

The Backbone of Gamification – a Theoretical Consideration of Play and Game Mechanics

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Abstract: Challenges in idea management research and practice no longer revolve around why it is important for people to participate. Instead, the focus has shifted onto how participants can be motivated and, in addition, how their full creative potential can be exploited. This paper develops a theoretical framework that emphasizes the benefits of game mechanics within the context of idea management in scientific literature. In a two-step approach, the aspect of why play is relevant for an organization is addressed first, before specific game mechanics are integrated.

1 Introduction

Accessing the potential of individuals within and outside organizational settings has become essential for the existence of organizations, and it offers opportunities for gaining a competitive advantage [Ch03; vH05]. Convincing external parties, such as customers and network partners, however, to participate in such open idea management systems is a major challenge [To06; PW06]. Not only do organizations need to motivate individuals to participate in idea generation, development and evaluation, but they also have to inspire individuals so that open innovation activities lead to highly qualitative task performance and results. However, little is known about how to induce participants to a more creative effort and output [PW06]. Leimeister et al. [LHB09] concluded, therefore, that the full potential of

open innovation initiatives has not been fully tapped yet. Based on findings from other scientific disciplines such as psychology, sociology, philosophy, computer science, neuroscience, and economics, play – in a predefined framework such as games or game like environments – indicates to be a promising solution to fostering motivation and creativity. The fact that no standard definitions exists for games, is for Schell [Sc08] no problems for researchers and practitioners alike, but rather a chance to possess an understanding of the term game that keeps up with ongoing advances of technology and societal changes. If games are occurring in a structured and predefined way, a consensus exist that game mechanics are constitutive elements for the creation of games as they support the implementation of game characteristics (e.g. rules, goals, interactivity, challenge, competition, cooperation etc.) [Ca61; Su78; SZ03; TC90]. In line with the definitions of e.g. Fullerton et al.[Fu04], Schell [Sc08] and Järvinen [Jä08] are game mechanics the instruments and the incentives to induce actions and behavior of players towards the goals of a game. Despite the lack of a set of properties common to all games [Wi53], a number of game mechanics – namely game points, social points, redeemable points, levels, leaderboards, story, virtual identity, exchange and collecting – recur frequently in games. Despite the substantial body of research devoted to the characteristics of games in general, only a few scientific studies have been conducted to analyze the effects of game mechanics in particular [WSR11]. A reason for this could lie in the lack of a theoretical basis which could explain the lamentable gulf between scientific research and insights and practical handbooks. The purpose of this paper, therefore, is to address this research gap and to suggest a theoretical framework in which play and, as a consequence, game mechanics are included.

2 Play as Facilitator of Motivation and Creativity

The proposed framework suggests that certain factors of play (person factor, social factor, escaping boundaries and task factor) increase the likelihood that a person engaged in an idea management activity is motivated and creative due to the inclusion of play. The following section explains the integral parts of these factors and the linkage to play.

Person Factor

The person factor consists of perceived behavioral control and affect. Perceived behavioral control resembles the concept of self-efficacy of Bandura [Ba77] and refers to a person's belief to perform a given task with respect to her or his capabilities. It determines in which activities people participate, how much effort they invest to overcome obstacles and how long they stay in this activity [TW84]. According to Bandura [Ba82], people develop and strengthen their self-efficacy by mastery experiences and by modeling observational learning, verbal persuasion and judgments of their own physiological states, respectively [Ba82; WB89; GM92]. The development of self-efficacy is additionally influenced by

