

GAMIFICATION IN KNOWLEDGE MANAGEMENT: MOTIVATING FOR KNOWLEDGE SHARING

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Abstract: Effective knowledge management relies on successful knowledge sharing. One of the main barriers for knowledge sharing is the lack of employees' motivation, whereas gamification is a proven means to induce intrinsic motivation. We consider these two observations as reasons to consider applying gamification in the area of knowledge management with the aim of inducing motivation for knowledge sharing. The paper discusses both the issues of knowledge sharing and the components of gamification, and then describes an implementable solution in a form of a system of gamification rules aimed at motivating employees for various activities related to knowledge sharing.

Key words: knowledge management, knowledge sharing, knowledge transfer, inducing motivation, gamification

Introduction

These days knowledge is considered to be “a critical organizational resource that provides a sustainable competitive advantage in a competitive and dynamic economy” (Wang and Noe, 2010). A resource of such an importance requires thoughtful management, especially that its immaterial nature makes it non-depletable yet often hardly extractable. Both these properties bring forth the notion of knowledge sharing, as the former accounts for its possibility, and the latter for the need for it.

Knowledge sharing is believed to be “the fundamental means through which employees can contribute to (...) the competitive advantage of the organization” (Wang and Noe, 2010; also see the multiple works cited therein).

Proportional to its importance is the difficultness of facilitating knowledge sharing within an organization, and one of the main obstacles is the willingness of employees to share their knowledge (Lam and Lambermont-Ford, 2010).

In this paper we propose gamification as a tool for inducing employees' motivation for knowledge sharing. In recent years, gamification gained a lot of interest, both in research (Reiners and Wood, 2015) and business circles (Narayanan, 2014), which led to its multiple implementations in many areas, spanning from banking (Rodrigues et al., 2014) to tourism (Negruşa et al., 2015).

Although gamification has already born a strong critique, aimed at both its crippled implementation (in a degenerated form known as *pointsification*) (Robertson, 2010), and ethical aspect (with a charge of manipulation, denouncing it as *exploitationware*) (Bogost, 2014), the gamification defends itself with its effectiveness, confirmed by acknowledged research results (Hamari et al., 2014).

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The goal of this paper is to define a system of gamification rules motivating employees to share their knowledge. Before we achieve that, however, we shall provide the reader with short introductions to both knowledge sharing, explaining its nature and main obstacles, and gamification, providing its definition and describing its basic components.

Knowledge Sharing

Knowledge sharing can be defined as the “exchange of knowledge between and among individuals, and within and among teams, organizational units, and organizations” (Schwartz, 2006).

Following the bulk of literature (see Paulin and Suneson, 2012, and works cited therein), we shall consider knowledge sharing to be semantically the same as knowledge transfer, although the reader must be aware that some authors have distinct definitions for these two terms (see e.g. Krok, 2013). Also, knowledge transfer should not be equaled with technology transfer, as the latter is merely a part of the former.

The volume of knowledge retained and used in contemporary organizations is growing (cf. Botha et al., 2008), driven by both technological (especially in the area of information and communication technologies), and non-technological developments (e.g. the transition to knowledge-based economy).

Knowledge sharing is a way for the organization to make an effective use of the volume of knowledge retained by its members. Not only it enables reapplying solutions known by one member of the organization to same problems faced by other members of the organization, but also combining and extending existing solutions to solve new problems, thus augmenting organization’s innovative capacities.

It also helps to sustain the effective operation of the organization. As the specialization of work increases, so does the specialization of knowledge, which poses a risk factor, as specific pools of knowledge may be held only by individual persons, whose leaving (for various reasons) or even short absence could result in the organization being unable to continue the operations those persons were involved in, at least at the same level of quality and/or efficiency. By ensuring that the knowledge gathered by individual employees is shared with other members of the organization, the negative consequences of their leaving or temporary absence are greatly reduced.

Knowledge transfer is therefore a matter of primary importance for the management. Enabling and supporting knowledge sharing in an organization is not, however, simple. The first factor that complicates it a lot is the dual nature of knowledge, which can be in tacit (“know-how”, useful, but difficult to express) or explicit (“know-that”, represented formally, but practically unusable as such) form (cf. Polanyi, 1958). Knowledge transfer is therefore based on knowledge conversion, turning knowledge in one form into another.

Probably the most widely acknowledged model of knowledge conversion was developed by Nonaka and Takeuchi (1995) who identified four knowledge conversion modes:

- Socialization,
- Externalization,
- Combination,
- Internalization.

During *Socialization*, sender's tacit knowledge is converted to receiver's tacit knowledge. It is the process of sharing experiences through which both mental models and technical skills are shared.

During *Externalization*, sender's tacit knowledge is articulated into explicit form. It sometimes requires using metaphors or analogies.

