

Gamification

Design of IT-Based Enhancing Services for Motivational Support and Behavioral Change

DOI 10.1007/s12599-013-0273-5

The Authors

Dr. Ivo Blohm (✉)
 Institute for Information
 Management
 University of St. Gallen
 Müller-Friedberg-Str. 8
 9000 St. Gallen
 Switzerland
ivo.blohm@unisg.ch

Prof. Dr. Jan Marco Leimeister
 Chair for Information Systems
 Research Center for IS Design (ITeG)
 University of Kassel
 Nora-Platiel-Straße 4
 34127 Kassel
 Germany
leimeister@uni-kassel.de
 and
 Institute for Information
 Management
 University of St. Gallen
 Müller-Friedberg-Str. 8
 9000 St. Gallen
 Switzerland
janmarco.leimeister@unisg.ch

Received: 2013-04-15
 Accepted: 2013-05-13
 Accepted after one revision by
 Prof. Dr. Sinz.
 Published online: 2013-06-14

This article is also available in German in print and via <http://www.wirtschaftsinformatik.de>: Blohm I, Leimeister JM (2013) Gamification. Gestaltung IT-basierter Zusatzdienstleistungen zur Motivationsunterstützung und Verhaltensänderung. WIRTSCHAFTSINFORMATIK. doi: 10.1007/s11576-013-0368-0.

© Springer Fachmedien Wiesbaden 2013

1 Gamification as Incentive Mechanism

NikeFuel is the fuel of the Nike+ community.¹ A fuel that has made two million users burn more than 68 bn. calories and that proliferates with each kilometer. The athletic performance of Nike+ users is measured via sensors in Nike sports shoes and an Apple iPod or iPhone, documented on the Nike+ platform and converted into NikeFuel. In doing so, users may visualize their progress, compare their performance with others, and obtain different status levels that reflect their athletic potential. For accomplishing particular milestones (e.g., *100 KM*), users receive badges that can be shared in social networks, as successful activities in general, and be displayed in a virtual trophy cabinet. Using such IT-based mechanisms, Nike has transformed endurance sports into a “game”. This approach derives from the domain of game design and is called *gamification* – enriching products, services, and information systems with game-design elements in order to positively influence motiva-

tion, productivity, and behavior of users (Deterding et al. 2011, pp. 10–12; Huotari and Hamari 2012, pp. 19–20).

In the consumer sector, various successful examples for gamification are gaining recognition. In 2011, Sweden’s National Society for Road Safety and Volkswagen hosted the *Speed Camera Lottery*.² This is a lottery in which car drivers participate automatically when they abide by the speed limit in a speed control. The prices of this lottery were financed by the speeding fines. *Carwings*³ is a smartphone app for Nissan’s electric car *Leaf* that attempts to encourage an ecological way of driving in order to increase the limited range of the electric car. *BahnScout*⁴ motivates passengers of Munich’s Metro to report damages at train stations. Telefonica *MoviPill*⁵ awards points and badges for correctly taking medicine. Additionally, more and more successful business applications have started to develop. For example, *Level Eleven*⁶ offers gamification plug-ins for steering sales people in Salesforce.com.

All these approaches do not represent games in the proper meaning of the word. Instead, they make use of the possibilities of IT to develop incentive concepts, which continuously engage users in using products, services and information systems. According to Gartner (2012, p. 4), gamification reflects a major trend that will play a central role for CIOs and IT planners in the near future. Already in 2015, 40 % of the world’s largest 1,000 organizations are expected to apply gamification for transforming their business operations.

¹<http://nikeplus.nike.com/plus/>.

²<http://www.thefuntheory.com/>.

³<http://www.nissanusa.com/innovations/carwings.article.html>.

⁴<http://www.bahnscout.de>.

⁵<http://www.tid.es/es/Research/Paginas/TIDProjectProfile.aspx?Project=MoviPill>.

⁶<http://leveleven.com/>.