assessing, both from an individual and situational perspective, the availability of resources and impediments, which may affect future performance [Aj91; GM92]. Gist [Gi89] showed in problem solving tasks that an increase in self-efficacy was linked to a larger number of generated ideas, which were moreover characterized by a higher divergence. Research by Dewett [De07] demonstrated that self-efficacy is linked to intrinsic motivation in the field of research and development. But there are also different ways, in which play is related to self-efficacy. Within the structure of games, for instance, the player has to master easy challenges at the beginning. As the game advances, the level of difficulty rises with the self-perceived level of competence. Mastery experience and observational learning by other players intensify self-efficacy continuously during playing. Affect, a second component of person factor, supports motivation [Cs90] and fosters cognitive processes, which are important for the creative problem-solving process [IB91; KI93]. Positive affect broadens cognitive categories [ID84] and increases the likelihood of individuals pursuing a problem-solving approach [CI86]. While Isen et al. [IDN87] showed that positive affect enhances the performance in creative tasks, studies by Vosburg [Vo98] and Clapham [CI01] proved that positive affect does not necessarily have an influence on idea generation. George and Zhou [GZ07] explained these opposing viewpoints by the ambivalent effect of moods towards creativity. Negative mood signals that individuals should try harder in order to improve, which could lead to the development of creative ideas. Play is “a vehicle for the expression of feeling states and affect-laden thoughts” [RS06, p. 248].

Social Factor

The social factor comprises the elements of social belonging and competition. The need to belong and the need to interact with others are fundamental human needs, which are universal regardless of culture and individual differences [BL95]. In Maslow’s hierarchy of needs [Ma54a], the social needs become prominent as soon as the essential needs for survival and safety are satisfied. Moreover, they are given higher importance than the esteem and self-actualization needs. A possibility to satisfy the social need is illustrated by the inclusion of play. Adult players participate in games in order to become an active part of a social community and to feel a sense of belonging [Su97]. Besides its motivational influence, social belonging has been found to influence creative processes in a work environment [Am88; PS03]. According to Mainemelis and Ronson [MR06], social belonging that is induced through play stimulates both the willingness to engage in a creative process and the generation of innovative outcomes. Competing, on the other hand, allows individuals to compare their own skills and competences with others. It provides them with emotional energy to cope with stress and fear of uncertainty [LRV01]. Being or becoming better than others can motivate individuals to tap the full potential of their skills and abilities [To06; Ha48] and drive them to participate in idea management activities in order to show and prove their own competences in relation to others [PW06]. Competition, however, can also trigger negative side-effects upon creative processes. Franke and Shah [FS03] found that

willingness to share information decreases with an increased level of competition. Nevertheless, competition is an important purpose and element of play and is considered as the most essential reason why people play [Ye07].

Escaping Boundaries

Effective idea management aiming to unfold the full creative potential and motivation of participants should provide a possibility to overcome mental and organizational obstacles. Thus, the third factor – escaping boundaries – consists of the elements equality, divergent thinking and unlearning. A low level of equality between individuals and a strong hierarchical structure within an organization can reduce the intrinsic motivation. It can hinder or even prevent people to participate in idea management. Play can thus help to overcome hindering organizational hierarchies as it is generally characterized by the principle of equality and the application of anti-authoritarian principles [SK84; LRV01]. All players start at the same hierarchical level and follow the same game rules while the hierarchy among them can evolve during play. Games can therefore inherently form the base for motivation through fulfilling the hygiene factors of motivation in the sense of Herzberg's [He76] motivation theory. Equality, however, becomes only comprehensible if the assignment of rewards and reinforcements is characterized by transparency for all participants. If transparency is missing not only the perception of equality would be hindered, but also superstitious beliefs could be developed [Bo72]. These beliefs would then determine the perception of what is rewarded and reinforced in the idea management system. The result thereof could be unwanted and unintended behavior as well as decrease or loss of motivation. The second element - divergent thinking - is coined as the major cognitive process in creativity and is used to generate a variety of ideas and associations to a problem. It involves fluidity of thinking, free association, broad scanning ability and is interrelated with mental transformation that enables the conversion of existing knowledge into new patterns of configurations [Gu68; Ru91]. A significant and positive relationship between divergent thinking and play has been acknowledged in prior studies [RG90; WS99; PR81; SR99]. Dansky and Silverman [DS73; DS75] have proven the positive effect of play on the increase of associative fluency. Furthermore, Dansky [Da80] delineated that play helps to abandon old associations. Bearing this in mind, play is also a powerful tool to achieve unlearning on an organizational and individual level. Tsang and Zahra [TZ08] defined unlearning as “the discarding of old routines to make way for new ones, if any” (p. 1437). In contrast to forgetting, unlearning is an intended and wanted result. Akgün et al. [ALB06] sees a change in beliefs, behavior, working and daily routines as the main characteristics of unlearning. Thus, by the use of play former impediments can be addressed and subsequently overcome.

