects and impacts on user perception and brand engagement and brand attitude. Additionally, the existing associations between the different dimensions and their variables were established.

Currently, there has been an increase in the number of gamified applications available in the different application stores, largely due to the high accessibility of mobile devices, which has increased the number of users using this type of applications. This study has made possible to establish the dimensions that user's value, so that brands consequently explore these aspects, to provide users with greater involvement with their respective brands and a positive attitude towards the brand, creating increased value for the concept of each brand.

The results confirm that interactive and challenging gamified applications allow the efficient exploitation of brand perception, engagement and positive attitude, and the most influential aspects of service marketing, to which gamified applications belong, have been identified by users.

In the context of gamified health applications, the concept of brand community can also be highlighted, as the characteristics identified by Kotler & Keller (2016) can be verified in this context, namely: the feeling of connection to the brand or other members of the community; the sharing of experiences among community members; and finally, a sense of shared commitment, both individually and as a group.

Currently, it is not enough for brands to be recognized by their users, but they need to promote the UAU factor, through a greater customer satisfaction, provide a unique customer experience and offer a greater involvement to customers, so that they can realize themselves (Kotler, Kartajaya, & Setiawan, 2017).

The present investigation also analyzed the digital transformation in the context of health, fitness, and well-being applications with recourse to gamification, exploring the main users' typologies in this context and, consequently the inherent motivations. Additionally, was also intended to assess whether brands seek to customize their applications by including game design elements associated with the most frequent user types in their applications.

It was possible to establish that users have predominantly intrinsic motivations in the context of health, fitness, and well-being, which means that is an activity based on its inherent satisfactions. In addition, it was also possible to establish that "free spirit" user type was the most recognized, which may be associated with the need for autonomy and self-expression of users. However, there is clearly no user typology model, and it is essential that brands seek to incorporate game design elements that meet the overall needs of all users.

The study has as added value the possibility for brands to recognize the most frequent typology of users in the context of health gamification and the dimensions more valued by these applications users, that have assumed an increasing role in the market, to develop their marketing with a focus on these variables, thus exploring the brand value and its relations with users.

There are two major limitations in this study that could be addressed in future research. First, the study focused on a limited study field, in the context of health, fitness and well-being and gamification is become more generalized and exploited by brands. Second this study presents as a possible limitation the questionnaire sample size, which may eventually limit the results generalization for other gamification environments.

Following the future directions for the present research, the authors Kotler, Kartajaya, & Setiawan (2017) highlight in their research that gamification can be further evaluated from the perspective of loyalty programs (LP's).

The LP's enable to reward consumers who buy frequently. It is a strategy that allows building consumer loyalty through its relationship with Customer Lifetime Value (CLV) concept and "can also produce a psychological boost and a feeling of being special and elite that customers value" (Kotler & Keller, 2016, pp. 165). The concept of CLV represents "the net present value of the stream of future profits expected over the customers' lifetime purchases" (Kotler & Keller, 2016, p. 160).

In this sense, it would be pertinent to assess the contribution of LP's in the different perceptions: - usefulness, ease-of-use, social influence and satisfaction, and brand engagement and brand attitude among users of gamified health, fitness and well-being applications.

Following the LP, was developed a pilot study in order to evaluate the previously defined objectives as future directions. Since the study of brand communities took place in the context of health applications, a search was made in order to define the LP in the same scope. In this sense, the "Farmácias Portuguesas" application was selected as the one that met the criteria for the study, namely being a gamified application and a LP.

For the evaluation of the respective components and sub-components, the questionnaire indicated in Appendix A was used. The questionnaire took place between February 3rd and February 20th, 2021 and was applied to two distinct samples, in order to obtain two different perspectives: 1) pharmaceutical users - represented as direct/indirect beneficiaries and 2) global users - individuals belonging to the community of Instituto Superior de Contabilidade e Administração do Porto (ISCAP).

