

The use of gamification mechanics to increase employee and user engagement in participative healthcare services

A study of two cases

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Abstract

Purpose – Gamification introduces game-like properties into routine service processes to make them more engaging for service employees and users alike. The purpose of this paper is to investigate the effects of gamification mechanics, or game design principles, on user engagement in gamified healthcare services.

Design/methodology/approach – Through observations, interviews and the study of desk materials, two cases of gamified healthcare services, each using different game mechanics, are analyzed.

Findings – Gamification mechanics produce four distinct experiential outcomes in patients: challenge, entertainment, social dynamics, and escapism. Patient engagement can be stimulated through these outcomes. However, to fully enjoy the benefits of gamified services, users are often expected to acquire and use new skills. The relative absence of these skills (or difficulties in acquiring them), depending on users' medical predispositions and age, may defer or negatively moderate the positive effects of gamification on engagement. In the case of progressively decreasing capabilities (e.g. in the case of aging users or users with degenerative diseases, whose physical or mental disabilities may be emphasized by the mechanics), it is recommended that health professionals adapt the mechanics accordingly or search for alternative options to increase patient well-being.

Research limitations/implications – The study was conducted in healthcare, and caution must be exercised in generalizing the findings to other domains. However, the finding that gamified service users' disabilities - or the lack of required abilities - may negatively impact the encouraging or engaging effects of the use of gamification appears to be relatively universal.

Originality/value – This study contributes to service research, specifically in the healthcare domain, by providing insight into employees' and users' motivations for using gamified service processes, the experiential impact of gamification mechanics, the individual factors that influence users' gamified experience and multiple forms of cognitive, emotional and behavioral engagement outcomes. A research agenda is developed.

Keywords Healthcare, Engagement, Transformative service research, Gamification

Paper type Research paper



Introduction

The healthcare sector faces important challenges, such as pressure to simultaneously reduce costs and increase the quality of care, a challenge that may require revolutionary solutions (Berry and Bendapudi, 2007; McColl-Kennedy *et al.*, 2012). Scholars have proposed that giving patients a more active role in healthcare processes may simultaneously increase the quality of care and reduce healthcare-related costs (cf. Gruber and Frugone, 2011;

Van Riel *et al.*, 2013). In such a collaborative care model, patients take partial responsibility for the management of their disease and have control and influence over the healthcare process (Barello *et al.*, 2012; McColl-Kennedy *et al.*, 2012). Despite agreement about the potential importance of patient involvement in increasing the effectiveness and efficiency of healthcare services, research on the methods that can be used to create, strengthen and maintain user engagement is lacking (Ostrom *et al.*, 2015).

A recent approach to increasing patient involvement is the use of gamification or “the application of lessons from the gaming domain in order to change stakeholder behavior and outcomes in non-game situations” (Robson *et al.*, 2014, p. 352). Relatively routine processes, such as rehabilitation or care for patients with chronic diseases, are thus transformed into a game-like experience. The virtual environment, in which patients can have fun and feel a sense of empowerment, provides participants with a lived experience and generates engagement (Robson *et al.*, 2014). For patients to become more involved in the healthcare process, however, they must be able to play this new role and be engaged in the process.

To develop a better understanding of the effects of gamification in the healthcare environment, the user experience during the use of gamified technologies was studied. Lemon and Verhoef (2016) introduced three perspectives from which the customer experience can be analyzed and understood, i.e., the firm’s point of view, the customer/user’s point of view, and a co-creation perspective, which recognizes the important role of the customer in the construction of the experience. The present paper adopts the third perspective because in a health care context, the experience partly depends on input from the patients themselves.

In gamified care processes, the patient is intentionally engaged through the use of game mechanics, defined as a game’s structure, goals and rules imposed by the designers (Robson *et al.*, 2014). Game mechanics include rewards of points or badges, a status system, and the way players advance through a hierarchy of different levels (Werbach and Hunter, 2012; Zichermann and Cunningham, 2011; Zichermann and Linder, 2013). Gruman *et al.* (2010, p. 352) describe patient engagement as “actions patients [...] take to obtain the greatest benefit from the health care services available to them.” Gamifying care is meant to enhance patient engagement using goals, rules and feedback and replacing the real-world experience with a “synthetic” experience in virtual reality (Deterding *et al.*, 2011; Blohm and Leimeister, 2013; Zichermann and Cunningham, 2011).

The literature related to the emerging concept of gamification remains largely conceptual. Empirical studies analyzing the effects of gamification mechanics on participant engagement (Werbach and Hunter, 2012; Zichermann and Cunningham, 2011; Zichermann and Linder, 2013), especially in a healthcare context, are lacking. The present study aims to develop a better understanding of the experiential value derived from gamified care throughout the patients’ journey. Four research questions are addressed:

- RQ1. What are the motivations for patients and staff to use gamified healthcare services?
- RQ2. What are the forms of experiential value derived from gamified healthcare services?
- RQ3. What are the positive/negative outcomes derived from patient engagement through the use of gamified healthcare?
- RQ4. Which factors influence the effects of engagement on positive and negative outcomes of gamified healthcare?

These research questions are addressed in an extensive study of patients’ experiences throughout their “customer journey” in medical centers that employ gamified care. Two cases are investigated: the integration of the Wii Fit technology in the physical

reeducation of patients, and the use of a tablet computer to facilitate the treatment of children. The collected data include extensive notes taken during six observational sessions and the transcripts of 38 in-depth interviews with medical staff and patients involved in gamified care. Supported by theory on the customer experience and the customer journey (Lemon and Verhoef, 2016), patients' pre-, current-, and post-use experiences with gamified care are analyzed. The study identifies patients' and medical staff's motives to participate in a gamified care trajectory. It also identifies four types of experiential value induced by gamification: entertainment, escapism, challenge, and social dynamics. Furthermore, the study identifies both positive and negative outcomes of engagement resulting from gamified care. Finally, it identifies factors that moderate the effects of engagement on the positive or negative outcomes.

This research contributes to the marketing and service literatures, with a focus on the healthcare context. First, as called for by multiple authors (Hamari, 2013; Insley and Nunan, 2014), gamification is investigated from a co-creation perspective by considering the experiential value derived from a gamified activity, rather than focusing on the introduction of game-like mechanics. Second, in line with recent developments in service management, the gamification mechanics are identified as facilitators of value creation for various beneficiaries (Jaakkola *et al.*, 2015). Third, responding to a call for research by Harwood and Garry (2015), this research explores positive outcomes but also some potential risks for the healthcare process related to gamified care. Finally, as suggested by McColl-Kennedy *et al.* (2012), this investigation contributes to the healthcare literature by understanding gamification as a tool to transform the role of medical staff and patients in the care process. Gamified care creates an opportunity to increase patients' engagement with the care process by providing them with a rich experience. In this context, it is demonstrated that medical staff is no longer fully in charge of the service but instead is expected to coach patients and to guide them through their gamified journey. By developing a better understanding of the role of healthcare professionals and patients in gamified healthcare services, this study also contributes to transformative service research (TSR), defined as "service research that centers on creating uplifting changes and improvements in the well-being of individuals (consumers and employees), families, social networks, communities, cities, nations, collectives, and ecosystems" (Anderson *et al.*, 2011). TSR focuses attention on the ramifications of enhancing or unintentionally hurting consumer well-being (Rosenbaum *et al.*, 2011).

In the following sections, theories on the service experience and value co-creation, as well as patient engagement, are reviewed, and the gamification concept is presented. Subsequently, the data collection and analytical methods are described. The findings are then detailed and discussed, and a theoretical framework summarizing the findings is depicted. The study concludes with a discussion of the results, opportunities for future research, and managerial implications.

Theoretical background

New technologies, the service experience, and patient/customer engagement (CE)

The emergence of new technologies has created an opportunity to develop the patient's role in the healthcare process from a relatively passive one into a role of active value co-creation (Drell, 2013; Graffigna *et al.*, 2013; Thorsteinsen *et al.*, 2014; Varnfield *et al.*, 2014). As a result, the number of user-oriented technologies dedicated to healthcare purposes, such as health apps, mobile devices, or online support communities, has increased (Nambisan and Nambisan, 2009). These technologies enable healthcare providers to collect unique data, monitor chronic diseases, promote healthy behaviors and provide better healthcare services (Cafazzo *et al.*, 2012; Drell, 2013; Menezes *et al.*, 2013). Miller *et al.* (2016) predict that by 2018, the number of smartphone users will reach 3.4 billion and that 50 percent of these users will download at least one healthcare application. Although these authors stress the key role of

technology in healthcare services, the sheer existence of the technology is not sufficient to stimulate patient engagement, a key condition for obtaining good healthcare service outcomes (Barello *et al.*, 2012; Graffigna *et al.*, 2013). This raises the question how technology can be used to create a service experience that stimulates patient or CE.