Task Factor

The task factor focuses on a given task. It combines the elements of autonomy, clear goal, immediate feedback, and optimal challenge. The first element - autonomy - is acknowledged in the scientific literature as an important facilitator of creativity [e.g. Am88; Sh91, DCR89; SB94]. It comprises the feeling of ownership and control over activities and leads to a higher intrinsic motivation [Al09; HO80]. Play gives participants the feeling of autonomy as it provides a high degree of freedom and independence. In a game, for instance, players can choose between different options, they can take on new identities for characters they create or even assume unrealistic roles [Ca61; MR06]. In terms of the second element, setting clear goals might be viewed as detrimental for idea management [HA10] but studies have shown that clear goals are facilitative to creativity and motivation [Am96; HA10]: goals that concern the creative activity enable cohesion, task focus and concentration and help to prevent distractions from the task [Cs90; Sh95; Sh08]. Play channels activities through specific goals, which are predefined by the rules of the game [GAD02; COS87], and when rules are violated the game is stopped. Thus, play builds an environment with clear goals. Another element of play is immediate feedback. As soon as a player makes a move, he or she is given an immediate feedback, either by other players or automatically by the game. In this way, play allows and stimulates learning by trial-and-error experiences [LRV01; Cs90]. Mainemelis and Ronson [MR06] stated in their work that errors „are used in play as triggers of exploration and practice, allowing one to perfect his or her skill and to discover unnoticed variables or opportunities” (p. 100). Depending on the rules of the game, learning can occur by all types of trial-and-error learning, which differ by the use of rewards and punishments for a particular behavior [Hu30]. Trial-and-error learning that is provided through immediate feedback facilitates the development and acquisition of tacit knowledge (von Hippel, 2001), which is crucial for the idea generation and creative performance [vHT95; FM07]. Yet feedback is only then positive, if it is given to a task or a competence in an informational and balanced manner to help an individual to develop and improve. By that it can enable the generation and transfer of tacit knowledge [Na02], foster motivation and creative behavior [Ma92; Cs90], and help to develop and stabilize intended behavior [Hu30]. The element of optimal challenge is another integral part of play and is conducive for motivation and creativity alike [OD80; Cs90]. Optimal challenge is given, if the personal level of skills is in balance with the challenge [Cs90; CR93]. Should the challenge exceed the skills, the consequences could be anxiety, frustration and lack of motivation, and the result - boredom and lack of motivation [SO85]. In games, the players have the possibility to choose an optimal challenge at the beginning [Cs90]. Over time, the skills improve and the level of challenge would increase [MR6]. At the same time, the player also gains perceived behavioral control.

3 The Role of Game Mechanics

In the following section the theoretical model is extended by the practical application of play into idea management systems. This is accomplished by embedding common game mechanics into the developed framework. These game mechanics are game points, social points, redeemable points, levels, leaderboards, story, virtual identity, exchange, and collecting.

Game points are assigned automatically by the system. They are awarded for predefined activities such as submitting an idea, entering a comment, rating an idea or a comment [HA09]. By gaining game points, individuals are provided with an immediate feedback and a clear goal, when a valued activity is conducted. Both these elements contribute to unlearn unnecessary, old and not intended behavior and routines. Earning points, however, does not provide any conclusion about the quality of an idea, comment or rating. Next to helping participants to channel their activities towards a clear goal and enhancing perceived behavioral control, the use of game points is also a formal expression of equality in idea management systems. All players receive the same points for a similar activity. Thus, points also serve as a basis for competition. In a transparent system, where players see each others' scores, it is possible to compare. So by causing an excitement and enjoyment, gaining points can affect a person on an emotional level.

Proposition 1: Game points may support immediate feedback, clear goal, perceived behavioral control, equality, competition, and affect.