In the pharmaceutical users study, a sample of 67 individuals was considered. The analysis of the sample allowed to identify 18 male individuals (26,9%) and 49 female individuals corresponding to 73,1%. Regarding the age groups of the participants, it was found that the 26-35 age group is the most frequent (38,8%), then the 36-45 age group (23,9%), the 46-55, 56-65, 18-25 and ≥ 66 years represents the least frequent age groups, with a percentage of 17,9%, 13,4%, 4,5% and 1,5% respectively. The academic background variable shows that most participants have a bachelor's degree (49,3%), followed by master's degree (44,7%) and PhD represented by 6,0%. Almost all participants indicated that they know the application "Farmácias Portuguesas" (98,5%). However, only 26 participants (38,8%) state their use.

The preliminary results of the statistical analysis demonstrate that usefulness, ease-of-use, social influence and satisfaction have an influence on their perception towards "Farmácias Portuguesas". Regarding brand engagement, it is influenced by emotional, cognitive and social engagement, and

by user perception (contrary to the study carried out in the brand communities). It can also be concluded that the brand attitude of the "Farmácias Portuguesas" users is influenced by the engagement with the brand and by the user's global perception.

In the ISCAP community study, a sample of 82 individuals was considered. The analysis of the sample allowed us to identify that 23 male individuals were considered, which corresponds to 28,0% of the sample and 59 female individuals corresponding to 72,0%. In relation to age groups of the participants, it was found that the 18-25 age group is the most frequent (67,1%), then the 26-35 age group (18,3%), the 36-45, 56-65 and 46-55 years represents the least frequent age groups, with a percentage of 11,0%, 2,4% and 1,2% respectively. The academic background variable shows that most participants have a bachelor's degree (52,4%), followed by high school education (37,8%) and master's degree represented by 9,8%. Regarding the variable about knowing the application "Farmácias Portuguesas", only 52.4% of the participants recognize it.

As the sample under study indicated that it does not use the application "Farmácias Portuguesas" in a majority way (98.8%), it was not possible to establish the pre-results related to the research model. Thus, it was verified through this result that the sampling chosen is representative of the non-use of the application. This result will lead to a new sampling criteria as a form of future direction for the research.

In addition, can be assessed in the future if gamified LP's may have a greater effectiveness when compared to traditional LP's, since there are studies showing that gamified LP's have better overall results than traditional LP's (Hwang & Choi, 2020).

References

Ambalov, I. (2021). Decomposition of perceived usefulness: A theoretical perspective and empirical test. *Technology in Society,* 64, 1-9.

American Marketing Association (2017). Definitions of Marketing: https://www.ama.org/the-definition-of-marketing-what-is-marketing/, accessed on 7th February 2021.

Amorim, V., & Bernardes, Ó. (2020). Game On: Gamification and Marketing in the Context of Health, Fitness and Well-being. *In Proceedings of the International Conference of Applied Business and Management*, 418-437.

Appiah, D., Ozuem, W., Howell, K., & Lancaster, G. (2019). Brand switching and consumer identification with brands in the smartphones industry. *Journal of Consumer Behaviour,* 18(6), 463-473.

Arjoranta, J. (2019). How to Define Games and Why We Need to. *The Computer Games Journal,* 8, 109-120.

Bai, S., Hew, K., & Huang, B. (2020). Does gamification improve student learning outcome? Evidence from a meta-analysis and synthesis of qualitative data in educational contexts. *Educational Research Review,* 30, 1-20.

Barbosa, M., & Rodrigues, C. (2020). Project Portfolio Management teaching: Contributions of a gamified approach. *The International Journal of Management Education,* 18(2), 1-13.

Bartle, R. (1996). Hearts, clubs, diamonds, spades: Players who suit MUDs. *Journal of MUD research,* 1(1), 1-27.