Service researchers have dedicated considerable attention to the service experience and the co-creation of this experience in various service settings (Jaakkola *et al.*, 2015). The service experience has been defined as “an actor’s subjective response to or interpretation of the elements of the service, emerging during the process of purchase and/or use, or through imagination or memory” (Jaakkola *et al.*, 2015, p. 186). Although the service experience is considered individual, subjective and context specific, several researchers have called for a phenomenological perspective that acknowledges interpersonal interactions as an important trigger and considers the service experience as inherently relational and social. Other parties thus influence the service experience and value co-creation processes (Aarikka-Stenroos and Jaakkola, 2012; Grönroos, 2008).

Recent literature studies CE behaviors, antecedents and outcomes in various service settings. Jaakkola and Alexander (2014) study the manifestations of CE, and identify four primary types of CE behaviors: augmenting, codeveloping, influencing, and mobilizing. Verleye (2015) extensively explores co-creation experience dimensions, i.e., key determinants and outcomes in terms of co-creation benefits. Despite their important contributions to the field, these studies investigate the service experience from a customer perspective or view it as dyadic or unidirectional. McColl-Kennedy *et al.* (2015) highlight the collective, interrelational, evolving, and dynamic nature of the service experience, and propose a co-created service experience practices (CSEP) framework, which helps integrate and deepen our understanding of CSEP.

Studying antecedents and consequences of engagement in healthcare is crucial but challenging. In contrast to many consumption contexts, healthcare is an undesired service that involves vulnerable patients, while most interactions between patients and service providers are emotionally charged (Danaher and Gallan, 2016). The healthcare service ecosystem is known to be extremely complex and fragmented, regardless of whether the patient’s health problem is acute or chronic. This situation likely increases patients’ frustration and complicates their care journey, which may decrease their motivation to play an active role in their care trajectories. Therefore, despite the recognition of the importance of patients as active partners in healthcare service delivery, actively engaging them might be challenging, and it may require innovative mechanisms to motivate them to play that role. Understanding antecedents of patient participation and engagement and facilitating the patient experience have thus been identified as top research priorities (Danaher and Gallan, 2016).

Emerging literature in this domain emphasizes the need to enhance interaction and communication between patients and care providers (McColl-Kennedy *et al.*, 2012). Several authors point at the potential role of interactive platforms, supporting interaction and the exchange of resources among actors while simultaneously serving as a means to engage individuals in the value co-creation process (Bell and Loane, 2010; Kaplan and Haenlein, 2010; Sawhney *et al.*, 2005; Sharma and Sheth, 2004). Ramaswamy and Gouillart (2010) use the term “engagement platform” to describe these online interfaces. In commercial sectors, these platforms already help firms provide customers with a compelling co-creation experience and to create, maintain, and develop CE (Brodie *et al.*, 2013; Fuller *et al.*, 2011; Jaakkola and Alexander, 2014; Jaakkola *et al.*, 2015; Kohler *et al.*, 2009). Among the tools that could be used to create such an engagement platform, practitioners and researchers have identified gamification as a promising avenue (Cugelman, 2013; Drell, 2014; King *et al.*, 2013; Miller *et al.*, 2016).

Gamification

Gamification refers to the use of gamification mechanics to create a gamified experience and to influence behaviors and emotions in traditionally non-game contexts (Robson *et al.*, 2014, 2015),

such as healthcare. The gamification phenomenon is attracting increasing attention among researchers and practitioners (Werbach and Hunter, 2012). Despite its practical adoption, research on this topic remains in its infancy and should ideally build a bridge between game studies and service research (Huotari and Hamari, 2012). Gamification is used in various domains, such as e-commerce (Insley and Nunan, 2014), mobile marketing (Hofacker *et al.*, 2016), innovation (Füller, 2006; Füller *et al.*, 2011), and intra-organizational management (Farzan and Brusilovsky, 2011), but also increasingly in healthcare. Extant literature highlights the positive effects of gamification on the attitudes of participants (Dominguez *et al.*, 2013), their experience (Robson *et al.*, 2014), and on their enjoyment and engagement (Harwood and Garry, 2015; Witt *et al.*, 2011).

Gamification connects two perspectives: the game designer and the user perspective. From the game designer's perspective, gamification is the introduction of game mechanics and elements (rather than full-fledged games) to non-game contexts (Deterding *et al.*, 2011). These practices aim to sustainably induce customer behaviors in favor of the company's activities (Werbach and Hunter, 2012; Zichermann and Linder, 2013). This definition distinguishes gamification from related concepts, such as serious gaming (Abt, 1987) or in-game advertising (Yang *et al.*, 2006), in which elements and mechanics related to non-entertainment processes (learning or advertising, respectively) are used within full-fledged games. Similarly, Werbach and Hunter (2012) conceptualize gamification as the process of making activities more game-like. More recently, from a service perspective gamification has been defined as "a process of enhancing a service with affordances for gameful experience in order to support [a] user's overall value creation" (Huotari and Hamari, 2012, p. 17). This focus on the user perspective highlights the experience that gamification attempts to create. A gameful service design is reflected in a user's lived experience (Huotari and Hamari, 2012). From the game designer's perspective, gamification mechanics are introduced in a non-game context to influence users' behaviors. From the user's perspective, gamification relates to their lived game-like experience during service consumption.

Combining user and designer perspectives, Robson *et al.* (2015) suggest that gamification practices can be better understood through the mechanics, dynamics, and emotions framework, which was adapted from the game design literature (Hunicke *et al.*, 2004). Mechanics refer to goals, rules, settings, types of interactions, and the boundaries of the situation to be gamified. These elements depend exclusively on designers' decisions and do not vary across participants or time (Robson *et al.*, 2015). Dynamics are behaviors and interactions that emerge from customers' gamified experience (Camerer, 2003). They encompass both desired (e.g. cooperation among participants, engagement, or compliance) and unintended behaviors (e.g. cheating, overuse) (Elverdam and Aarseth, 2007). Finally, emotional components include the positive and negative affective states induced by game play (Robson *et al.*, 2015). Gamification thus operates through a value co-creation process between users and designers. Indeed, designers introduce gamification mechanics in the service they provide to facilitate users' creation of their own experience (Jaakkola *et al.*, 2015). The mechanics are determined and controlled by the designer, but the resulting gamification dynamics and emotions are difficult to predict. Consequently, the key issue designers face is to develop mechanics that generate the intended experience (Robson *et al.*, 2014; Robson *et al.*, 2015), and therefore to better understand the relationships between specific mechanics and the effects they induce.

Robson *et al.* (2014) distinguish two major dimensions in customer-created value: the orientation of the value (intrinsic/extrinsic) and the nature of the value (active vs reactive). Whereas extrinsic value is derived from outcomes generated through the experience, intrinsic value refers to customers' appreciation of the experience for its own sake, apart from any other consequence that may result. Reactive value is derived from the customer's

passive response to a consumption object such as technology. Active value, on the other hand, is derived from an active participation of the customer in the production of the experience. The present study investigates how patients derive various forms of intrinsic and extrinsic value from the active or passive co-creation of the gamified experience, and how these types of value affect their engagement and engagement outcomes.

Methodology

Gamification in healthcare services affects the patient experience. The patient experience was investigated along the three stages of the customer journey suggested by Lemon and Verhoef (2016), i.e., pre-, current-, and post-interaction experience. Given the exploratory nature of this research, a qualitative, case-based approach was employed. Such an approach facilitates the exploration of a phenomenon within its context through the use of multiple data sources. This methodology is promising when the research objective is to achieve a better understanding of novel concepts or contexts that have not yet been adequately covered by the literature (Yin, 2003b). Due to its still burgeoning development in the academic field, gamification in healthcare service management exhibits the above-mentioned features. A case-based approach was therefore considered suitable.

Case selection

To find a balance between consistency and variation, the similarities among contexts were taken into account in the case selection, as was the need for structural diversity to produce contrasting results and enable comparisons (Corbin and Strauss, 1990; Flick, 2006). Recent work in marketing considers gamification to be a homogenous group of mechanics inducing fun and/or challenge (Harwood and Garry, 2015). However, many different approaches to game mechanics are possible (Caillois, 2001). In his seminal work, Malone (1981) distinguishes challenge from fantasy mechanics to classify these mechanics.

On the one hand, challenge mechanics require participants to achieve a task by overcoming specific obstacles and thereby enable them to test their skills (Zichermann and Cunningham, 2011). The levels of difficulty make the completion of the challenge increasingly uncertain (Malone, 1981). Dahl and Moreau (2007) underline the positive effects induced by challenging tasks in terms of feelings of self-accomplishment. Nevertheless, they also note that although challenges are designed to increase the perception of competence, these mechanics may ironically decrease perceptions of autonomy and control by imposing structures and rules on the task completion. On the other hand, fantasy mechanics refer to the playful designs that may be implemented by designers around the asked task. It implies the use of ludic interfaces to help users escape from reality and immerse them into a virtual environment (Werbach and Hunter, 2012; Koster, 2013).

