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Changing the Game: A Case for Gamifying Knowledge Management

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Changing the Game: A Case for Gamifying Knowledge Management

Purpose: This exploratory paper investigates gamification as a medium for knowledge workers to interact with each other. The paper aims to open the discussion around the sustaining impact that gamification might have on knowledge management.

Design/methodology/approach: The paper employs an exploratory literature review investigating the current state of the art in relation to knowledge management and gamification; this literature review serves as the starting point of subsequent theorizing.

Findings: Based on the literature review we theorize that the use of gamification in knowledge management can go far beyond the motivational aspects. To name just a few uses of gamification, it can help in: supporting flexibility, facilitating transparency and therefore improving trust, visualizing skills and competences as well as generating requirements for new competences, and promoting a collaborative environment among the knowledge workers.

Research limitations/implications: This paper opens the discussion around knowledge management and gamification and suggests a wide range of areas for further research.

Practical implications: In this paper we argue that by looking at gamification as more than just a set of tools for improving motivation and engagement a company can address some pitfalls of a particular type of knowledge workers.

Originality/value: Gamification is a new, but increasingly popular approach, which has been shown to be to be powerful in many areas. This paper is novel in that it initiates a dialogue around the impact that gamification might have on knowledge management.

Keywords: knowledge management, gamification, innovation, knowledge management systems.

A conceptual paper

Introduction

Since its recent entrance into the arena of both practice and scholarship of management, 'gamification' has been rapidly gaining ground as a tool of practicing managers, often specialized consultants, and also as a promising research area of management and organization scholars. By today it has acquired sufficient legitimacy to claim that it is more than just another management fad. In this paper we explore the possibility of making use of gamification for supporting knowledge workers in general, with particular focus on innovation-oriented organizations – which is a natural context, as adopting gamification at work today qualifies as innovative.

Gamification is becoming a game changer in some areas, such as marketing (Huotari and Hamari, 2012; Zuckerman and Gal-Oz, 2014), education and learning (DeVries and Edwards, 1973; Gee, 2004; Malone, 1981). We can also find an increasing number of interesting examples of using gamification in the vast area of sustainability. Gamification mechanics is used to increase awareness and facilitate behavioral change in sustainable behavior in smart cities (Kazhamiakin et al., 2016), ride sharing (Reiners and Wood, 2015), energy savings in residential buildings (Muchnik et al., 2016) and sustainable nutritional behavior (Berger and Schrader, 2016), to promote sustainability in tourism by facilitating connection between the stakeholders (Negrusa et al., 2015) and to teach sustainability through games (Nordby et al., 2016). With the increasing attention around the term of gamification we find it surprising that the literature is silent about the potential that gamification might bring to the field of knowledge management (KM), and this papers aims to open the discussion.

Prusak argued that KM has experienced three waves (Lambe, 2008). After the appearance of the inspirational work of Argyris and Schön (1978), the first wave started with an attempt to articulate and codify all the knowledge in an organization. During this wave researchers tried to classify the knowing processes (Marquardt, 1996; Ruggles, 1997; Van der Spek and Spijkervet, 1997) and present knowledge as a mechanistic entity that follows the cycle of articulation and integration back to the organization (Nonaka and Takeuchi, 1995). But soon after many KM projects failed and many knowledge repositories turned into junk-yards (McDermott, 1999), both researchers and practitioners realized that KM projects cannot be driven primarily by IT (Swan et al., 2000), knowledge cannot be detached from the knower (Tsoukas, 2003) and that by far not everything can be articulated (Alavi and Leidner, 2001; Fahay and Prusak, 1998; Nickols, 2000), therefore going back to the origins of the nature of knowledge, conceptualized by Polanyi (1962, 1967). During the second wave the practitioners concentrated on the communication technologies, such as Lotus Notes, that aimed to help the knowledge workers start a conversation and share their knowledge (Davenport and Prusak, 1998), and a lot of effort was dedicated to encourage the workers to contribute to the discussions (Brown and Duguid, 2000). The researchers continued trying to classify the knowing processes, but the focus shifted from capturing and transferring to sharing and applying knowledge (Chinowsky et al., 2007; Davenport, 2005; Davenport and Prusak, 1998). Researchers also started engaging motivation, as it appeared that simply understanding and explaining the benefits of KM program is not enough to persuade the workers to charge their everyday routines (Ardichvili et al., 2003; Bordia et al., 2006; Hsu and Lin, 2008; O'Dell and Grayson, 1998). This approach did not revolutionize the work of knowledge workers either, and as a result, the third wave followed with KM shifting towards being a set of principles (Lambe, 2008). Approximately at the same time the practitioners