Behl, A., & Dutta, P. (2020). Engaging donors on crowdfunding platform in Disaster Relief Operations (DRO) using gamification: A Civic Voluntary Model (CVM) approach. *International Journal of Information Management,* 54, 1-15.

Berger, A., Schlager, T., Sprott, D., & Herrmann, A. (2018). Gamified interactions: whether, when, and how games facilitate self–brand connections. *Journal of the Academy of Marketing Science,* 46, 652-673.

Bergonse, R. (2017). Fifty Years on, What Exactly is a Videogame? An Essentialistic Definitional Approach. *The Computer Games Journal,* 6, 239-255.

Briciu, C., & Filip, I. (2018). Applying Gamification for Mindset Changing in Automotive Software Project Management. *Procedia - Social and Behavioral Sciences,* 238, 267-276.

Bryman, A., & Bell, E. (2011). *Business Research Methods,* 3rd Edition. Oxford: Oxford University Press.

Chow, C., Riantiningtyas, R., Kanstrup, M., Papavasileiou, M., Liem, G., & Olsen, A. (2020). Can games change children's eating behaviour? A review of gamification and serious games. *Food Quality and Preference,* 80, 1-16.

Conaway, R., & Garay, M. (2014). Gamification and service marketing. *SpringerPlus,* 3(653), 1-11.

Davis, F. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *Management Information Systems Research Center - University of Minnesota,* 13(3), 319-340.

Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From Game Design Elements to Gamefulness: Defining "Gamification". *In MindTrek'11*, 9-15.

Esposito, N. (2005). A Short and Simple Definition of What a Videogame Is. *In Proceedings of the 2005 DiGRA International Conference: Changing Views: Worlds in Play*, 1-6.

Flick, U. (2011). *Introducing Research Methodology: A Beginner's Guide to Doing a Research.* London: Sage Publications Ltd.

Foote, C. (2019). Fact of the Week: The Digital Economy Grew 4.3 Times Faster than the U.S. Economy Overall from 1997 to 2017: https://itif.org/publications/2019/04/15/fact-week-digital-economy-grew-43-times-faster-us-economy-overall-1997-2017, accessed on 1st June 2020.

Frie, K., Hartmann-Boyce, J., Jebb, S., Albury, C., Nourse, R., & Aveyard, P. (2017). Insights From Google Play Store User Reviews for the Development of Weight Loss Apps: Mixed-Method Analysis. *JMIR Mhealth Uhealth,* 5(12), 1-14.

Friedrich, J., Becker, M., Kramer, F., Wirth, M., & Schneider, M. (2020). Incentive design and gamification for knowledge management. *Journal of Business Research,* 106, 341-352.

Georgiou, K., & Nikolaou, I. (2020). Are applicants in favor of traditional or gamified assessment methods? Exploring applicant reactions towards a gamified selection method. *Computers in Human Behavior,* 109, 1-10.

Gillpatrick, T. (2019). The Digital Transformation of Marketing: Impact on Marketing Practice & Markets. *Economics,* 7(2), 139-156.

Hamari, J., & Koivisto, J. (2013). Social Motivations To Use Gamification: An Empirical Study of Gamifying Exercise. *In Proceedings of the 21st European Conference on Information Systems*, 1-12.

Hamari, J., & Koivisto, J. (2015). Why do people use gamification services? *International Journal of Information Management,* 35(4), 419-431.

Hamari, J., Koivisto, J., & Sarsa, H. (2014). Does Gamification Work? - A Literature Review of Empirical Studies on Gamification. *In Proceedings of the 47th Hawaii International Conference on System Sciences*, 3025-3034.

Hamid, M., & Kuppusamy, M. (2017). Gamification Implementation in Service Marketing: A Literature Review. *Electronic Journal of Business & Management,* 2(1), 38-50.

Harwood, T., & Garry, T. (2015). An investigation into gamification as a customer engagement experience environment. *Journal of Services Marketing,* 29(6/7), 533-546.