Within each category of gamification mechanics, i.e., challenge and fantasy mechanics, a case was selected, wherein gamified healthcare services were robust and relevant for the present study. Partnerships were established with two Belgian hospitals that use different gamification approaches.

In the first case, Wii Fit Plus technology used for the purpose of functional rehabilitation was investigated. This technology was meant for adults with various medical problems, such as the amputation of a limb, a stroke, or multiple sclerosis. A multidisciplinary medical team was involved. Wii Fit Plus is an innovative peripheral for Wii that captures real-life movements through a balance board and brings these movements to life on a screen. The technology allows patients to improve their balance through challenges such as a snowboarding simulation or walking on a tight rope.

The second case study consists of a multiple enhanced reality application called Vr4Child, which is dedicated to children's pain management during medical procedures. Staff sometimes experience difficulties in caring for children aged two to six years old

because these children fear medical staff or do not understand the procedures. Vr4Child is an app installed on a tablet that allows children to view reality enhanced by imaginary and fantasy elements such as clouds, butterflies or fire trucks with fire hoses that appear on the tablet. In addition to producing a digital environment, the app clarifies the procedures that doctors are applying to the children.

Data collection

As suggested by Yin (2003a), qualitative data were collected from a variety of sources. In the context of this study, in-depth interviews and observation sessions were used to collect rich and complementary data. In total, 38 in-depth interviews with patients and members of the medical staff were carried out. Then, field observations in both hospitals were conducted, and extensive notes were taken. These observations added richness to the findings. By using mixed methods and interacting with different actors from different hospitals, the validity of the study was improved (Grove and Fisk, 1992).

In-depth interviews

To fully understand the context, as suggested by Grönroos and Voima (2012), the value co-creation process that occurs between actors engaged in gamified healthcare practices was examined. Therefore, patients and members of the medical staff who were engaged in gamified care projects – occupational therapists, physiotherapists, and nurses – were interviewed. Vr4Child is exclusively dedicated to children, but because the hospital's ethical regulations forbade us from interviewing their youngest patients, the children's parents were interviewed. As presented in Table I, 12 patients and 12 members of the medical staff were interviewed in the hospital that employed the Vr4Child app. In the medical center that used Wii Fit Plus technology, five patients and nine members of the medical staff were interviewed. Two interview guides were developed, one for patients and one for medical staff. The aim of the in-depth interviews was to discuss the respondents' motivation to participate in gamified care processes, experiences when they used the gamified technology and outcomes derived from these practices. These in-depth interviews were carried out to explore patients' pre-, current-, and post-gamified experiences. They were conducted face-to-face and lasted between one hour and an hour and a half. Interviews were conducted until information redundancy was reached (Lincoln and Guba, 1985). Each of the 38 interviews was then transcribed, resulting in 387 pages of text. A content analysis was subsequently performed.

Observations. To develop a better understanding of the gamified care experience and the roles of patients and medical staff, observational sessions were conducted. Investigating healthcare phenomena by means of traditional research methods is difficult; however, observation is an effective and unobtrusive method to examine phenomena. Observation enables researchers to observe phenomena as they occur in natural settings (Grove and Fisk, 1992). Due to the specificity of the context, two weeks were allocated to observing the hospital's functioning and gamified care process. During this period, multiple gamified care sessions were observed. All of the people who were observed were informed that they were being observed to reduce concerns regarding research ethics, which is especially important in a hospital context. Six observations were conducted, and each lasted

Table I.
In-depth interviews:
respondents
repartitioned
according to gamified
care technology

	Medical staff	Patients	Total
Vr4Child app	12	12	24
Wii Fit Plus	9	5	14
Total	21	17	38

between 19 and 50 minutes. These observations were organized in an observation grid and resulted in 28 pages of text. They included patient and staff behaviors and patient-to-patient and patient-to-practitioner interactions. Data from an observation grid were used to enrich the findings from the in-depth interviews and reveal patients' and staff's practices during the gamified care process.

Data analysis

Consistent with grounded theory, the analysis of the observations and in-depth interviews was performed through coding and categorizing (Glaser and Strauss, 2009). First, the qualitative material was coded into interpretable units, and these units were then organized into meaningful categories to support conceptual development. As suggested by grounded theory, the coding was an iterative and inductive process, from which descriptive summaries of the basic facts were elaborated to provide an understanding of the studied contexts (Eisenhardt, 1989). Such a process warrants both a systematic procedure and the ability to investigate large volumes of textual content (Kolbe and Burnett, 1991). In-depth interviews with service providers and patients were merged with notes taken during observation sessions to analyze patients' motives, experience and engagement during the gamified healthcare process. Although patients and medical staff participate in a joint value creation process, their roles differ. Further explorations of the qualitative material were therefore performed to better understand the role of medical staff members in gamified care.

To reach saturation, consensus was reached through discussions, and it was checked if each identified factor or theme appeared repeatedly in the data (Glaser and Strauss, 2009). After successive rounds of reading and discussion, the researchers agreed on the codes and their interpretations. This iterative process, during which several researchers interpreted the same data, guarantees the validity of the findings (Denzin and Lincoln, 2011). NVivo 10 software was used, which supports the coding and analysis of large amounts of content and can link data, display findings, and support theory development (Bazeley and Jackson, 2013).

The length of the resulting codes varied from one sentence to several paragraphs. Based on the codes, a thematic content analysis was performed to develop categories, as recommended by Spiggle (1994). This phase implies an inductive process from categorization to abstraction, comparison, and integration. All authors participated in categorizing the coded data into content themes. Then, by abstracting higher-order conceptual constructs from the content-theme categories, six categories were established. The resulting categories were used to compare and contrast the two gamified healthcare services. Finally, these categories were integrated in a conceptual framework. This process involved lengthy discussions on the emerging themes and led to the implications stemming from the data.

Findings

The content analysis revealed 18 emerging codes, which were classified into six categories. The first category referred to the gamification mechanics as perceived by patients. The second category included the experiential value that patients derived from gamified care. The third category represented the motivations that enabled patients to derive experiential value from the gamification mechanics. The fourth and fifth categories covered the positive and negative outcomes of engagement derived from the gamified care, respectively. The last category included the individual factors that influenced patients' engagement outcomes. In the next sections, each category will be explored and the multiple codes that emerged from the content analysis are identified. The insights obtained from the case studies are illustrated with citations and summarized in a range of propositions.

Effects of motivation on the gamified care experience

Patients' and care providers' use of gamified technologies in the healthcare process is driven by multiple motives. These motives were identified in the content analysis and classified into two categories: utilitarian and experiential. These different categories were confirmed by patients and/or medical staff.

First, patients and medical staff both appear to use gamified technologies because of their effectiveness in achieving therapeutic and interactive goals. The Vr4Child technology helps professionals communicate with children and distracts the children's attention from the medical treatment they are undergoing. The Wii Fit Plus technology creates therapeutic utility by enhancing patients' balance through exercises. Therapists mentioned the following utilitarian motives for using gamified care:

I use the Wii and Kinect for patients who have a good sense of balance but who still lack a little something to be able to go one step further (Interview No. 5, Occupational therapist, Wii Fit Plus).

When a child has already faced a blood test and does not want me to come near him, I can do it through the game and get closer to him [...] showing him that the first gestures are not invasive (Interview No. 31, Nurse, Vr4Child app).

The second motivator seemed to be the experiential benefits. Several informants emphasized that these benefits motivated them to engage in gamified care processes. Whereas patients desire a compelling experience, the medical staff wishes to enhance the provided service to improve patients' current and future experience. Two types of experiential benefits emerged from the content analysis, namely, achievement-related and hedonic:

The advantage of these games is the feedback, you know, the game and the related feedback it provides. That is fun. It is more playful than other activities. This is an activity close to everyday life! This is an activity that makes sense to patients, rules and a stake – a stake that encourages you to go beyond your own limits (Interview No. 1, Therapist, Wii Fit Plus).

P1. Patients' and medical staff's motivations to participate in gamified healthcare are both utilitarian and experience oriented.

Beyond the direct effect of gamification mechanics on the patient's experience, these mechanics are also sources of motivation for patients as they track their activity and provide feedback on their performance. Furthermore, being motivated increases the patient's tendency to integrate gamification mechanics in the value creation process and, therefore, to develop a ludic experience. The three following quotes illustrate the effects of gamification mechanics, especially challenges, on the patient's motivation:

I began alone, but it is better when there are two of us, as there is a competition that motivates us to do better and sometimes to collaborate. I prefer that over just walking, for instance. When walking, there is no feedback; it is less motivating (Interview No. 10, Patient, Wii Fit Plus).

Challenge helps us to perform better. This is an additional motivation (Interview No. 11, Patient, Wii Fit Plus).