started experimenting with integration of WEB 2.0 tools in the corporate environment, such as blogs (Davison et al., 2013; Hsu and Lin, 2008), wikis (Wagner and Bolloju, 2005), social networks (O'Dell and Huber, 2011) and forums (Voelpel et al., 2005). The latter was the earliest adopted tool and it was the earliest to have game elements embedded in it, before the term 'gamification' was widely accepted, for example rating and giving points to the contributors on an urgent requests forum and recognizing the major contributors as experts (Voelpel et al., 2005). This paper also suggests various other ways to gamify WEB 2.0 tools.

The paper is structured as follows. We start by clarifying the term of gamification, which has already generated a lot of confusion. This is then followed by providing an overview of the components that comprise gamification. Subsequently, we continue by discussing the reasons why gamification should be taken seriously in KM and how it could benefit KM. Finally, we outline areas for further research.

What is Gamification?

The term gamification was first coined in 2002, but if we think about it, this concept is not so new. Loyalty cards and frequent flyer programs are early examples of gamification the way it is understood today. Frequent flyer programs were first introduced by American Airlines, and soon other airlines, hotel chains and car rentals started using the mechanics of collecting the points and redeeming them for other products and services as a tool to increase the return rate of customers (O'Malley and Lisa, 1998). Collecting points became a very powerful marketing tool, at least for a while.

The original definition of Pelling (2011) was narrowly focused on adding game experience to the electronic transactions, but the examples provided above illustrate a much broader range of applications. Later he revisited his own definition and interpreted it as systems that call for social action, such as Kickstarter and Alibaba (Pelling, 2015), but this definition excludes a range of personal applications, such as Nike Plus: a running app, that tracks user's progress and provides instant feedback in various forms, for example, in a form of an animated avatar that changes the mood and the shape depending on the progress (McGonigal, 2011). Therefore, it would be more appropriate to say that gamified systems can generate a call for social actions, but do not exclusively lead to that.

Table 1 presents the definitions of gamification that were found in the literature review. Other definitions ~~(Table 1)~~ emphasize the use of game elements (Burke, 2012; Deterding et al., 2011; Werbach and Hunter, 2012; Zicherman and Cunningham, 2011) in order to engage users (Burke, 2012; Huotari and Hamari, 2012; Zicherman and Cunningham, 2011) in a non-gaming environment (Burke, 2012; Deterding et al., 2011; Werbach and Hunter, 2012). The last aspect is very important, because it draws a line between games and gamified systems, and therefore shifts the focus from entertaining and creating a full gaming experience to studying the ways in which individual game elements and their combinations influence the behavior. However, most of these definitions are incomplete, too restrained, or misleading.

Insert Table 1 about here

~~Table 1. Definitions of Gamification.~~

In particular, Zicherman and Cunningham (2011) did not explain what they understand by game-thinking and did not distinguish between gamified systems and serious games. Burke (2012) defined well the purpose of the application of gamification (e.g. behavioral change), but gamification can serve other purposes, such as triggering organizational change (Rimon, 2015), therefore this definition is too restraining. Huotari and Hamari (2014) developed their definition for marketing applications, therefore it cannot be used for a broader range of applications either.