Hassan, L., & Hamari, J. (2020). Gameful civic engagement: A review of the literature on gamification of e-participation. *Government Information Quarterly,* 37(3), 1-21.

Herbert, B., Charles, D., Moore, A., & Charles, T. (2014). An Investigation of Gamification Typologies for Enhancing Learner Motivation. *In International Conference on Interactive Technologies and Games*, 71-78.

Hidalgo-Hidalgo, M., Jiménez, N., & López-Pintado, D. (2021). Social influence and position effects. *Journal of Economic Behavior and Organization,* 182, 113-131.

Hofacker, C., Ruyter, K., Lurie, N., Manchanda, P., & Donaldson, J. (2016). Gamification and Mobile Marketing Effectiveness. *Journal of Interactive Marketing,* 34, 25-36.

Hollebeek, L. (2011a). Exploring customer brand engagement: definition and themes. *Journal of Strategic Marketing,* 19(7), 555-573.

Hollebeek, L. (2011b). Demystifying customer brand engagement: Exploring the loyalty nexus. *Journal of Marketing Management,* 27(7/8), 785-807.

Hollebeek, L., Glynn, M., & Brodie, R. (2014). Consumer Brand Engagement in Social Media: Conceptualization, Scale Development and Validation. *Journal of Interactive Marketing,* 28(2), 149-165.

Hunicke, R., LeBlanc, M., & Zubek, R. (2004). MDA: A Formal Approach to Game Design and Game Research. *In AAAI Workshop on Challenges in Game AI*, 1-5.

Huotari, K., & Hamari, J. (2012). Defining Gamification - A Service Marketing Perspective. *In MindTrek 2012*, 17-22.

Hwang, J., & Choi, L. (2020). Having fun while receiving rewards?: Exploration of gamification in loyalty programs for consumer loyalty. *Journal of Business Research,* 106, 365-376.

Jeon, J. (2017). The impact of brand concept on brand equity. *Asia Pacific Journal of Innovation and Entrepreneurship,* 11(2), 233-245.

Johnson, D., Deterding, S., Kuhn, K., Staneva, A., Stoyanov, S., & Hides, L. (2016). Gamification for health and wellbeing: A systematic review of the literature. *Internet Interventions,* 6, 89-106.

Kapalo, K., Dewar, A., Rupp, M., & Szalma, J. (2015). Individual Differences in Video Gaming: Defining Hardcore Video Gamers. *In Proceedings of the Human Factors and Ergonomics Society 59th Annual Meeting*, 878-881.

Keller, K. (1993). Conceptualizing, Measuring, and Managing Customer-Based Brand Equity. *Journal of Marketing,* 57(1), 1-22.

Kietzmann, J., Hermkens, K., McCarthy, I., & Silvestre, B. (2011). Social media? Get serious! Understanding the functional building blocks of social media. *Business Horizons,* 54(3), 241-251.

Kim, Y., & Hollingshead, A. (2015). Online Social Influence: Past, Present, and Future. *Annals of the International Communication Association,* 39(1), 163-192.

Klock, A., Gasparini, I., Pimenta, M., & Hamari, J. (2020). Tailored gamification: A review of literature. *International Journal of Human-Computer Studies,* 144, 1-22.

Kotler, P., & Armstrong, G. (2021). *Principles of Marketing,* 18th Global Edition. Essex: Pearson Education Limited.

Kotler, P., & Keller, K. (2016). *Marketing Management,* 15th Global Edition. Essex: Pearson Education Limited.

Kotler, P., Kartajaya, H., & Setiawan, I. (2017). *Marketing 4.0 - Moving from Tradicional to Digital.* Sussex: John Wiley & Sons Ltd.

Kusuma, G., Wigati, E., Utomo, Y., & Suryapranata, L. (2018). Analysis of Gamification Models in Education Using MDA Framework. *Procedia Computer Science,* 135, 385-392.