We got into the game. We wanted to go there every time. When there is a gamified session, we are happy. It motivates us, and this makes the experience more ludic. We want to come back and try new ways to overcome the obstacles (Interview No. 1, Patient, Wii Fit Plus).

P2a. Gamification mechanics reinforce the patient's motivation to engage in a gamified healthcare process.

P2b. The patient's motivation moderates the effectiveness of gamification mechanics in generating experiential value.

Gamification mechanics as a facilitator of the gamified care experience

In both cases (Vr4Child app and Wii Fit Plus), informants mentioned two specific gamification mechanics. On the one hand, they mentioned the set of rules that governed the challenges they were facing in the experience. These challenges implied the possibility for them to win and to lose when using the gamified technology. On the other hand, informants pointed at the virtual and fantasy environment. Two care providers who described the gamified healthcare technology illustrated these mechanics:

You need to understand, respect and remember the rules! [...] Compliance with the rules needs to be clearly stated. You know what you seek, why and how (Interview No. 1, Therapist, Wii Fit Plus).

When you're playing [...] Whatever the game, there is always a competitive mind, a determination to win or the willingness to achieve the objective [...] not necessarily to be the best. You want to reach your goals. Otherwise, you don't like the game. If there is no win, you do not play (Interview No. 11, Therapist, Wii Fit Plus).

Every time she touched the tablet, a cloud appeared on the screen. All of that was visual and colorful. She also likes it when things move (Interview No. 1, Parent, Vr4Child app).

Gamification mechanics shape experiences when patients use the gamified healthcare technology. However, even when patients are exposed to the same gamification mechanics, individual experiences may differ. In the content analysis, four types of experiential value were identified that patients derived from these mechanics.

Patients using the Wii Fit Plus technology specifically stressed the first form of experiential value. Following each episode, patients received feedback in the form of a score and a ranking that included their best results. Patients paid close attention to these elements, which stimulated them to improve or at least to maintain their level of performance from one session to another. This form of experiential value will be called "challenge":

Each time, it allows me to improve my scores and to reach new records. It is important because it is a challenge every time, and I am not happy when I do not win. For instance, in football matches, I went from beginner to pro and that is a challenge! (Interview No. 17, Patient, Wii Fit Plus).

The second form of experiential value derived from gamified care refers to the entertainment patients experience while using the technology. In both of the studied cases, patients mentioned the joy of playing at the hospital. This form of experiential value was called "entertainment." In contrast with challenge, with respect to entertainment, patients and medical staff did not consider feedback on the outcomes of the gamification mechanics. They only valued the fun they derived from the activity. Patients and medical staff both perceived this feeling in a more relaxing climate. The following excerpts illustrate this form of experiential value:

It is true that sometimes we really have fun and get the giggles, so it is relaxing [...]. This session is sometimes eagerly awaited because you know you will have a good time, and the therapist too, I think (Interview No. 22, Patient, Wii Fit Plus).

Oh, he was so happy to play at the hospital! (Interview No. 37, Parents, Vr4Child app).

The third form of experiential value occurs when multiple actors interact in the gamified care process. Some of them report cooperation and emulation emerging from their joint participation. Indeed, patients tease, motivate and advise each other, and this motivates them to work harder than they would if they were alone. This form of experiential value will be called "social dynamics" because it emerges from the interactions that occur among actors engaged in the gamified care process. This value was experienced in both cases. With the Wii Fit Plus, two or three patients can participate simultaneously in the gamified care process to jointly achieve results. Therefore, the patients either cooperated or competed

to achieve common objectives. In the case of the Vr4Child app, the social dynamics took place among the children, their parents and the medical staff as they interacted and cooperated in the virtual environment. The following excerpt highlights this form of experiential value:

There are positive dynamics because these are patients who know each other, who meet from one session to another. I encourage patients, and [the] patients themselves encourage each other (Interview No. 10, Physiotherapist, Wii Fit Plus).

The last type of experiential value refers to the extent to which users feel disconnected from the reality of the care process. Patients escape from the actual care context through immersion in a virtual environment. This form of experiential value is called escapism. To illustrate this phenomenon, a therapist described the Vr4Child app as follows:

[...] a door, a window we propose to the child and which is an opportunity to escape [...]. It is a universe into which they plunge [...]. For me, it is really a door we open, an opening in their mind. He is in the hospital without really being there (Interview No. 33, Pediatric nurse, Vr4Child app).

P3. Gamified healthcare processes may induce four types of experiential value: social dynamics, challenge, entertainment, and escapism.

According to the type of value they experience, patients give more importance to specific elements of the gamified service. Whereas patients who value social dynamics and challenge focus on the challenges and the game's rules; patients who value escapism and entertainment focus more on the technology's interface and virtual fantasy aspects:

P4a. Patients who value social dynamics and challenges consider the rule-based challenge mechanics fundamental to their gamified experience.

P4b. Patients who value escapism and entertainment consider fantasy mechanics and the technology's interface fundamental to their gamified experience.

The effect of the experiential value patients derive from their engagement

Based on the experiential value patients derive from their interactions with gamified care, they become engaged with the healthcare process. Indeed, patients highlight the importance of the experience based on the relationship they develop with this particular context. Accordingly, one respondent underlined the opportunity that gamification offers:

In the medical context, I think it is great that we can use a game to cure people, to enhance their well-being. A main objective of a game is playing, entertaining. Here, patients have the opportunity to play and spend an enjoyable moment while fighting the illness. How could it be better? As we tell our children, "By playing, you learn". Here, it is rather "By playing, you cure yourself (Interview No. 10, Parent, Vr4Child app).

P5. Experiential value derived by patients through gamification leads to their engagement with the gamified game process.

However, whereas the gamified healthcare process may generate experiential value for patients and ultimately lead to engagement, outcomes generated by such engagement in the gamified healthcare process may also be the source of negative outcomes. Indeed, six codes emerged from the content analysis regarding patients' engagement outcomes. Three of them refer to positive outcomes derived from patients' engagement in the gamified care process. The three other outcomes are related to the negative effects that patients' engagement may have on the global healthcare process.

Positive patient engagement outcomes

Positive outcomes derived from patients' engagement in gamified care may take three forms. First, the gamified tools encourage patients to adopt specific behaviors specified by medical staff. In the Wii Fit Plus case, patients are stimulated to continually improve their physical exercise and to work harder to reach their limits. The Vr4Child app aims to relax children to ensure that they will remain calm during medical procedures. The following excerpts illustrate both cases:

The patient feels more involved [...] than when he is standing in front of a table doing a typical exercise. There is less repetition and boredom. In a session of 45 minutes, it is very rare that patients get sick of the activity and lose interest in doing it. It almost never happens (Interview No. 1, Therapist, Wii Fit Plus).

The child will be calmer, so we spend less time trying to calm him and holding him in place (Interview No. 25, Nurse, Vr4Child app).

Second, gamified care can help patients focus all their attention on the activity that they are performing. When patients used the Vr4Child app, their cognitive engagement helped them to not focus on the nurses' and therapists' actions. In the case of the Wii Fit Plus, the patients were so busy with the gamified care that they were unaware of the effort and the time they dedicated to the exercise that they were performing:

In physiotherapy, I do ten flexions, but here, without realizing it, I maybe do fifty flexions while watching the game. It makes a difference. One is captivated by the game; you are totally involved and do not feel the fatigue (Interview No. 17, Patient, Wii Fit Plus).

The third code that emerged from the data referred to the emotional outcomes derived from patients' engagement in gamified service. Several patients stated that they felt less anxious about the medical procedure because of gamified care. For instance, a parent described this effect on his child's feelings:

Fascinating. I want to buy one [...]. Last week, we were disappointed because the Kinect was not available. We always want to use it. When we use it, we are happy. Progressively, motivation is generated (Interview No. 1, Patient, Wii Fit Plus).

P6. Gamified care processes may generate positive emotional, cognitive and behavioral engagement outcomes.

Negative patient engagement outcomes

Although gamified care may help engage patients in the healthcare process, negative outcomes may also occur as a result of inappropriate use of these technologies. Three negative outcomes emerged from the content analysis.

First, although goals should not be overly easy to achieve and should remain challenging, medical staff expressed the need to adapt the level of difficulty to patients' abilities to avoid decreasing the experiential value and discouraging patients from participating further. Therapists stressed the risk of repeated negative feedback that reminds patients of their disabilities and leads to disengagement from the gamified care and the overall healthcare objectives. The following statement illustrates the risk of disengagement:

When we receive negative feedback, we sometimes feel a bit demotivated. If someone always loses, that is no fun. Someone with difficulty standing who tries to play a game requiring balance – well, that is no fun. They need to find a way for them to have fun. I suppose that it is possible due to the large range of available activities. However, they need to pay attention to that point and not set objectives that are unreachable for the patients because they risk being demotivated (Interview No. 12, Patient, Wii Fit Plus).

