INTEGRATING GAMIFICATION WITH KNOWLEDGE MANAGEMENT

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Abstract:
Knowledge management is becoming de facto one of the required business strategies to support innovation and competitive advantage. Several knowledge management activities would be more engaging for people if they would use principles of gamification. This paper analyzes frequencies of gamification terms in knowledge management articles and tries to answer the question if only organizational learning would be improved by integrating gamification or there are other knowledge management areas that would benefit by it.

Keywords: gamification, knowledge management, research, literature

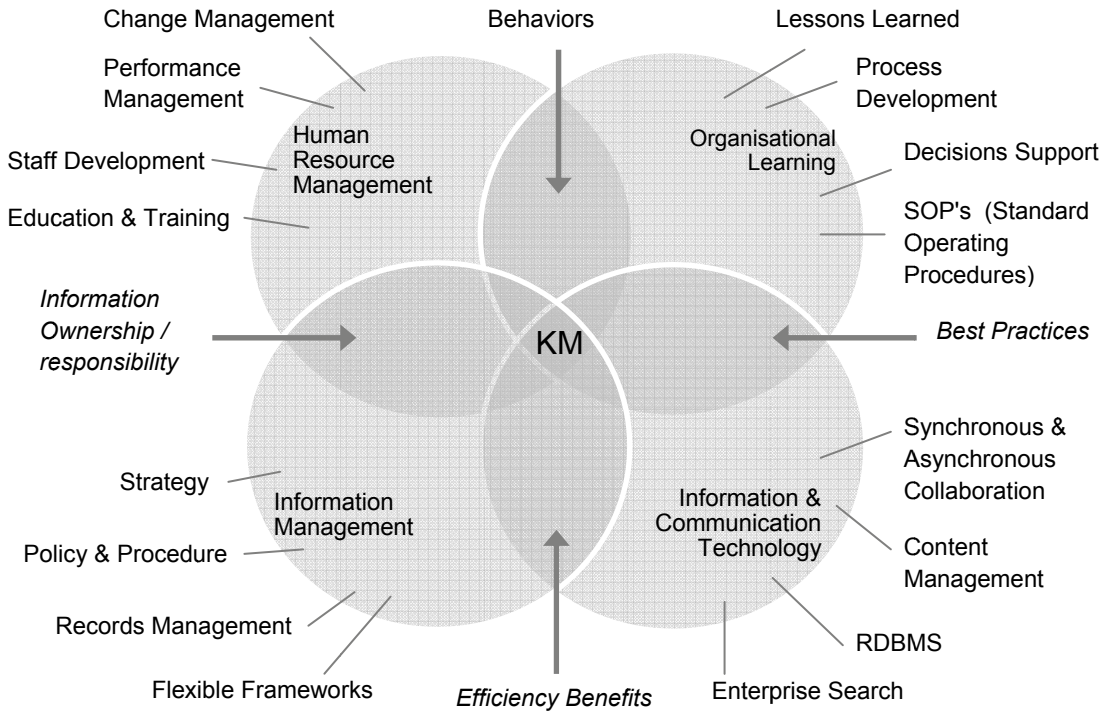
1. INTRODUCTION

Since the first Gartner report about *gamification* (Gartner, 2011) the term itself is becoming less a buzzword and more a mainstream word. As that report defined the goals of gamification "are to achieve higher levels of engagement, change behaviours and stimulate innovation" (ibid), it is clear that gamification can become widely used for achieving better personal and organizational results. While we can be sceptical how many organizations will gamify[1] their processes (stated report mentioned 50 percent of organizations with innovation processes management in place would gamify them by 2015) gamification has become somehow connected with innovation.

Up to 2014 the academic and industrial circles were motivated to produce books, conference events and (as would be expected) software solutions for gamification. One book particularly, For The Win (Werbach and Hunter, 2012), influenced creation of various gamification models e.g. researched, documented and implementation-tested steps to include gamification into various business and other processes. But in spite of implied connection between gamification and innovation like for example most searched common gamification application phrase in Google News from 2010 to 2012 was "gamification AND innovation" (Burke, 2012), there is not much known information about gamification relation to *knowledge management*.