Werbach (2014) revisited his earlier definition and, as well as Huotari and Hamari, shifted the focus from the use of game elements to the nature of gamification being a process, but at the same time he removed 'non-game contest' from the definition and even suggested that games can be gamified too, which blurs the borders between gamification and serious games. Therefore, the final definition, which will also serve as a working definition for this paper, is a combination of the two definitions of Werbach.

> *'Gamification – the process of making activities in non-game contexts more game-like.'*

Deconstructing Gamification

In this subsection we try to further our understanding of gamification by identifying and classifying its components. When researchers mention game elements, they usually refer to such components as points, badges, rating, leaderboards, progress bars, etc., but the variety of game elements extends beyond these most widely cited types. The examples of classifications that were found in the literature are presented in the ~~(~~Table 2~~)~~. And with the variety of these elements comes confusion.

Insert Table 2 about here

Most scholars classify the game elements by their level of abstraction, but there is a disagreement in the levels (varying from two to five) as well as in the terminology in the literature ~~(Table 2)~~. The authors of the two most widely cited books, Zicherman & Cunningham (2011) and Werbach & Hunter (2012), define three levels, but in different ways. For example, what the former call mechanics (e.g. points and badges), the latter name components, and since they are the most cited frameworks in the gamification literature and stand in disagreement with each other, it is worth reviewing each of them in more detail.

Zicherman and Cunningham based their classification on the MDA (mechanics, dynamics and aesthetics) framework of game design (Hunicke et al., 2004), which is cited by a number of other scholars, but they do not elaborate on the third aspect of it as well as misinterpret the meaning of the first two levels assigned to them by the original authors. In particular,

Hunicke et al. (2004) refer to mechanics as actions and control mechanisms, not simple interface elements, and dynamics as an the underlying behavior. On the other hand, Werbach and Hunter (2012) shared the understanding of Hunicke et al., but instead of adopting and adapting it to the gamification needs, they concentrated on the components that comprise the interface and are visible to us, and left the aesthetics aside.

With regards to other classifications that were identified, Deterding et al. (2011) define five levels, but their understanding is quite different from the previously discussed classifications. Some of the examples provided by the authors are included in different levels by other authors, and the explanation of these examples is not sufficient to understand the logic of categorizing the elements in this way. For example, challenges that are presented as a game model are included in game mechanics by Werbach and Hunter (2012), and the whole MDA framework is included in the game models. Apart from that, some levels seem to be applicable to all the games. They include game principles and game design, and since they do not refer to specific game types, adding them as extra levels of gamification elements is not justified.

Other researchers distinguish between two levels of the game elements: game mechanics and game dynamics (Blohm and Leimeister, 2013; Pedreira et al., 2015), and their definitions are supported by examples partially overlapping with all three levels listed at the beginning, as well as misinterpret the original meaning of each level of Hunicke et al. (2004).

~~Table 2. Classifications of gamification elements.~~

All the authors mention such elements as points, badges and leaderboards, giving them different names, and these elements constitute the basic building blocks, the objects, that users see and interact with. To us it seems logical that the next level should link different building blocks with each other and describe various actions that can be performed with them. And finally the top level binds the elements of the previous levels together. Of all the classifications, the one suggested by Werbach and Hunter (2012) corresponds the most to this logic, namely: components, mechanics and dynamics, though the components that have been included in this classification might need further revision and can be complemented with examples from other frameworks.

Why Knowledge Management?

The examples of applying gamification techniques in the corporate environment can already be found in the literature. For example, researchers experiment with applying gamification in innovation, in particular, for research (Ionica and Leba, 2015), for ideation (Hélène Michel, 2016; Hutter et al., 2011; Roth et al., 2015) and selection of ideas (Petersen and Ryu, 2015). Gamification is also used to enhance training programs (Dale, 2014; Uskov and Sekar, 2014) and make tutorials more engaging (Deterding, 2012; Li et al., 2012; Rauch, 2013), and this area of application was borrowed from the advances in gamifying education. However, gamification of knowledge management (KM) is so far rarely addressed in a holistic way. Conversely, most of the current examples of gamification are contextualized in knowledge work, therefore we believe that it is worth exploring in more depth the possibilities of gamification in KM.