Whereas some patients might progressively disengage from gamified care, others might become too engaged. For these patients, the tool may no longer serve its healthcare objectives because it may push the patients to perform beyond their physical limits. Therapists described this phenomenon as the game part taking over the healthcare process. They expressed the need to clarify the relationship between game objectives and healthcare objectives. The aim is to position the game within healthcare rather than vice versa.

Finally, in relation to the overuse of gamified care, patients might dedicate so much attention to the game that they forget the healthcare context and their own physical limits. Consequently, they may practice their exercises without paying attention to their disabilities. This may lead to situations in which patients risk hurting themselves or not following their therapists' advice on how to use the technology. Parents who reported their children's experience with the gamified technology highlighted this negative outcome:

The parents lose their roles, and there is no longer any interaction because children are so focused on the screen. It is easy to be isolated by the technology. It does not allow us to put words to emotions (Interview No. 12, Parent, Vr4Child app).

The analysis showed that engagement travels beyond the boundaries of the hospital; multiple patients mentioned their subsequent use of the technologies at home. The therapists also noted the role that they must play to control and reduce the risk that negative engagement outcomes will occur. For instance, they attempted to continuously adapt the game to the healthcare objectives:

One needs to clearly explain that it is only a game. The objective is the physical practice and rehabilitation. The goal is not to win the game. The goal is to use the game to achieve healthcare objectives. One always needs to restate the purpose of the activity (Interview No. 3, Therapist, Wii Fit Plus).

P7. Gamified care processes may generate negative emotional, cognitive and behavioral engagement outcomes.

Individual factors influencing the effectiveness of gamified care in engaging patients

Two factors emerged as antecedents of patient engagement outcomes: patients' age and the nature of the disease. Indeed, because they are accustomed to the new technologies applied in gamification, digital natives are better able to participate in gamified care, whereas older patients first need to acquaint themselves with the technology to benefit from the experience. Furthermore, older patients seem to value more complex games, which challenge them and allow them to demonstrate their abilities. While older patients seek self-accomplishment, younger patients seem to seek interactivity and immersion through the gamified care to escape from the hospital environment, which may be frightening:

When they [young patients] are focused on the tablet while we execute a treatment, they are captivated by it. Otherwise, they would be focused on the treatment and cry or struggle with the therapists [...]. However, the type of game must be adapted to the patient's age. For instance, for, I will not ask a 15-year-old teenager to pierce soap bubbles. He risks getting bored. Therefore, starting with children of 8-9 years old, we need to provide better games than just playing with soap bubbles (Interview No. 24, Therapist, Vr4Child app).

Of course, for older people, we need to find something more complex, to get rid of the feeling of being treated like a 5-year-old child. Patients need a game adapted to their age that won't give them the impression that they are simple-minded, you know (Interview No. 12, Therapist, Wii Fit Plus).

Furthermore, specific to the healthcare context, the severity of the disease was one of the key factors that influenced the outcomes derived from the gamified experience.

Therapists distinguish two applications of the gamification of care: to enhance patients' well-being by stimulating healthy practices and to cure chronic diseases such as sclerosis. To promote healthy practices, gamification offers patients the opportunity to actively engage in sports, develop and maintain social relationships and regain a sense of empowerment in their environment. However, concerning the use of gamification to cure chronic diseases, therapists highlighted the key challenge to continuously adapt the difficulty of the task to the evolution of the patient's disease. Otherwise, as mentioned by one therapist, when a patient suffers from a degenerative disease, gamification may emphasize the patient's progressively increasing disabilities:

Unfortunately, when a patient suffers from multiple sclerosis, she never recovers her physical abilities. There is always some functional loss that she perceives, day after day. We therefore need to discuss it with her and try to maintain the activity, the game. However, both she and we know that this is not an easy task! (Interview No. 3, Therapist, Wii Fit Plus).

P8. Patient age and disease severity are individual factors that influence the effectiveness of the gamified care process in engaging patients.

The role of medical staff and patients in the gamified care process

During sessions, it was observed that multiple roles were performed by medical staff and patients throughout the gamified care process. Each process began by selecting the game and the rules determining the patients' exercises. The patients' abilities – but also, and more importantly, their desires and preferences – were taken into account. The type of gamified care to be used was determined in a discussion between patients and therapists. When patients were performing the gamified exercises, therapists frequently took part in the exercise to challenge patients to perform at their best. Based on these observations, medical staff and patients can be considered co-designers and co-performers of the gamified care process. In addition to these two roles, therapists also coached patients to ensure the medical effectiveness of the exercises:

P9a. During gamified care, patients are co-designers and co-performers of the exercises.

P9b. During gamified care, therapists are co-designers and co-performers of the exercises, and they coach the patients.

In Figure 1, the propositions are visualized in a conceptual model summarizing the findings.

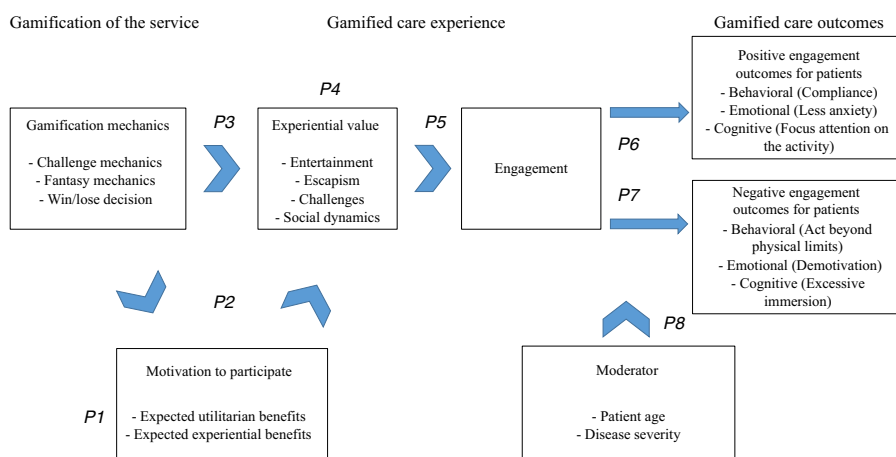


Figure 1.
Conceptual framework

Discussion

Theoretical contributions

In increasingly complex competitive environments, engaging customers in a value co-creation process through new technologies is a highly challenging task for service providers. In response to this issue, the dynamically evolving healthcare sector was investigated, where care providers increasingly use new technologies to engage their patients (Drell, 2013, 2014). The value co-creation framework was used, a process in which patients and medical staff interact (Grönroos, 2008, 2011; Grönroos and Ravald, 2011), provide resources, and integrate the resources provided by others to generate value (Lusch and Vargo, 2011; Vargo, 2008; Vargo and Lusch, 2004, 2016). This study, based on in-depth interviews with both patients and medical staff and observations of two cases of gamified care processes, offers a fine-grained understanding of how gamification mechanics might be used to create, support and maintain users' engagement in a service.

In response to the first research question, inquiring what motivates patients and staff to participate in gamified healthcare services, the analysis revealed that expected utilitarian and experiential benefits drive the participation of both patients and staff in gamified care. In response to the second research question, inquiring into the forms of experiential value that are induced by gamification mechanics, four distinct types of experiential value were found: challenge, entertainment, social dynamics, and escapism. In Figure 2, these four forms of experiential value are categorized according to the two dimensions identified by Robson *et al.* (2014), i.e., the intrinsic/extrinsic and the active/reactive dimensions. Accordingly, the challenge and social dynamics refer to extrinsic value, as patients experiencing such value are motivated by tangible or intangible outcomes at stake. However, whereas “challenge” indicates a dynamic initiated by the patients themselves (active), “social dynamics” – embodied by cooperation and competition – refers to the patient's reactions to actions of other participants in the gamified care process. Furthermore, the escapism and entertainment experiences are both classified as intrinsic, as they reflect the extent to which patients experience the gamified process for itself and not for the potential outcomes. However, whereas escapism is initiated by patients when they are immersed in a virtual environment, entertainment indicates patients' reactions to such an environment.

Social dynamics are an important aspect of the customer/patient experience (Lemon and Verhoef, 2016; De Keyser *et al.*, 2015; Verleye, 2015). In their typology of co-creation practices, McColl-Kennedy *et al.* (2012) also highlight the role of interactions between patients and other individuals, mainly considering interactions between patients and their relatives or between patients and medical staff. In addition to confirming the social dynamics between these actors, the findings point at co-created value emerging from the interactions among patients through gamified care.