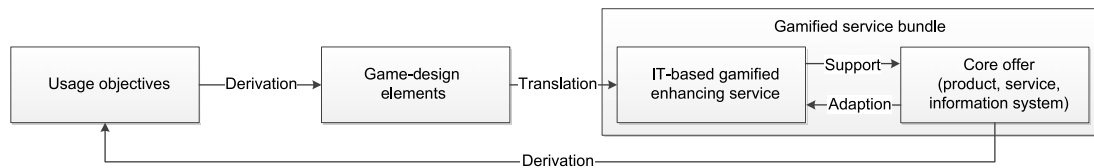


Fig. 1 Gamification as design approach

Table 1 Game-design elements and motives

Game-design elements		Motives
Game mechanics	Game dynamics	
Documentation of behavior	Exploration	Intellectual curiosity
Scoring systems, badges, trophies	Collection	Achievement
Rankings	Competition	Social recognition
Ranks, levels, reputation points	Acquisition of status	
Group tasks	Collaboration	Social exchange
Time pressure, tasks, quests	Challenge	Cognitive stimulation
Avatars, virtual worlds, virtual trade	Development/organization	Self-determination

2 Gamification in the Context of Previous Research

Gamification is a *persuasive technology* that attempts to influence user behavior by activating individual motives via game-design elements (Petkov et al. 2011, p. 2). As a consequence, this approach does not deal with designing games that can generally be defined as solving rule-based artificial conflicts or simulations (Deterding et al. 2011, p. 11; McGonigal 2011, p. 21). Thus, gamification needs to be contrasted to related concepts such as *serious games* and *games with a purpose*. Serious games reflect games that are linked to a particular learning objective (Simões et al. 2013, pp. 345–346). For instance, *IBM Innov8 2.0* is a game that aims at helping users experience the benefits of business process management. Games with a purpose reflect an approach in which problems that cannot satisfactorily be solved with information systems are transformed, so that human individuals can solve them in a game-like fashion (Von Ahn 2006, p. 96). For example, *ARTigo*⁷ is a game which was developed by the University of Munich. In this game, two players compete in finding more tags for characterizing images from the digital archive of the Institute for Art History than their opponent.

By contrast, gamification encompasses the design of “gamified” service bundles (Leimeister 2012). These bundles comprise of a core offer (a product, a ser-

vice or an information system) and an IT-based, gamified enhancing service for the core offer (Huotari and Hamari 2012, pp. 19–20). The starting point for designing gamified enhancing services are the specific usage objectives for the core offer as defined by core office providers. For instance, such usage objectives could be derived from the analysis of historic user behavior and may describe how core offer providers wish their core offer to be used in future. These objectives are translated into appropriate game-design elements that are compiled into gamified enhancing services. By creating a game-like usage experience, these enhancing services strive to activate individual user motives regarding the core offer (Huotari and Hamari 2012, pp. 19–20) and consequently support its consumption. Moreover, bundling core offer and enhancing services also requires the adaption of the core offer to the enhancing service. **Figure 1** summarizes these assertions.

- Usage objectives: The usage of products, services and information systems generally depends on a person’s motives (Ryan and Deci 2000, pp. 54–55). Thus, the fundamental idea of gamification is to invoke particular behavior by activating individual user motives. This systematic intervention into existing usage patterns aims at influencing users towards a priori defined objectives of a core offer provider. In doing so, gamification translates the objectives of a core offer provider into a

target system that is compatible with individual user motives.

- Game-design elements: Game-design elements comprise game mechanics and game dynamics (Deterding et al. 2011, pp. 11–12; Zichermann and Cunningham 2011, pp. 35–36). Game mechanics cover diverse building blocks for gamifying a core offer such as scoring systems or badges. Game dynamics, however, describe the effects of these mechanics on the subjective user experience over time (Huotari and Hamari 2012, p. 19) and correspond to specific user motives. For instance, mechanics such as rankings induce competitive dynamics that relate user activities to a reference group and should thus satisfy the pursuit for social recognition (Petkov et al. 2011, pp. 3–5). **Table 1** highlights the most important game-design elements. However, according to their specific design, single mechanics may cause different dynamics that might correspond to different motives.
- Gamified service bundles: Many game mechanics are not novel per se. Badges, for instance, have a long military tradition (Zichermann and Cunningham 2011, p. 56). Similarly, loyalty programs have been used in marketing for decades. Many current frequent flyer programs make use of game mechanics such as credit point systems (e.g., air miles) or status levels (e.g.,

⁷<http://www.artigo.org>.

frequent flyer status). The innovation about gamification is bundling such game-design elements into comprehensive, IT-based and increasingly ubiquitous enhancing services. Such services not only offer benefits on their own but also lead to a new cognitive, emotional, and social usage experience of the core offer (Lee and Hammer 2011, pp. 3–4). In contrast to many frequent flyer programs, approaches such as Nike+ comprise an independent value proposition (training support) and create a completely new usage context for the core offer “Nike sports shoes”.