Past and present

It is possible to find a number of examples of the use of game elements in KM in the past, though they were not labelled as gamification before. E.g. Siemens used points to reward contributors to the corporate Knowledge Management System (KMS), and these points were either used to demonstrate a status of an expert (the more points you have, the more knowledgeable you are), or they could be redeemed for material rewards. This system worked with mixed results: in some countries knowledge workers put significant value on the expert status, in other countries they preferred to receive material goods (Voelpel et al., 2005). BP used visual intervention called "15 minutes of fame", a display of someone's profile that was recently updated, on their Connect KMS (Grant, 2013), and this mechanics exploited the dynamics of expression and promoted people to update their profiles to get noticed. Texas Instrumental gave "Not invented here, but I did it anyway" award in a case contest, where employees could share their experience of knowledge reuse (Davenport and Prusak, 1998). The competition dynamics and the rewarding mechanics legitimized and encouraged searching for existing knowledge and its reuse. These early examples suggest that gamification could be a powerful technique used for various different purposes.

Currently, gamification has only started entering the area of KM research, and at the moment it either focuses on the aspects of motivation and worker engagement (Jung et al., 2010; Swacha, 2015; Vassileva, 2012), a topic favored by consultants, or employees assessment (Tansley et al., 2016) and HR trainings (Rinc, 2014), being an extension of gamified education, or gamification is mentioned as an add on entertaining layer for a KMS (Pandey and Dutta, 2013). However, we believe that the use of gamification can extend beyond another HR fad.

Future

Of course, such aspects as trainings are important, and motivation of knowledge workers seems to be important as well, but by reducing gamification to motivation we stay only on the surface of its true potential. Intrinsic motivation has been acknowledged for being the strongest type of motivation (Richard M. Ryan and Deci, 2000), and it cannot be manipulated or reinforced externally. Therefore, it seems that motivation is only an excuse for making others do a job that is not interesting. Certainly, there are examples of monotonous routine jobs that are boring, but need to be done, for example, calibrating a sensor (Flatla et al., 2011) or digitalizing a library (Roth et al., 2015), and we see examples of successful gamification of these processes, but one could argue that this work can hardly be called knowledge work, and the majority of knowledge worker jobs is more sophisticated and interesting.

In order to imagine the potential impact of gamification on KM we could take some of the most widely used elements of gamification and try to replicate their areas of application in the context of KM. For instance, the *points* are mostly used to reward the users for certain actions, therefore they can be used as rewards. They can also indicate status, for example, the status of a knowledgeable person, if the points are awarded for sharing the knowledge, and this type of mechanics might reveal 'disguised heroes' who have a higher level of expertise than it seems. Awarding certain activities with points would also legitimize the time spent on these activities, if they are not seemingly related to the primary job, and varying the amount of rewards would help to prioritize some of these activities over others. Apart from that, allowing knowledge workers to reward others with points for KM activities may lead to

reciprocation behavior (Hamari and Koivisto, 2013; Webster and Vassileva, 2006), and create a vicious cycle of mutual help and sustain non-productive collaborative behavior.

Another element, the *rates*, can enable monitoring the contents of KMS in a decentralized way. If knowledge workers are able to rate the material, the most relevant and up to date contents will have the highest rates, and changing the mechanics of calculating the overall rate allows to change the priorities, e.g. give more weight to the more recent rates or on the overall number of ratings. However, this could also be achieved with points that would keep the score of each material.