The third research question enquired which outcomes are generated by engagement through the use of gamified care. Traditionally, patients' behavioral engagement is

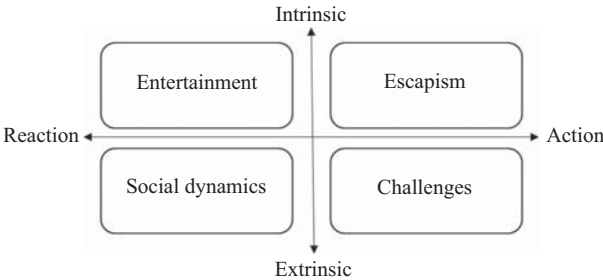


Figure 2.
Gamification:
experiential value
typology

conceptualized as compliance, or the extent to which patients follow the medical prescriptions of therapists (Fattal *et al.*, 2005; McColl-Kennedy *et al.*, 2012). However, following the definition of engagement provided by Brodie *et al.* (2011), the present study suggests that two other types of outcomes result from engagement: cognitive outcomes, referring to the level of concentration of patients during the gamified health care process; and emotional outcomes, when patients develop positive affect during the experience. Furthermore, a distinction was made between positive and negative engagement outcomes. Whereas gamified technologies aim to create, boost and maintain engagement, they may also negatively affect healthcare outcomes when they are used in an inappropriate manner. Value co-destruction is a term that is used to refer to practices that lead to the reduction in value for at least one of the actors (Plé and Cáceres, 2010). Defective behavior, which can be a result of over-participation or overvaluation of the game dimension in the healthcare service, may lead to value co-destruction (Greer, 2015).

In reply to the fourth research question, enquiring which factors influence the effects of engagement on outcomes, this research contributes to the TSR literature by showing how gamified care processes influence the well-being of patients. It was found that the relationships between engagement and positive and negative outcomes are moderated by two factors: the age of the patients and the severity of the disease. This may be the result of a lack of role readiness occurring in patients. Verleye (2015) finds that the role readiness of customers affects the value they can co-create through their interactions with a technology. Customer role readiness reflects the motivation to fulfill the role they are expected to perform, the extent to which they clearly perceive their role, and their ability to perform that role. Accordingly, patients' age and the severity of their disease may affect the experiential value they derive from gamified care. Older patients are better informed and motivated to perform their role as patients. Consequently, they seek experiential value related to challenges and tracking their performance. In contrast, younger patients seem to use gamified care more to escape from their role as patient and to be immersed in a less anxious environment. Similarly, the severity of the disease may affect patients' abilities to perform an active role in their treatment. Patients suffering from progressively debilitating diseases may feel increasingly unable to take part in gamified care. Furthermore, regarding disease severity, therapists referred to two distinct applications of gamified healthcare: curing diseases and enhancing patients' well-being. Although the gamification of healthcare seems to create an invaluable opportunity to promote healthy practices (Hamari and Koivisto, 2015), it may be a risky alternative when it is implemented to address chronic diseases. For instance, there is a clear risk in using gamification when patients suffer from chronic or degenerative illnesses because it increases awareness of their progressively increasing disabilities and therefore discourages them (Gallan *et al.*, 2013).

Managerial implications

From a managerial perspective, this research provides suggestions on how to design service encounters using new technologies such that they provide users with smooth service experiences and engage them (Ostrom *et al.*, 2015). This research underlines that gamification mechanics in service design must be used carefully to engage users in several dimensions (i.e. cognitive, emotional, and behavioral). Furthermore, the creation of value through the use of technology was examined in the specific context of vulnerable users with decreasing physical capabilities. This study contributes to the understanding of the value of gamification mechanics as a means of engaging these users and provides insight into how to manage these mechanics to achieve more desirable outcomes. As suggested by Lucassen and Jansen (2014), for gamification to result in positive outcomes, it should be applied with the clear purpose of fulfilling managerial objectives, rather than as a goal in itself. Given the diversity of gamification mechanics, managers can benefit from insight into how to select

appropriate designs based on service context and user type. This research is one of the first to explore effects of gamification mechanics on the user experience, especially in the healthcare context. The use of gamification design principles in healthcare is a burgeoning innovation practice (Miller *et al.*, 2016). Although the literature has suggested that gamification is connected to engagement, the present study uncovered several unexpected and negative outcomes. Therefore, future research should avoid exclusively stressing positive effects at the expense of negative outcomes that are not yet well known and studied (cf. Ponsignon *et al.*, 2015).

Limitations and suggestions for further research

Despite the use of multiple methods, some limitations persist. To conduct this investigation, qualitative methods were applied. Although the exploration has provided a better understanding of the gamified service experience, the proposed relationships in the model and the generalizability of the findings require further empirical study. Furthermore, because the study focused on two specific cases, other types of mechanics such as cooperation and competition mechanics were discarded (Werbach and Hunter, 2012; Zichermann and Cunningham, 2011; Zichermann and Linder, 2013). It may also be the case that some moderating factors have been ignored, since they were not observed in the two cases that were studied.

By addressing recent calls for research (McColl-Kennedy *et al.*, 2012; Ostrom *et al.*, 2015), this study increased the understanding of how users and providers develop engagement through new gamified technologies (e.g. wearable devices, 3D environment, social media, connected technologies, Kinect technologies). Multiple types of experiential value generated by gamified applications were identified (Gallan *et al.*, 2013), and the potential benefits of implementing gamification to enhance the service process by making the experience fun and helping create habits were highlighted (Huotari and Hamari, 2012; Robson *et al.*, 2015). We also addressed calls from Lucassen and Jansen (2014) and Hamari *et al.* (2014) by providing insights into how to properly manage gamification to effectively generate engagement. The paper contributes to the healthcare service management literature by highlighting that gamification could support the shift toward a more proactive role of the patient in healthcare, as indicated by McColl-Kennedy *et al.* (2012).

Based on the insights gained in this study, a research agenda is suggested to further the understanding of gamification as a tool to engage service users and providers. Future research could focus on effects of other gamification practices and mechanics, such as the use of a badge system, a 3D environment or a playful design, or on its use in other contexts, such as commerce (Hamari, 2013), online retailing (Insley and Nunan, 2014), education (Domínguez *et al.*, 2013), intra-organizational management (Farzan and Brusilovsky, 2011), and innovation (Bullinger *et al.*, 2010). In the healthcare context, research efforts could be dedicated to the development of methods to assess the relative effectiveness of gamification mechanics, specifically in relation to patients' age and disease severity.

The purpose of using gamification should explicitly be taken into account. For instance, it can be expected that gamification aimed at prevention (e.g. promotion of healthy activities) differs from gamification aimed at caring or curing (e.g. treatment of chronic diseases).

Moreover, as observed in this paper, gamification may indeed induce a shift in the roles of the users and providers of the service. For example, the provider will likely need to be more focused on or concerned with supporting and guiding the user in a gamified experience. Some healthcare professionals might be reluctant to provide gamified care despite patients' interest in it because they may worry about their jobs as medical professionals. Therefore, it is important to better understand how gamification that induces fun and entertainment may transform the role of service providers, especially those in professions perceived as serious-minded (e.g. medical staff).

Furthermore, the potential benefits of inducing fun could also influence the professionals' experience by making their job more enjoyable and, consequently, enhance their customer orientation, self-efficacy, organizational identification, and service performance (Menguc *et al.*, 2016). However, the effect of gamification on the role of service professionals requires further research (Ostrom *et al.*, 2015). Gamification seems to be an effective mechanism to address the issue of lack of involvement. It helps stimulate a shift in the users' roles – from passive recipients to value co-creators. Future research should also investigate the extent to which gamification mechanics stimulate lasting and intensive engagement that extends beyond a single experience to promote behavioral changes. In other words, could gamification be used as a means to transform behaviors and induce new habits?