During *Combination*, explicit knowledge is converted to another explicit knowledge. It is by this process that individual concepts are systematized into a knowledge system.

During *Internalization*, explicit knowledge acquired by receiver is incorporated into his or her tacit knowledge by personal experience („learning by doing”).

There are various obstacles hampering effective knowledge transfer. Szulanski looks for sources of these barriers in the transferred knowledge (being causally ambiguous or unproven), the source (lack of motivation or perceived reliability), the recipient (lack of motivation, or absorptive or retentive capacity), and the context of the transfer (barren context, arduous relationship between the source and the recipient) (Szulanski, 1996). In the case of external transfers (i.e., to or from outside of the organization) he also mentions confidentiality and legal barriers (Szulanski, 1996).

Although Szulanski's results indicate that motivation is not the dominant factor for successful knowledge sharing, at the same time they clearly show that it still is an important factor (Szulanski, 1996). Stenmark (2001) states emphatically that “people do not share knowledge without a strong personal motivation”.

Motivation for knowledge sharing can be induced by various incentives (Ipe, 2003; and works cited therein). Unfortunately, many of these have a form of anticipated extrinsic rewards, which not only are not proven to work, but were even found to have a negative effect on attitudes towards knowledge sharing (Bock and Kim, 2003). Per contra, intrinsic motivation enables the transfer of tacit knowledge even under conditions in which extrinsic motivation fails (Osterloh and Frey, 2000). This is what makes usage of games interesting, as they are known to motivate people intrinsically (Werbach and Hunter, 2012). Hence the idea of *serious games* (Abt, 1970), i.e. games used for serious purposes. As much as they can be useful for knowledge transfer, hardly any workplace can be made a part of a game for all the time and in a general scope rather than solving of few individual problems. A much more convenient vehicle for building intrinsic motivation is therefore *gamification*, which makes use of only selected game design elements in non-game contexts.

Gamification

Although the term ‘gamification’ has only been in use for over ten years (Burke, 2014), already a number of definitions were devised for it (Marczewski, 2014). Deterding et al. (2011) devoted a whole paper to construct (and provide explanation for) the following definition: “gamification is the use of design elements characteristic for games in non-game contexts”. Werbach (2014) provides a more general definition, saying that “gamification is the process of making activities more game-like”, whereas Marczewski (2014) defines it as “the use of game elements and design metaphors to solve problems”

Although there is not a complete list of what an actual implementation of gamification can consist of, there are some elements, which may be found in almost every gamification implementation. The three most obvious are points, badges, and leaderboards (hence the acronym PBL used as a synonym of gamification, especially in its primitive form).

Points basically measure how well a participant is doing, provide immediate feedback on that to him or her, and can serve as a hallmark of status when presented to other players. Points precisely fit ‘an instant reward’ concept, therefore they have huge motivational potential. It can be raised even further, as passing specific point thresholds may unblock extrinsic rewards or even determine the win state (Werbach and Hunter, 2012).

Badges are visual representations of achievements within the gamified process (Werbach and Hunter, 2012). They have strong motivational potential as they can serve as goal-setting tool, challenging participants to meet the requirements set for them, but they also provide instruction to new participants on what is achievable within the system, build participant’s reputation, providing information on what he or she has already accomplished, stand as status symbols for other participants and provide personal affirmation as reminders of past achievements much like trophies on a mantelpiece, as well as help create group identification based on a set of shared experiences (Antin and Churchill, 2011).

Leaderboards let participants compare their achievements to each other. Compared to points and badges, the participant’s progress information provided this way is relative to the progress of other participants, which makes it a crucial component of competitive gamified environments.

Other typical gamification components are:

- avatars, i.e. visual representations of a participants’ characters,
- challenges – that the participants have to pass to make progress in the game,
- missions and quests, i.e. predefined sets of challenges usually with special rewards,
- levels (understood as parts of game world, or participant’s character development stages), clearly showing steps in participant’s progression on a more general frame than points,
- teams – composed of participants working together for a common goal,

- virtual goods – earned as rewards, that could be spent to foster progress in the game, and given or traded to other participants.

In order to implement gamification properly, one needs to consider both its faces, that “On one hand, it involves emotional concepts such as fun, play, and user experiences. On the other hand, it’s about engineering measureable and sustainable systems to serve concrete business objectives” (Werbach and Hunter, 2012).

A Proposal of Gamification System for Organizational Knowledge Sharing

We have already discussed the role of employees’ motivation in organizational knowledge sharing and the notion of gamification as a tool for augmenting motivation. In this section, we show how gamification can be applied to motivate employees to share knowledge with other employees, and to reuse knowledge shared by other employees, by describing a system of gamification rules intended for this purpose.