3 Potentials and Application of Gamification

The potential of gamification is based on comprehensive motivational support and on invoking flow experiences. Ryan and Deci (2000, pp. 56–65) distinguish between intrinsic and extrinsic motivation. Intrinsic motivation is directly rooted in a given task, whereas extrinsic motivation always aims at external goals such as financial compensation. Traditional incentive mechanisms are usually based on increasing extrinsic motivation, i.e., introducing financial rewards. Such stimuli often fail to increase motivation in the long run as adaptation effects undermine their effectiveness (McGonigal 2011, pp. 45–48). However, IT-based gamified enhancing services are able to arouse the intrinsic motivation of users regarding a core offer (McGonigal 2011, pp. 52–115):

- Increase in user satisfaction: The continuous documentation of one’s own behavior visualizes progress, facilitates the derivation of achievable personal goals and offers immediate feedback so that users perceive feelings of high individual performance.
- Conveyance of optimism: Gamification enables self-determination as well as experiencing a sense of achievement, or more specifically the hope of experiencing success.
- Facilitation of social interaction: Gamification is usually related to entering

a community of peers and thus allows for social exchange and/or competition.

- Provision of meaning: Gamification frequently allows users to participate in resolving superordinate problems that go beyond one’s personal possibilities.

These mechanisms facilitate perceptions of control, autonomy, and fun that are central antecedents of flow experiences. Flow reinforces the voluntary use of gamified service bundles and increases both motivation and performance of individuals (McGonigal 2011, pp. 35–38). However, intrinsic motives and flow can be systematically activated by setting extrinsic incentives (Ryan and Deci 2000, pp. 63–65). Thus, incentives such as badges do not only comply with the intrinsic motive of collecting but also with the extrinsic motive of gaining social recognition. As a consequence, gamification allows for the design of persuasive incentive mechanisms that go far beyond financial incentives. Thus, gamification has a high potential for changing behavioral patterns and for supporting accompanying learning processes:

- Behavioral change: Gamification relates behavioral change to positive emotional feedback. In doing so, gamification may support the introduction of new patterns of behavior as well as the modification of habitual behavior. Such behavioral patterns are usually unconscious and automatized so that traditional incentive schemes frequently only exhibit a low effectiveness. In providing positive emotions, gamification may break up existing habits, update them with new behaviors and support the stabilization of new behaviors by continuously setting appropriate stimuli (Ortiz de Guinea and Markus 2009, pp. 438–441).
- Support of learning processes: Gamification decomposes tasks into various subtasks and milestones. Users can solve such subtasks by trial and error and repeat them until the problem has been solved and a particular skill level

has been reached (McGonigal 2011, pp. 127–132). By designing tasks of increasing difficulty, cognitive structures for the internalization of learning contents may be systematically created (Simões et al. 2013, p. 348).

Gamification supports and enables the transformation of organizational value creation processes. Today, gamification is most frequently applied in marketing in order to improve customer loyalty and brand image. However, current applications in innovation (e.g., *Smart Design Contest*⁸), sales (e.g., *LevelEleven*), after sales (e.g., *freshdesk*⁹), or leadership processes (e.g., *Work Simple*¹⁰) depict this approach’s potentials along the value chain. The support of learning processes is a second major application domain of gamification (Simões et al. 2013). For instance, Microsoft motivates Office users by means of *Ribbon Hero*¹¹ to learn to use new functionalities by offering credit points and rewards that can be earned whilst using the Office Software. Deloitte was able to significantly increase participation in its *Leadership Academy*¹² by a gamification approach. Another application field comprises (social) welfare (Haller et al. 2011, p. 104). This embraces, for instance, approaches for promoting personal well-being (e.g., *HealthMonth*¹³) or the protection of the environment (e.g., *Google PowerMeter*¹⁴). However, many organizations make use of such a positioning in order to enhance their own approaches with superordinate meaning (*‘Epic Meaning’*).

4 Implications for Information Systems Research

Consumerization approaches such as gamification involve various organizational change processes and, thus, confront companies with great challenges (Weis and Leimeister 2012). In the following, these challenges imposed by gamification are briefly outlined using

⁸<http://www.smart-design-contest.com/matching-game>.

⁹<http://freshdesk.com/gamification-of-support-help-desk/>.

¹⁰<http://getworksimple.com/>

¹¹<http://www.ribbonhero.com/>.