References

- Aarikka-Stenroos, L. and Jaakkola, E. (2012), "Value co-creation in knowledge intensive business services: a dyadic perspective on the joint problem solving process", *Industrial Marketing Management*, Vol. 41 No. 1, pp. 15-26.
- Abt, C.C. (1987), *Serious Games*, University Press of America, Lanham, MD.
- Anderson, L., Ostrom, A.L. and Bitner, M.J. (2011), "Surrounded by services: a new lens for examining the influence of services as social structures on well-being", working paper, W.P. Carey School of Business, Arizona State University, Phoenix, AZ.
- Barello, S., Graffigna, G. and Vegni, E. (2012), "Patient engagement as an emerging challenge for healthcare services: mapping the literature", *Nursing Research and Practice*, Vol. 2012, pp. 1-7.
- Bazeley, P. and Jackson, K. (2013), *Qualitative Data Analysis With NVivo*, 2nd ed., Sage, London.
- Bell, J. and Loane, S. (2010), " 'New-wave' global firms: web 2.0 and SME internationalisation", *Journal of Marketing Management*, Vol. 26 Nos 3/4, pp. 213-229.
- Berry, L.L. and Bendapudi, N. (2007), "Health care, a fertile field for service research", *Journal of Service Research*, Vol. 10 No. 2, pp. 111-122.
- Blohm, I. and Leimeister, J.M. (2013), "Gamification – design of IT-based enhancing services for motivational support and behavioral change", *Business & Information Systems Engineering*, Vol. 5 No. 4, pp. 275-278.
- Brodie, R.J., Hollebeek, L.D., Juric, B. and Ilic, A. (2011), "Customer engagement: conceptual domain, fundamental propositions, and implications for research", *Journal of Service Research*, Vol. 14 No. 3, pp. 252-271.
- Brodie, R.J., Ilic, A., Juric, B. and Hollebeek, L. (2013), "Consumer engagement in a virtual brand community: an exploratory analysis", *Journal of Business Research*, Vol. 66 No. 1, pp. 105-114.
- Bullinger, A.C., Neyer, A.K., Rass, M. and Moeslein, K.M. (2010), "Community-based innovation contests: where competition meets cooperation", *Creativity and Innovation Management*, Vol. 19 No. 3, pp. 290-303.
- Cafazzo, J.A., Casselman, M., Hamming, N., Katzman, D.K. and Palmert, M.R. (2012), "Design of an mHealth app for the self-management of adolescent Type 1 diabetes: a pilot study", *Journal of Medical Internet Research*, Vol. 14 No. 3, pp. 1-13.
- Cailliois, R. (2001), *Man, Play and Games*, University of Illinois Press, Champaign, IL.
- Camerer, C. (2003), *Behavioral Game Theory: Experiments in Strategic Interaction*, Princeton University Press, Princeton, NJ.
- Corbin, J. and Strauss, A. (1990), "Grounded theory research: procedures, canons, and evaluative criteria", *Qualitative Sociology*, Vol. 13 No. 1, pp. 3-22.
- Cugelman, B. (2013), "Gamification: what it is and why it matters to digital health behavior change developers", *JMIR Serious Games*, Vol. 1 No. 1, pp. 1-6.
- Dahl, D.W. and Moreau, C.P. (2007), "Thinking inside the box: why consumers enjoy constrained creative experiences", *Journal of Marketing Research*, Vol. 44 No. 3, pp. 357-369.

- Danaher, T.S. and Gallan, A.S. (2016), "Service research in health care: positively impacting lives", *Journal of Service Research*, Vol. 19 No. 4, pp. 433-437.
- De Keyser, A., Lemon, K.N., Keiningham, T. and Klaus, P. (2015), "A framework for understanding and managing the customer experience", MSI Working Paper No. 15-121, Marketing Science Institute, Cambridge, MA.
- Denzin, N.K. and Lincoln, Y.S. (2011), *Sage Handbook of Qualitative Research*, 4th ed., Sage, Thousand Oaks, CA.
- Deterding, S., Dixon, D., Khaled, R. and Nacke, L. (2011), "From game design elements to gamefulness: defining gamification", in Lugmayr, A., Fransila, H., Safran, C. and Hammouda, I. (Eds), *Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments, Tampere, Finland, September 28-30*, ACM, New York, NY, pp. 9-15.
- Domínguez, A., Saenz-de-Navarrete, J., De Marcos, L., Fernández-Sanz, L., Pagés, C. and Martínez-Herráiz, J.-J. (2013), "Gamifying learning experiences: practical implications and outcomes", *Computers & Education*, Vol. 63 No. 4, pp. 380-392.
- Drell, L. (2013), "An app a day keeps the doctor away", *Marketing Health Services*, Vol. 34 No. 2, pp. 20-23.
- Drell, L. (2014), "Let the gamification begin", *Marketing Health Services*, Vol. 35 No. 1, pp. 24-27.
- Eisenhardt, K.M. (1989), "Building theories from case study research", *Academy of Management Review*, Vol. 14 No. 4, pp. 532-550.
- Elverdam, C. and Aarseth, E. (2007), "Game classification and game design construction through critical analysis", *Games and Culture*, Vol. 2 No. 1, pp. 3-22.
- Farzan, R. and Brusilovsky, P. (2011), "Encouraging user participation in a course recommender system: an impact on user behavior", *Computers in Human Behavior*, Vol. 27 No. 1, pp. 276-284.
- Fattal, O., Lampe, E., Barcelona, I. and Muzina, D. (2005), "Patient compliance with medication and follow-up appointments", *Psychiatric Annals*, Vol. 35 No. 2, pp. 165-178.
- Flick, U. (2006), *An Introduction to Qualitative Research*, 3rd ed., Sage, London.
- Fuller, J. (2006), "Why consumers engage in virtual new product developments initiated by producers", *Advances in Consumer Research*, Vol. 33 No. 1, pp. 639-646.
- Fuller, J., Hutter, K. and Faullant, R. (2011), "Why co-creation experience matters? Creative experience and its impact on the quantity and quality of creative contributions", *R&D Management*, Vol. 41 No. 3, pp. 259-273.
- Gallan, A., Jarvis, C., Brown, S. and Bitner, M. (2013), "Customer positivity and participation in services: an empirical test in a health care context", *Journal of the Academy of Marketing Science*, Vol. 41 No. 3, pp. 338-356.
- Glaser, B.G. and Strauss, A.L. (2009), *The Discovery of Grounded Theory: Strategies for Qualitative Research*, 6th ed., Transaction Publishers, New Brunswick, NJ.
- Graffigna, G., Barello, S. and Riva, G. (2013), "Technologies for patient engagement", *Health Affairs*, Vol. 32 No. 6, p. 1172.
- Greer, D.A. (2015), "Defective co-creation", *European Journal of Marketing*, Vol. 49 Nos 1/2, pp. 238-261.
- Grönroos, C. (2008), "Service logic revisited: who creates value? And who co-creates?", *European Business Review*, Vol. 20 No. 4, pp. 298-314.
- Grönroos, C. (2011), "Value co-creation in service logic: a critical analysis", *Marketing Theory*, Vol. 11 No. 3, pp. 279-301.
- Grönroos, C. and Ravald, A. (2011), "Service as business logic: implications for value creation and marketing", *Journal of Service Management*, Vol. 22 No. 2, pp. 5-22.
- Grönroos, C. and Voima, P. (2012), "Critical service logic: making sense of value creation and co-creation", *Journal of the Academy of Marketing Science*, Vol. 41 No. 2, pp. 133-150.
- Grove, S.J. and Fisk, R.P. (1992), "Observational data collection methods for services marketing: an overview", *Journal of the Academy of Marketing Science*, Vol. 20 No. 3, pp. 217-224.

- Gruber, T. and Frugone, F. (2011), "Uncovering the desired qualities and behaviours of general practitioners (GPs) during medical (service recovery) encounters", *Journal of Service Management*, Vol. 22 No. 4, pp. 491-521.
- Gruman, J., Holmes-Rovner, M., French, M.E., Jeffres, D., Sofaer, S., Shaller, D. and Prager, D.J. (2010), "From patient education to patient engagement: implications for the field of patient education", *Patient Education and Counseling*, Vol. 78 No. 3, pp. 350-356.
- Hamari, J. (2013), "Transforming homo economicus into homo ludens: a field experiment on gamification in a utilitarian peer-to-peer trading service", *Electronic Commerce Research and Applications*, Vol. 12 No. 4, pp. 236-245.
- Hamari, J. and Koivisto, J. (2015), "'Working out for likes': an empirical study on social influence in exercise gamification", *Computers in Human Behavior*, Vol. 50 No. 9, pp. 333-347.
- Hamari, J., Koivisto, J. and Sarsa, H. (2014), "Does gamification work? A literature review of empirical studies on gamification", *47th Hawaii International Conference on System Sciences, IEEE Computer Society, Washington DC, January 6-9*, pp. 3025-3034.
- Harwood, T. and Garry, T. (2015), "An investigation into gamification as a customer engagement experience environment", *Journal of Services Marketing*, Vol. 29 Nos 6/7, pp. 533-546.
- Hofacker, C.F., de Ruyter, K., Nicholas, H.L., Manchanda, P. and Donaldson, J. (2016), "Gamification and mobile marketing effectiveness", *Journal of Interactive Marketing*, Vol. 34 No. 2, pp. 25-36.
- Hunicke, R., LeBlanc, M. and Zubek, R. (2004), "MDA: a formal approach to game design and game research", in San José, C.A., Fu, D., Henke, S. and Orkin, J. (Eds), *Proceedings of the AAAI Workshop on Challenges in Game AI*, Vol. 4, The AAAI Press, Menlo Park, CA, July 25-26, pp. 1-5.
- Huotari, K. and Hamari, J. (2012), "Defining gamification: a service marketing perspective", Lugmayr, A. (Ed.), *Proceedings of the 16th International Academic MindTrek Conference*, ACM, New York, NY, October 3-5, pp. 17-22.
- Insley, V. and Nunan, D. (2014), "Gamification and the online retail experience", *International Journal of Retail & Distribution Management*, Vol. 42 No. 5, pp. 340-351.
- Jaakkola, E. and Alexander, M. (2014), "The role of customer engagement behavior in value co-creation: a service system perspective", *Journal of Service Research*, Vol. 17 No. 3, pp. 247-261.
- Jaakkola, E., Helkkula, A. and Aarikka-Stenroos, L. (2015), "Service experience co-creation: conceptualization, implications, and future research directions", *Journal of Service Management*, Vol. 26 No. 2, pp. 182-205.
- Kaplan, A.M. and Haenlein, M. (2010), "Users of the world, unite! The challenges and opportunities of social media", *Business Horizons*, Vol. 53 No. 1, pp. 59-68.
- King, D., Greaves, F., Exeter, C. and Darzi, A. (2013), "'Gamification': influencing health behaviours with games", *Journal of the Royal Society of Medicine*, Vol. 106 No. 3, pp. 76-78.
- Kohler, T., Matzler, K. and Füller, J. (2009), "Avatar-based innovation: using virtual worlds for real-world innovation", *Technovation*, Vol. 29 No. 6-7, pp. 395-407.
- Kolbe, R.H. and Burnett, M.S. (1991), "Content-analysis research: an examination of applications with directives for improving research reliability and objectivity", *Journal of Consumer Research*, Vol. 18 No. 2, pp. 243-250.
- Koster, R. (2013), *A Theory of Fun for Game Design*, 2nd ed., O'Reilly, Sebastopol, CA.
- Lemon, K.N. and Verhoef, P.C. (2016), "Understanding customer experience throughout the customer journey", *Journal of Marketing*, Vol. 80 No. 6, pp. 69-96.
- Lincoln, Y.S. and Guba, E.G. (1985), *Naturalistic Inquiry*, Sage, Beverly Hills, CA.
- Lucassen, G. and Jansen, S. (2014), "Gamification in consumer marketing: future or fallacy?", *Procedia – Social and Behavioral Sciences*, Vol. 148 No. 40, pp. 194-202.
- Lusch, R.F. and Vargo, S.L. (2011), "Service-dominant logic: a necessary step", *European Journal of Marketing*, Vol. 45 Nos 7/8, pp. 1298-1309.