The *badges* can be used as a reward for certain achievements, similar to the points. But they can also visualize these achievements and the skills that knowledge workers have, and therefore become a knowledge map of the company (which is however standardized to some extent), making it easier for others to identify people with necessary skills and expertise. In some instances, if the badges are linked to certain rewards or compensation and this information is visible to everyone, this system can help to create transparency and therefore trust, which is an essential prerequisite of knowledge sharing (Davenport and Prusak, 1998) and thinking together (Pyrko et al., 2016). They can also help to generate requirements for new skills and attract people who would be genuinely interested in acquiring these skills in a more efficient and informal manner.

One could suggest multiple other possibilities of using various gamification elements in KM. For instance, *progress bars* could be used as a form of instant feedback of achieving the goal, while *leaderboards* could be a tool for putting peer pressure and facilitating desired behavior (e.g. knowledge sharing and contributing to the knowledge pool). And when the elements are used together, the combined effects can exceed imagination. On the contrary, when the elements are studied in isolation, the results might be limited. For example, if a study examines the effect of points on the participants, but the collection of points is pointless and not aligned with any rewards and recognition, it is no surprise that the study demonstrates very modest results (De-Marcos et al., 2014; Zuckerman and Gal-Oz, 2014).

KM initiative is always accompanied by organizational change, and gamification could serve as a perfect environment for initiating or supporting an organization change. For example, a former VP of customer experience in Yahoo! used gamified corporate portal to implement change by making slight changes in the system, and he claimed that it accelerated the speed of change several times (Rimon, 2015), though the details are not shared. The influence of gamification on corporate culture and organizational change could become two other significant new areas of research, and both topics overlap with KM.

When looking at the technology side of KM, gamification is believed to reinforce the benefits of some of the KMS that became widespread in the recent years (mainly social computing technologies). Gamification elements have already been used in some systems, and the suggestions above would work the best if the elements are embedded in KMS, but more research and pilot studies need to be done to discover its full potential and go beyond simple gamified tutorials (Li et al., 2012).

This paper does not elaborate on some important criteria, such as cultural (Rimon, 2015), age (Hartmann and Klimmt, 2006; Williams et al., 2009) and gender (Coppens, 2015) differences that are being explored in the field of gamification and that will have an impact on the ways it

could be used in the corporate environment, including the KM area. All of these questions could not be possible covered in one paper, partly due to the limited length of this paper, and partly due to the novelty of this research area. But this is exactly what makes the contribution of this paper significant – it steps on a virgin field and opens a wide range of new areas for further research.

Concluding remarks

This paper aimed at opening the discussion around the area of applying gamification in KM. We have reviewed the literature on gamification and discussed the meaning of this term and made sense of the elements that compose it. We then suggested the definition and a classification that would be appropriate for the purpose of KM and theorized about the ways in which gamification could be used in KM and the possibilities that it opens for KM. Through the early examples that we could find we can see that the impact of gamification on KM can stretch far beyond improved motivation and engagement, and one could find limitless possibilities for further research in this area.

Gamification becomes a trend, a fashionable practice, just like KM was two decades ago, and just like 80% of KM projects failed, four out of five gamification projects will probably fail as well in the early period. Some authors express concerns that gamification can be easily turned into 'pointification', meaning that implementing it is limited to introducing game mechanics with no meaningful experience behind them (Werbach and Hunter, 2012).

Gamification was also criticized for becoming an exploitation tool (Bogost, 2011). Gamified systems allow to provide instant feedback on the progress, and instead of creating an enjoyable experience they can be turned into a "Big Brother is watching you" controlling mechanism (Cohen, 2015), but the matter of turning any useful tool into the means of abuse is a question of a weak implementation of that tool and the intentions of those who implement it. The possibility of instant feedback can also be extremely beneficial.