Basic Gamification Elements

Following the bulk of existing gamification systems, the proposed solution uses *points* as a basic, micro-scale reward for performing activities related to knowledge transfer. As there are various types of knowledge-sharing-related activities that the employees should be rewarded for taking part of with points, and we want to keep the system balanced and sustainable for a long time, therefore we need to block the possibility that a given employee would get profusely rewarded for a single type of activity (probably one that he or she would be non-voluntarily involved in anyway) thus losing interest in other types of activities that would benefit the organization. For this reason we opt for distinguishing several types of points (which could be visualized by different colors) and *levels* as the primary measure of progress, with the level progress being dependent on collecting a specific number of points necessarily in various colors. This concept, proposed earlier in the context of education gamification (Swacha and Baszuro, 2013), allows for the employee to focus on the activities he or she prefers, but requires him/her to engage (at least to some defined minimum extent) in activities of other types.

On the other hand, in order to avoid demotivation of those employees who are particularly proficient in just one type of activity, we propose *badges* of various kinds and grades to be designed and used to reward activities and attitudes which do not lead directly to level progress, such as: mastery in a specific activity, regularity (avoiding long periods of inactivity), reciprocity (being engaged on both the active and passive side of knowledge transfer), or promptitude (being the first to help when someone is asking).

As a form of *virtual good*, we introduce knowledge credits. The difference between credits and points is that the latter are awarded automatically by the system, whereas the former can only be earned from the other employees. Every employee

receives a pool of credits to distribute, proportional to his or her organizational position, which is renewed every month. The credits can be spent as a form of gratitude for making use of knowledge provided by other employees. Note that credits can thus be only earned by successfully sharing one's knowledge (i.e., there is a recipient on the other side who actually used it or at least thinks of using it), whereas points can also be earned by making one's knowledge available for the others (regardless of whether there is anyone actually interested in it) and using someone else's knowledge – along with the generally agreed notion that not only the active, but also the passive participant of knowledge transfer should be rewarded (see e.g. Krok, 2009).

The received credits can be spent like the credits from the pool, the difference is they are not replenished every month, there is no upper limit for them, and they are valid forever (the credits from the pool are lost if not spent in the month they were given for). Passing certain thresholds of accumulated credits results in obtaining respective badges.

We also propose a debit limit for the earned credits account, which can be paid off with the credit pool replenishments in subsequent months, to help the employees cope with temporary accumulation of problems and meeting the deadlines.

An employee can also state problems (thus implementing another gamification concept of *challenges*) and allocate a part of his/her credit pool as a reward for solving it. The credits allocated to the problem are distributed among the employees who helped solving it, increasing their account of earned credits. Note that the reward attached to an unresolved problem can be increased by other employees (also interested in its solution), or by the employee who originally stated it, either from his/her credit pool in subsequent months, or from his/her earned credits account. An employee can also contribute credits to an already solved problem (in which case they will be distributed among the problem and solution authors), as a form of gratitude for reusing the presented solution. Note also that allowing multiple employees to work on a single problem may lead to spontaneously forming *teams*, possibly spanning different organizational units.

We consider two types of *leaderboards*, a life-time ranking list, ordering employees by the level they achieved, and several periodical rankings, listing employees' progress (measured in level-ups, points or credits they acquired) in a given period of time. The latter are closed with the end of each month or year, with the respective winners receiving badges and, possibly, other types of rewards, and the ranking lists restarted.

Point Categories

As already mentioned, the points belong to categories, defined by the type of activity they were awarded for. We propose to base the point categories on the four knowledge conversion modes: Socialization, Externalization, Combination, and Internalization. It must be clear, though, that the proposed categorization is conventional: some activities may involve various modes of knowledge

conversion, yet they are counted towards a single point category. For instance, the activities related to problem solving mechanism described earlier (i.e., stating the problem, providing the solution, accepting the solution) will often include phases belonging to each of the four knowledge conversion modes, yet they are all counted towards Socialization.

Due to the nature of Socialization, the relevant points are awarded not for outputs (which would be difficult to determine), but merely for involvement in the following activities:

- taking part in meetings (including teleconferences),
- taking part in team work (including online collaboration),
- posting and solving problems within the employee community,
- registered communication with co-workers (e.g., by email or phone), especially discussion on the intranet forum (including but not limited to posts related to problem solving),
- mentoring other employees and being mentored,
- taking part in knowledge fairs.

The Externalization points are awarded for creating information objects, which are based on the author's own experience rather than the existing documents, or adding own annotations to existing documents. The following outputs should be considered:

- documents of instructional type for internal usage and their reviews,
- organizational wiki page edits,
- internal blog posts and comments,
- written or recorded stories,
- shared notes in note-taking tools (like Evernote, Google Keep, or One Note),
- organizational knowledge maps and their corrections,
- annotations and tags added to existing documents or parts of them, in a way that makes the annotations and tags visible for other employees.