Laros, J. (2012). O uso da Análise Fatorial: Algumas diretrizes para pesquisadores. In *Análise fatorial para pesquisadores* (pp. 163-193). Brasília: LabPAM Saber e Tecnologia.

Lee, J., & Jin, C. (2019). The role of gamification in brand app experience: The moderating effects of the 4Rs of app marketing. *Cogent Psychology,* 6(1), 1-18.

Legaki, N., Xi, N., Hamari, J., Karpouzis, K., & Assimakopoulos, V. (2020). The effect of challenge-based gamification on learning: An experiment in the context of statistics education. *International Journal of Human-Computer Studies,* 144, 1-14.

Li, X., Sun, C., & Zia, M. (2020). Social influence based community detection in event-based social networks. *Information Processing and Management,* 57(6), 1-17.

Lister, C., West, J., Cannon, B., Sax, T., & Brodegard, D. (2014). Just a Fad? Gamification in Health and Fitness Apps. *JMIR Serious Games,* 2(2), 1-12.

Lucassen, G., & Jansen, S. (2014). Gamification in Consumer Marketing - Future or Fallacy? *Procedia - Social and Behavioral Sciences,* 148, 194-202.

Lutz, R., MacKenzie, S., & Belch, G. (1983). Attitude Toward the Ad As a Mediator of Advertising Effectiveness: Determinants and Consequences. *NA - Advances in Consumer Research,* 10, 532-539.

Mahmood, A. (2020). Identifying the influence of various factor of apps on google play apps ratings. *Journal of Data, Information and Management,* 2, 15-23.

Marczewski, A. (2015). *Even Ninja Monkeys Like to Play - Gamification, Game Thinking and Motivational Desing.* Blurb.

Mitchell, R., Schuster, L., & Jin, H. (2020). Gamification and the impact of extrinsic motivation on needs satisfaction: Making work fun? *Journal of Business Research,* 106, 323-330.

Mullins, J., & Sabherwal, R. (2020). Gamification: A cognitive-emotional view. *Journal of Business Research,* 106, 304-314.

Murillo-Zamorano, L., Sánchez, J., & Muñoz, C. (2020). Gamified crowdsourcing in higher education: A theoretical framework and a case study. *Thinking Skills and Creativity,* 36, 1-18.

Nasirzadeh, E., & Fathian, M. (2020). Investigating the effect of gamification elements on bank customers to personalize gamified systems. *International Journal of Human-Computer Studies,* 143, 1-19.

Nobre, H., & Ferreira, A. (2017). Gamification as a platform for brand co-creation experiences. *Journal of Brand Management,* 24, 349-361.

OECD. (2020). *A roadmap toward a common framework for measuring the Digital Economy - Report for the G20 DigitalEconomy Task Force.* Saudi Arabia.

Oliveira, C. (2019). *Brand management na era digital e humana: a gestão para o sucesso.* Coimbra: Conjuntura Actual Editora.

Osei-Frimpong, K., & McLean, G. (2018). Examining online social brand engagement: A social presence theory perspective. *Technological Forecasting & Social Change,* 128, 10-21.

Ponce, P., Meier, A., Méndez, J., Peffer, T., Molina, A., & Mata, O. (2020). Tailored gamification and serious game framework based on fuzzy logic for saving energy in connected thermostats. *Journal of Cleaner Production,* 262, 1-39.

Raj, B., & Gupta, D. (2018). Factors Influencing Consumer Responses to Marketing Gamification. *In International Conference on Advances in Computing, Communications and Informatics (ICACCI)*, 1538-1542.

Rapp, A. (2020). An exploration of world of Warcraft for the gamification of virtual organizations. *Electronic Commerce Research and Applications,* 42, 1-17.

Robson, C., & McCartan, K. (2016). *Real World Research,* 4th Edition. Sussex: John Wiley & Sons Ltd.