¹²<http://www.deloitte.la/welcome/>.

¹³<http://healthmonth.com/>.

¹⁴<http://www.google.com/powermeter/about/>.

the business engineering framework of Österle and Winter (2003). On the level of *business strategy*, gamified service bundles often require new business models and value creation networks. However, it has yet to be clarified how appropriate business models and networks should be designed in detail. Further, gamification implies the transformation of existing and the design of new *business processes* in order to include customers or end users in value creation processes, or to increase the productivity of employees. In this regard, central questions include, e.g., for which kind of tasks and in which contexts gamification may be useful. For instance, it could be possible that gamification may distract too much from a core offer and lead to productivity losses under certain contingencies. Moreover, the question of an appropriate degree of gamification is still open. On the level of *information systems*, gamification comprises the design and operation of gamified service bundles for the implementation of transformed and newly created business processes. This includes the design of IT-based, gamified enhancing services as well as an adaption of core offers, so that both parts can be bundled. For instance, integrating electronic sensors in Nike sports shoes was a central prerequisite for creating the Nike+ service bundle. Gamification often involves storing and processing of personal, context-sensitive, and potentially also sensitive data. This is especially a challenge within company boundaries, where gamification could lead to “transparent employees” or where inappropriate extrinsic incentives might crowd out intrinsic motiva-

tion (Ryan and Deci 2000, p. 63). The design and adjustment of gamified service bundles is thus a complex task that exceeds applying simple point systems and badges. Gartner (2012, p. 4) assumes that approximately 80 % of current gamified applications will fail due to inappropriate design and fine-tuning. In the context of accompanying *leadership processes*, gamification allows the implementation of an all-embracing change management. Adoption and use of new products, services, and information systems can thus be systematically supported. Further, it facilitates the adaption of habitual behavior (Ortiz de Guinea and Markus 2009). In this regard, we need to clarify how gamification is adopted by different demographic groups such as *born digitals* and older generations (McGonigal 2011, pp. 127–132).

Acknowledgements

This paper presents outcomes of the research project “Produce” that is funded by the German Ministry of Research and Education under contract No. 01FL10043. For further information please visit: <http://projekt-produce.de/projektbeschreibung/>

References

Deterding S, Dixon D, Khaled R, Nacke L (2011) From game design elements to gamefulness: defining gamification. In: Proc 15th MindTrek conference, Tampere, pp 9–15

Gartner (2012) Gamification: engagement strategies for business and IT. Report G00245563

Haller J, Bullinger A, Möslin K (2011) Innovation contests. An IT-based tool for innovation management. *Bus Inf Sys Eng* 53(2):105–108

Huotari K, Hamari J (2012) Defining gamification – a service marketing perspective. In: Proc 15th MindTrek conference, Tampere, pp 17–22

Lee JJ, Hammer J (2011) Gamification in education: what, how, why bother? *Academic Exchange Quarterly* 15(2):1–5

Leimeister JM (2012) *Dienstleistungsengeineering und -Management*. Springer Gabler, Berlin

McGonigal J (2011) *Reality is broken. Why games make us better and how they can change the world*. Penguin Press, New York

Ortiz de Guinea A, Markus ML (2009) Why break the habit of a lifetime? Rethinking the roles of intention, habit, and emotion in continuing information technology use. *MIS Quarterly* 33(3):433–444

Österle H, Winter R (2003) *Business Engineering: Auf dem Weg zum Unternehmen des Informationszeitalters*. Springer, Heidelberg

Petkov P, Köbler F, Foth M, Medland RC, Krmar H (2011) Engaging energy saving through motivation-specific social comparison. In: Proc conference on human factors in computing systems, Vancouver, pp 1–6

Ryan RM, Deci EL (2000) Intrinsic and extrinsic motivations: classic definitions and new directions. *Contemporary Educational Psychology* 25(1):54–67

Simões J, Redondo RD, Vilas AF (2013) A social gamification framework for a K-6 learning platform. *Computers in Human Behavior* 29(2):345–353

Von Ahn L (2006) Games with a purpose. *Computer* 39(6):92–94

Weis F, Leimeister JM (2012) Consumerization. IT innovations from the consumer market as a challenge for corporate IT. *Bus Inf Sys Eng* 54(6):351–354

Zichermann G, Cunningham C (2011) *Gamification by design: implementing game mechanics in web and mobile apps*. O'Reilly, Sebastopol