Social points are assigned by other players. In idea management systems social points are labeled as "community rating" [LHB09] or "group decision" [MLD09]. Participants in an idea management system provide each other with an immediate feedback in the form of "voting" or "averaging" [MLD09]. Voting means that users directly vote for an idea or a comment. The ratings are often averaged and shown in an overall score. In some cases, several dimensions such as originality, degree of innovation, marketing potentials, or customer value have to be evaluated [LHB09]. In this context, if social points provide the opportunity to demonstrate interest in others' ideas and comments, the act of earning and assigning points may provoke a feeling of social belonging: the more ratings one has submitted and received within a group, the stronger his or her connections in this group. Apart from inducing the feeling of social belonging, social points may also stimulate competition due to the possibility of comparison are. They are, moreover, an expression of social expectations towards the behavior of an individual within a group and set a clear goal for his or her behavior. Like game points, social points support the unlearning of behavior and routines, which are not valued by the group. And last but not least, social points may

intensify the feeling of equality as everyone within a community can only assign the same amount of social points.

Proposition 2: Social points may support immediate feedback, social belonging, competition, clear goal, unlearning and equality.

The next element of game mechanics - redeemable points - is comparable to a virtual currency. Users, who have earned redeemable points, can use them in exchange for virtual or real goods, or intangible objects, respectively [HL10; Fū10]. In games, they either occur as an own category of points gained as a reward for specific achievements or are transformed into game and/or social points. By giving the option to convert points into new functions, new items, convenience or further development of the virtual identity [Le09], redeemable points provide the individual with greater freedom of expression. Subsequently, they may influence the perception of autonomy positively.

Proposition 3: Redeemable points may support autonomy.

Accumulating points enables the use of levels. Once sufficient points are earned, players level up [Ca05]. Hence, levels are an expression of performances in the past. They occur as sections or stages in games. If levels are designed as sections, they do not differ in difficulty. Sections allow players to choose parts of the games that they like most and break the “gameload” down to small pieces [By05]. If levels are used in form of stages, they represent a “discrete change in difficulty” [MJ09, p. 104]. They indicate major encounters and goals for the next period of play [MJ09, p. 104]. Therewith levels can be a form of a steadily growing optimal challenge. Along with the gradual increase of challenges, the belief intensifies that individuals can accomplish new tasks successfully. Levels may, therefore, give rise to perceived behavioral control. If achieved level can also be shared with others, this would allow a comparison and may foster competition among participants.

Proposition 4: Levels may support optimal challenge, competition and perceived behavioral control.

Gaining points allows for the use of another game mechanic - leaderboards or highscores, respectively. Leaderboards show in the form of a ranking list how participants perform in relation to others. Packard [Pa59] and Frank [Fa85] emphasize that the meaning of a rank within a group is a strong motivator of human behavior. Leaderboards can foster competition as they offer a possibility for direct comparison among participants [RR09] and enable visibility in the game. Thus, leaderboards function as an anchor point to both assess and appreciate individual achievements, and to increase in perceived behavioral control.

Proposition 5: Leaderboards may support competition and perceived behavioral control.

Story illustrates another major game mechanic and can be used in multifaceted ways. A story can be either static, predetermined and passive in nature [e.g. Ab02; Lo00] or dynamic, unplanned and interactive [Cr04]. Background stories are static, predetermined and passive. The background story defines the narrative framework and gives actions an overall purpose and aim. It builds an imaginary frame or virtual world where people act. Moreover, it determines rules and laws upon which the virtual world is based. People normally stay in confined mental corridors. In these corridors previous and existing ideas are only slightly changed, permuted and newly defined [CCD08]. Background stories may contribute to overcoming these mental boundaries and to creating a cognitive framework in which people may see obstacles from a new angle or different perspective. Stories further facilitate the process of connecting pieces of information [SZ03], even if not all of these pieces can be communicated or even if the story itself possesses minor inconsistencies and logical gaps [Fl07]. A dynamic, unplanned and interactive form of stories can be observed when individuals are motivated and enabled to write and share stories in a narrative form. Access into the beliefs and thinking patterns of participants is gained by shifting from a mere reader to a narrator [BZ96; Br86]. Both types of stories offer possibilities to socialize, to generate commitment, and to impose social pressure and control [Bo96; Mc84]. Schank and Abelson [Sa95] even argued that all meaningful social knowledge is acquired and memorized in the form of stories. Thus, stories help to meet the social need of belonging and can impact readers on an emotional level. They can increase suspense, curiosity and surprise [Al02] and can attract the attention of players. In extreme cases, the reader can lose access to the real world through absorption into a story [Br10].