As was mentioned before, gamification has already demonstrated strong presence in education (Baker et al., 2012; Lee and Hammer, 2011). Education is probably one of the most knowledge-intense industries and has always been. The generation of millennials grew up playing video games, and it might seem natural that education was also among the early adopters of gamification. The millennials grew up, and gamification moved to other areas together with them, and for them a gamified environment might be an expectation rather than an interesting addition; which is another reason for not neglecting gamification in KM. Education, having gathered a substantial amount of experience and being a natural habitat for knowledge workers, could be a good place to start looking for practical ways that gamification could be of use to KM. For instance, there is early evidence that gamification has an impact on such knowing processes as thinking and learning. Apart from that gamification is believed to create social connectivity (McGonigal, 2011), therefore encourages conversations and knowledge sharing, and a sense of belonging to something bigger, such as the purpose of the organization .

However, one should not forget that gamification is only an extra layer and can work only in conjunction with a properly developed KM, so that it can support KM initiatives rather than trying to fix poorly functioning KM by adding gamification to it. In particular, if the KM strategy is not aligned with the corporate culture, the KM initiative is likely to fail

(McDermott and O'Dell, 2001; Park et al., 2004). For example, in companies that value individual and novel knowledge, employees will be reluctant to contribute to the organizational knowledge, because then they will lose opportunities by giving away what is valued the most (De Long and Fahey, 2000), and gamification is unlikely to reverse the culture. However, gamification could send the signal that the attitude has changed, and accelerate the change.

There are examples of the use of gamification to sustain desired behavior, e.g. to promote behavior towards more sustainable use of energy in buildings (Muchnik et al., 2016) or sustainable nutrition (Berger and Schrader, 2016). We believe that similarly gamification could be used in KM to initiate, sustain and support desired behavior and adherence to values.

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Table 1. Definitions of Gamification.

(Pelling, 2011, p. 1)	'Applying game-like accelerated user interface design to make electronic transactions both enjoyable and fast.'
(Zicherman and Cunningham, 2011, p. xiv)	'The process of using game-thinking and mechanics to engage users.'
(Deterding et al., 2011, p. 1)	'The use of game design elements in non-game contexts.'
(Burke, 2012, p. 1)	'The use of game mechanics and game design techniques in non-game contexts to design behaviours, develop skills or to engage people in innovation.'
(Werbach and Hunter, 2012, p. 26)	'The use of game elements and game-design techniques in non-game contexts.'
(Huotari and Hamari, 2012, p. 19)	'A process of enhancing a service with affordances for gameful experiences in order to support user's overall value creation.'
(Werbach, 2014, p. 266)	'The process of making activities more game-like.'

Source: Authors' research data

Table 1. Classifications of gamification elements.

Source	Game elements	Examples
(Zicherman and Cunningham, 2011)	Mechanics	points, levels, progression bar, leaderboards, badges
	Dynamics	pattern recognition, collecting, surprise, creating order, gifting, flirtation, recognition for achievements, leading others, fame, heroism, gaining status, growing
	Aesthetics	sensation, fantasy, narrative, challenge, fellowship, discovery, expression, submission (Hunicke et al., 2004)
(Werbach and Hunter, 2012)	Components	achievements, avatars, badges, boss fights, collections, social graph, virtual goods, combat, content unlocking, gifting, leaderboards, levels, points, quests, teams
	Mechanics	challenges, chance, competition, cooperation, feedback, resource acquisition, rewards, transactions, turns, win states
	Dynamics	constrains, emotions, narratives, progression, relationship
(Deterding, 2012)	Interface design patterns	e.g. badges, leaderboard, level
	Design patterns and mechanics	e.g. time constraint, limited resources, turns
	Design principles and heuristics	e.g. enduring play, clear goals, variety of game styles
	Game models	e.g. MDA, challenge, fantasy, curiosity, game design atoms, CEGE
	Game design methods	e.g. playtesting, play-centric design, value conscious game design
(Blohm and Leimeister, 2013)	Mechanics	documentation of behaviour, scoring systems, badges, trophies, rankings, ranks, levels, reputation points, group tasks, time pressure, tasks, quests, avatars, virtual worlds, virtual trade
	Dynamics	exploration, collection, competition, acquisition of status, collaboration, challenge, development / organization, motives

Source: Authors' research data