Robson, K., Plangger, K., Kietzmann, J., McCarthy, I., & Pitt, L. (2015). Is it all a game? Understanding the principles of gamification. *Business Horizons,* 58(4), 411-420.

Robson, K., Plangger, K., Kietzmann, J., McCarthy, I., & Pitt, L. (2016). Game on: Engaging customers and employees through gamification. *Business Horizons,* 59(1), 29-36.

Rodrigues, L., Oliveira, A., & Costa, C. (2016). Does ease-of-use contributes to the perception of enjoyment? A case of gamification in e-banking. *Computers in Human Behavior,* 61, 114-126.

Rodríguez, I., Puig, A., Tellols, D., & Samsó, K. (2020). Evaluating the effect of gamification on the deployment of digital cultural probes for children. *International Journal of Human-Computer Studies,* 137, 1-11.

Ryan, R., & Deci, E. (2000). Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions. *Contemporary Educational Psychology,* 25(1), 54-67.

Sailer, M., Hense, J., Mandl, H., & Klevers, M. (2013). Psychological Perspectives on Motivation through Gamification. *Interaction Design and Architecture(s) Journal,* 19, 28-37.

Sardi, L., Idri, A., & Fernández-Alemán, J. (2017). A systematic review of gamification in e-Health. *Journal of Biomedical Informatics,* 71, 31-48.

Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research Methods for Business Students,* 8th Edition. Harlow: Pearson Education Limited.

Shen, Y., Choi, H., Joppe, M., & Yi, S. (2020). What motivates visitors to participate in a gamified trip? A player typology using Q methodology. *Tourism Management,* 78, 1-15.

Silverman, D. (2013). *Doing Qualitative Research: A practical handbook.* London: Sage.

Snieder, R., & Larner, K. (2009). *The Art of Being a Scientist: A Guide for Graduate Students and their Mentors.* Cambridge: Cambridge University Press.

Sousa, B., & Alves, G. (2019). The role of relationship marketing in behavioural intentions of medical tourism services and guest experiences. *Journal of Hospitality and Tourism Insights,* 2(3), 224-240.

Stoyanov, S., Hides, L., Kavanagh, D., Zelenko, O., Tjondronegoro, D., & Mani, M. (2015). Mobile App Rating Scale: A New Tool for Assessing the Quality of Health Mobile Apps. *JMIR Mhealth Uhealth,* 3(1), 1-9.

Tobon, S., Ruiz-Alba, J., & García-Madariaga, J. (2020). Gamification and online consumer decisions: Is the game over? *Decision Support Systems,* 128, 1-13.

Tondello, G., Wehbe, R., Diamond, L., Busch, M., Marczewski, A., & Nacke, L. (2016). The Gamification User Types Hexad Scale. *In CHI PLAY '16: Proceedings of the 2016 Annual Symposium on Computer-Human Interaction in Play*, 229-243.

Tu, R., Hsieh, P., & Feng, W. (2019). Walking for fun or for “likes”? The impacts of different gamification orientations of fitness apps on consumers' physical activities. *Sport Management Review,* 22(5), 682-693.

Weber, J., Azad, M., Riggs, W., & Cherry, C. (2018). The convergence of smartphone apps, gamification and competition to increase cycling. *Transportation Research Part F: Traffic Psychology and Behaviour,* 56, 333-343.

Wolf, T., Weiger, W., & Hammerschmidt, M. (2020). Experiences that matter? The motivational experiences and business outcomes of gamified services. *Journal of Business Research,* 106, 353-364.

Xi, N., & Hamari, J. (2019). Does gamification satisfy needs? A study on the relationship between gamification features and intrinsic need satisfaction. *International Journal of Information Management,* 46, 210-221.

Xi, N., & Hamari, J. (2020). Does gamification affect brand engagement and equity? A study in online brand communities. *Journal of Business Research,* 109, 449-460.