The Combination points are awarded for creating information objects, which are based on the existing documents rather than the author's own experience. The following outputs should be considered:

- lists of existing documents (relevant to some process or part of organization),
- summaries of existing documents,
- e-manuals, instructional videos, and interactive tutorials based on existing paper manuals,
- datasets composed of data obtained from multiple sources,
- datasets containing processed data mined from existing raw sources,
- fact sheets, charts and infographics presenting key data extracted from existing sources.

The Internalization points are awarded for using the information objects existing within the organization. The following activities should be considered:

- reading instructional documents,

- listening to recorded stories,
- watching instructional videos,
- completing interactive tutorials,
- practicing, including virtual practices,
- completing exercises, including on-line exercises in virtual learning environments,
- passing knowledge tests in virtual learning environments.

Note that the lists presented above should not be considered as complete, in fact they should be adjusted to the type of activities, communication technology, and the types of information objects used in the organization.

Implementation of the System

The most critical implementation success factor is balancing the awards well. A number of negative consequences may result from using an unbalanced system, such as making the employees focus on few highly rewarded activities, thus neglecting other, possibly more productive for knowledge sharing, and frustrating employees engaged in activities, which are both toilsome and highly beneficial to the organization, but underrated by the system. As it is certainly difficult to devise a well-balanced system from the scratch, taking an iterative design approach is suggested, in which the point awards are adjusted after some period of usage, when it becomes notorious that some activities are rewarded extremely munificently or miserly.

Regarding the technical aspect, although the proposed gamification system for organizational knowledge sharing consists only of rules which could, in theory, be implemented even using paper-and-pencil approach, we strongly recommend its implementation in software, to automatize both gathering of data and conditional triggering of rules, for the sake of its swiftness and reliability, as well as to avoid the enormous work effort to keep the system updated by hand. In order to leverage the recent developments in ICT, especially with regard to data sharing, task automation, and multi-platform user interfaces, we suggest implementing it as a cloud-based service. We also believe that it could and should be implemented following – at least to some extent – the design guidelines defined for gamified Learning Management Systems (Swacha, 2014).

Summary

With the growing role of knowledge as a critical organizational resource, also grows the importance of managing it properly. It is even referred to as a “necessary factor for organizational survival and maintenance of competitive strength” (Patalas-Maliszewska and Kłos, 2012). And the effective knowledge management requires effective knowledge sharing (cf. Wang and Noe, 2010).

As one of the key barriers for knowledge sharing is the lack of employees’ motivation to participate, we point to gamification as an effective means to induce

intrinsic motivation. We define a system of appropriate gamification rules which makes use of a number of purposely selected gamification components, and aims at motivating employees for various activities related to knowledge transfer. Our future work will be to apply the system in a real-world organization, then measure and evaluate the results.

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GAMIFIKACJA W ZARZĄDZANIU WIEDZĄ: MOTYWOWANIE DO DZIELENIA SIĘ WIEDZĄ

Streszczenie: Efektywne zarządzanie wiedzą opiera się na pomyślnym dzieleniu się wiedzą. Jedną z głównych barier dzielenia się wiedzą jest brak motywacji pracowników, natomiast gamifikacja jest sprawdzonym środkiem do wywołania wewnętrznej motywacji. Uznajemy te dwie obserwacje jako powody do rozważenia stosowania gamifikacji w obszarze zarządzania wiedzą w celu indukowania motywacji do dzielenia się wiedzą. W pracy omówiono zarówno zagadnienia związane z dzieleniem się wiedzą, jak i elementy gamifikacji, a następnie opisano możliwe do wdrożenia rozwiązanie, w postaci systemu zasad gamifikacji mających na celu motywowanie pracowników do różnych działań związanych z dzieleniem się wiedzą.

Słowa kluczowe: zarządzanie wiedzą, dzielenie się wiedzą, transfer wiedzy, indukowanie motywacji, gamifikacja

遊戲化知識管理：激勵知識共享

摘要：有效的知識管理依賴於成功的知識共享。一個知識共享的主要障礙是缺乏員工的積極性，而遊戲化是一個行之有效的手段，誘使內在動力。我們認為這兩種意見的理由考慮採用遊戲化的知識管理與誘導動機知識共享的目標區域。本文論述了知識共享的兩個遊戲化的組件有關的問題和，然後介紹了旨在激勵員工進行相關知識共享各種活動遊戲化規則體系的一種形式，可實施的解決方案。

關鍵詞：知識管理，知識共享，知識轉移，誘導動機，遊戲化