Proposition 6: Story may support the elements clear goal, divergent thinking, unlearning, social belonging, and affect.

Another game mechanic is virtual identity. In online and video games players can often generate a visual representation of themselves [NR05]. Avatars resemble players in terms of appearance, gender role and sex [Ry07; TRB08; TR10] but not in terms of character traits like extraversion, conscientiousness and neuroticism [BSK07]. This helps players create a new identity within the game. The identity is free from real-life deficits and highly anonymous in nature [St95; BSK07; TR10]. The process of initial customization as well as the time and the energy spent to shape the avatar during the play causes an emotional connection [Di94]. Identities become thus a social status within games [Ja02]. Based on Kohler et al. [KMF09], we propose that anonymity of virtual identities can help overcome hierarchical restrictions and boundaries. Virtual identity may also reduce perceived obstacles and strengthen the belief in one's abilities to achieve a wanted outcome. Hence, virtual identities may improve perceived behavioral control.

Proposition 7: Virtual identities may support affect, equality and perceived behavioral control.

Exchange relations occur in games competitively and cooperatively [Bl64]. Taking turns or trading characterizes the competitive type. This is also called explicit exchange. Implicit exchange (e.g. sharing, helping, gifting) illustrates the cooperative way. Players, who share, help and make gifts, are motivated by the obligation to give, receive and repay (reciprocity) and by earning social reputation. They want to become an active part of a social community and to feel a sense of belonging [SLH06; Ma54b]. Exchanges offer a possibility to strengthen personal bonds between participants in idea management systems and help satisfying the need for social belonging. Divergent thinking and collaboration may be induced and supported if information is shared between the participants. As a consequence, a process of unlearning may be activated as old and useless knowledge is abandoned and replaced by newly acquired knowledge.

Proposition 8: Exchanges may support the feeling of social belonging, divergent thinking and unlearning.

The last of the game mechanics addressed by this paper is collecting. Games build on the human urge to complete a set [TBC07] by collecting different and mostly rare items. In such a way, games provide players with another possibility to accumulate social value. Collecting is defined as the “process of actively, selectively and passionately acquiring and possessing things removed from ordinary use and perceived as part of a set of non-identical objects or experiences” [Be95, p. 67]. Thereby, the function of objects is of secondary (or no) concern. Collectors do not use items they have collected [MS04; LS97]. Completed sets are displayed to others, who understand and admire them [DK89; Go09]. Collecting is, thus, viewed as an activity that triggers fear of scarcity and produces thereby a base for competition among participants [LS97; Fo91]. Examples for collected sets in a game environment are badges, which summarize accomplishments within a game in a graphical object [EM09]. In combination with exchange, it can strengthen social bonds and may contribute to satisfying the need for social belonging.

Proposition 9: Collecting may support competition and social belonging.

Overall, it can be concluded that game mechanics possess the possibility to support motivation to participate, to stabilize engagement over time and to foster the creativity of participants by exerting an influence on the integral parts of play.

4 Conclusion

Challenges in idea management research and practice revolve no longer around why it is important for people to participate. Instead, the focus has shifted onto how participants can be motivated and, in addition, how their full creative potential can be exploited.

This paper develops for the first time a theoretical framework that emphasizes the benefits of game mechanics within the context of idea management in scientific literature. In a two-step approach, the aspect of why play is relevant for an organization was addressed first, before specific game mechanics were integrated to support the identified reasons.

The argumentation shows that play is not a pure “waste of time, energy, ingenuity, skill, and often of money” [Ca61, p. 5-6]. Play affects person factors, social factors, helps to escape boundaries and influences task factors. Thereby, it facilitates motivation and creativity. We propose, in this paper, also that game mechanics can exert a direct effect on the motivation and creativity of players by influencing person factors, social factors, escaping boundaries and task factors. Future research could analyse how game mechanics interact and impact each other and if the use of game mechanics will need to follow a phase specific procedure.

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