- McColl-Kennedy, J.R., Cheung, L. and Ferrier, F. (2015), "Co-creating service experience practices", *Journal of Service Management*, Vol. 26 No. 2, pp. 249-275.
- McColl-Kennedy, J.R., Vargo, S.L., Dagger, T.S., Sweeney, J.C. and Van Kasteren, Y. (2012), "Health care customer value cocreation practice styles", *Journal of Service Research*, Vol. 15 No. 4, pp. 370-389.
- Malone, T.W. (1981), "Toward a theory of intrinsically motivating instruction", *Cognitive Science*, Vol. 5 No. 4, pp. 333-369.
- Menezes, J., Gusmão, C. and Machiavelli, J. (2013), "A proposal of mobile system to support scenario-based learning for health promotion", *Procedia Technology*, Vol. 9 No. 3, pp. 1142-1148.
- Menguc, B., Auh, S., Katsikeas, C.S. and Jung, Y.S. (2016), "When does (mis) fit in customer orientation matter for frontline employees' job satisfaction and performance?", *Journal of Marketing*, Vol. 80 No. 1, pp. 65-83.
- Miller, A.S., Cafazzo, J.A. and Seto, E. (2016), "A game plan: gamification design principles in mHealth applications for chronic disease management", *Health Informatics Journal*, Vol. 22 No. 2, pp. 1-10.
- Nambisan, P. and Nambisan, S. (2009), "Models of consumer value cocreation in health care", *Health Care Management Review*, Vol. 34 No. 4, pp. 344-354.
- Ostrom, A.L., Parasuraman, A., Bowen, D.E., Patrício, L. and Voss, C.A. (2015), "Service research priorities in a rapidly changing context", *Journal of Service Research*, Vol. 18 No. 2, pp. 127-159.
- Plé, L. and Cáceres, R.C. (2010), "Not always co-creation: introducing interactional co-destruction of value in service-dominant logic", *Journal of Services Marketing*, Vol. 24 No. 6, pp. 430-437.
- Ponsignon, F., Smart, A., Williams, M. and Hall, J.H. (2015), "Healthcare experience quality: an empirical exploration using content analysis techniques", *Journal of Service Management*, Vol. 26 No. 3, pp. 460-485.
- Ramaswamy, V. and Gouillart, F. (2010), *The Power of Co-Creation*, Free Press, New York, NY.
- Robson, K., Plangger, K., Kietzmann, J., McCarthy, I. and Pitt, L. (2014), "Understanding gamification of consumer experiences", in Cotte, J. and Wood, S. (Eds), *Advances in Consumer Research*, Vol. 42, Duluth, MN, pp. 352-356.
- Robson, K., Plangger, K., Kietzmann, J.H., McCarthy, I. and Pitt, L. (2015), "Is it all a game? Understanding the principles of gamification", *Business Horizons*, Vol. 58 No. 4, pp. 411-420.
- Rosenbaum, M.S., Corus, C., Ostrom, A.L., Anderson, L., Fisk, R.P., Gallan, A.S. and Shirahada, K. (2011), "Conceptualisation and aspirations of transformative service research", *Journal of Research for Consumers*, Vol. 19 No. 1, pp. 1-6.
- Sawhney, M., Verona, G. and Prandelli, E. (2005), "Collaborating to create: the internet as a platform for customer engagement in product innovation", *Journal of Interactive Marketing*, Vol. 19 No. 4, pp. 4-17.
- Sharma, A. and Sheth, J.N. (2004), "Web-based marketing: the coming revolution in marketing thought and strategy", *Journal of Business Research*, Vol. 57 No. 7, pp. 696-702.
- Spiggle, S. (1994), "Analysis and interpretation of qualitative data in consumer research", *Journal of Consumer Research*, Vol. 21 No. 3, pp. 491-503.
- Thorsteinsen, K., Vittersø, J. and Svendsen, G.B. (2014), "Increasing physical activity efficiently: an experimental pilot study of a website and mobile phone intervention", *International Journal of Telemedicine and Applications*, Vol. 2014 No. 8, pp. 1-9.
- Van Riel, A.C.R., Visser, L., Van der Eijk, M., Faber, M.J., Munneke, M. and Bloem, B.R. (2013), "Collaborative care for patients with Parkinson's disease: combining an offline professional network with an online health community for the sustainable provision of care", in Kandampully, J. (Ed.), *Service Management in Health and Wellness Services*, Kendall Hunt, Dubuque, IA, pp. 311-324.
- Vargo, S.L. (2008), "Customer integration and value creation: paradigmatic traps and perspectives", *Journal of Service Research*, Vol. 11 No. 2, pp. 211-215.
- Vargo, S.L. and Lusch, R.F. (2004), "Evolving to a new dominant logic for marketing", *Journal of Marketing*, Vol. 68 No. 1, pp. 1-17.

- Vargo, S.L. and Lusch, R.F. (2016), "Institutions and axioms: an extension and update of service-dominant logic", *Journal of the Academy of Marketing Science*, Vol. 44 No. 5, pp. 5-23.
- Varnfield, M., Karunanithi, M., Lee, C.-K., Honeyman, E., Arnold, D., Ding, H., Smith, C. and Walters, D.L. (2014), "Smartphone-based home care model improved use of cardiac rehabilitation in postmyocardial infarction patients: results from a randomised controlled trial", *Heart*, Vol. 2014 No. 100, pp. 1770-1779.
- Verleye, K. (2015), "The co-creation experience from the customer perspective: its measurement and determinants", *Journal of Service Management*, Vol. 26 No. 2, pp. 321-342.
- Werbach, K. and Hunter, D. (2012), *For the Win: How Game Thinking Can Revolutionize Your Business*, Wharton Digital Press, Philadelphia, PA.
- Witt, M., Scheiner, C. and Robra-Bissantz, S. (2011), "Gamification of online idea competitions: insights from an explorative case", Berlin, T.U. (Ed.), *The Society for Computer Science, Informatik 2011: Informatik schafft Communities*, Berlin, pp. 1-15.
- Yang, M., Roskos-Ewoldsen, D.R., Dinu, L. and Arpan, L.M. (2006), "The effectiveness of 'in-game' advertising: comparing college students' explicit and implicit memory for brand names", *Journal of Advertising*, Vol. 35 No. 4, pp. 143-152.
- Yin, R.K. (2003a), *Applications of Case Study Research*, 2nd ed., Vol. 34, Applied Social Research Methods Series, Sage, Thousand Oaks, CA.
- Yin, R.K. (2003b), *Case Study Research: Design and Methods*, 3rd ed., Vol. 5, Applied Social Research Methods Series, Sage, Thousand Oaks, CA.
- Zichermann, G. and Cunningham, C. (2011), *Gamification by Design: Implementing Game Mechanics in Web and Mobile Apps*, O'Reilly, Sebastopol, CA.
- Zichermann, G. and Linder, J. (2013), *The Gamification Revolution: How Leaders Leverage Game Mechanics to Crush the Competition*, McGraw-Hill, New York, NY.

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