Xu, F., Buhalis, D., & Weber, J. (2017). Serious games and the gamification of tourism. *Tourism Management,* 60, 244-256.

Yang, Y., Asaad, Y., & Dwivedi, Y. (2017). Examining the impact of gamification on intention of engagement and brand attitude in the marketing context. *Computers in Human Behavior,* 73, 459-469.

Zainuddin, Z., Chu, S., Shujahat, M., & Perera, C. (2020). The impact of gamification on learning and instruction: A systematic review of empirical evidence. *Educational Research Review,* 30, 1-23.

Appendices

Appendice A Research I - Dimensions and items of questionnaire model.

Dimension		Items	Adapted
Perception	Usefulness	U1 - Increases my productivity.	(Davis, 1989)
		U2 - Improves my performance.	
		U3 - Enhances my efficiency.	
		U4 - It is useful for my daily life.	
	Ease-of-Use	EU1 - I consider applications flexible.	(Davis, 1989; Yang, Asaad, & Dwivedi, 2017)
		EU2 - It is accessible to compete with another person.	
		EU3 - Applications are easy to operate.	
	Social Influence	SI1 - If the people who influence me use it, I will use it too.	(Hamari & Koivisto, 2013)
		SI2 - People encourage me to use gamified applications.	
		SI3 - For my friends it is pertinent to use gamified applications.	
	Satisfaction	S1 - Applications integrate my free time.	(Yang, Asaad, & Dwivedi, 2017)
		S2 - I am satisfied with the applications.	
		S3 - I find the applications interesting.	
		S4 - I feel pleasantly involved.	
Brand Engagement		**Emotional**	(Xi & Hamari, 2020)
		BEE1 - I consider myself linked to the brand.	
		BEE2 - I am excited about the brand.	
		BEE3 - I love the brand.	
		Cognitive	
		BEC1 - I like to learn more about the brand.	
		BEC2 - Any subject related to the brand captivates my attention.	
		BEC3 - I think a lot about the brand.	
		Social	
		BES1 - I like to use brand products with my friends.	
		BES2 - I share my experiences with the brand's products/services with other people.	
		BES3 - I like to recommend the brand's products/services to other people.	
Brand Attitude		BA1 - I feel more available to buy branded products.	(Yang, Asaad, & Dwivedi, 2017)
		BA2 - The application makes me feel satisfied when selecting the brand.	
		BA3 - The application makes me intend to use other services/products of the brand.	
		BA4 - I could recommend the brand to other people.	

Appendice B Research II - Dimensions and items of questionnaire model.

User Type	Item	
Philanthropist	P1	I am glad if I can help others by sharing my results in applications.
	P2	Through my experiences, I like to guide others in new challenges.
	P3	I like to share my experiences and knowledge.
	P4	The well-being of other people is important to me.
Socialiser	S1	Interaction with other people in applications is important to me.
	S2	I like working as a team.
	S3	It is important for me to feel like an integral member of a certain community.
	S4	I like to participate in group activities.
Free Spirit	FS1	It is important for me to go my own way, without influence from other people.
	FS2	I often allow my curiosity to guide me to new experiences.
	FS3	I like to try new challenges.
	FS4	Being independent is important to me.
Achiever	A1	I like to overcome the obstacles that may arise.
	A2	It is important for me to accomplish all the tasks inherent to the challenges that exist in applications.
	A3	It is hard for me to give up a problem before I have found a solution.
	A4	I like to master tasks considered difficult.
Disruptor	D1	I like to challenge other people on applications.
	D2	I often question the current state of affairs.
	D3	I see myself as a rebel.
	D4	I do not like following rules.
Player	PR1	I like to participate in applications where I can earn rewards.
	PR2	Rewards are a good way to motivate me to achieve the goals of applications.
	PR3	It is important for me to get a return on my investment in the applications that I use.
	PR4	If there is a reward, I will do my best to achieve it.