Among the diagrams of knowledge management strategies, methods and tools we have chosen one (Figure 1) leaning more on content management but depicting knowledge management perfectly to discuss where gamification can, already does and will be influencing knowledge management if not be its crucial part in the organization. We expect that current academic research of gamification and knowledge management intersection will be in the Organisational Learning domain.

Picture 1: Knowledge management strategies, methods and tools



Source: Content Management in a Knowledge Management Context, 2010.

In the second chapter we briefly put gamification in context and point to areas of its application to knowledge management from Figure 1. Third chapter explains methodology we used to research academic articles that reference both terms. The results of an analysis are in chapter four and we end this article with a conclusion regarding further integration of gamification and knowledge management.

[1] Gamifying means using game elements (like points, badges and leader board) in non-gaming context.

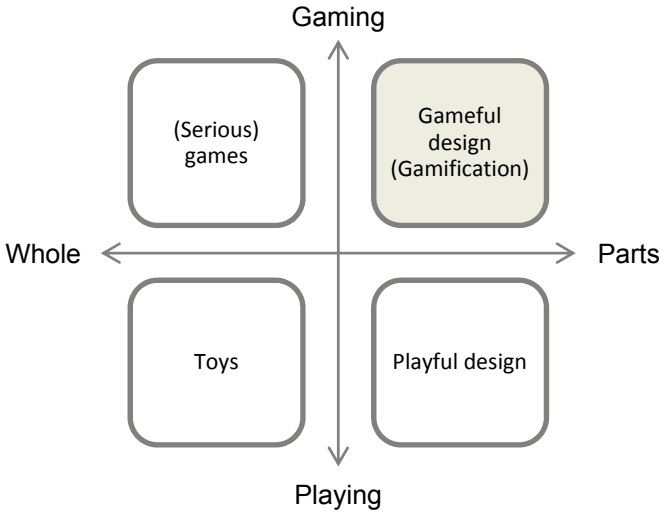
2. GAMIFICATION IN CONTEXT WITH KNOWLEDGE MANAGEMENT

In order to put gamification in context we must separate it from the usually predicted meaning what it actually is (e.g. not games per se). The first part of this chapter will briefly explain four established concepts of playing and gaming. After that we will map some possible gamification implementations to knowledge management areas from a high level to predict academic interests for possible integrations – and to get a better understanding of the research part of this paper.

2.1. Gamification in context

Various gamification experts including Werbach and Hunter (2012) refer to the diagram that put gamification in the right context related to gaming and play overall (Deterding & al, 2011). For better differentiation we have repeated a diagram in the Figure 2.

Picture 2: Gamification in the context of game and play, whole and parts



Source: Deterding & al, 2011.

The first distinction is the engagement of the *player*. Games and in the business context more interesting *serious games* are designed to be used from the start to the end. Imagine a business scenario of a sales process defined as steps of a case study following successful organization project win. Serious game simulating this process involves the complete process and not just part of it like negotiation part.

The second distinction is gaming versus playing. Playing is usually improvisational, free form combination of play activities while gaming captures playing that follows *rules* and builds on increasing knowledge gathering to achieve specific *goals* (ibid). Here parallel with computer games is most self-explanatory – we can play (with) a simple drawing program with no predefined goal to achieve and we just draw an image while to get to the end of a certain game one must follow its rules and remember the steps he has taken to pass several levels to achieve a final goal (finishing a game).

So gamification means using game design elements in non-game contexts (ibid), not extending and using game-based technologies and just for the sake of play. Of course having fun is encouraged and must not be forgotten when designing gamification implementation (Werbach & Hunter, 2012).

2.2. Integrating gamification with knowledge management

Where can we then integrate gamification in knowledge management areas shown in Figure 1? As we imply that we can use game design elements in learning and especially in e-learning, it's obvious that first logical attempts to incorporate gamification in organization would be in Organisational Learning area. Similarly, education and training as part of Human Resource Management would definitely benefit with more engaging elements that would increase motivation of learners towards final goal (getting a knowledge of a new business process, for example).

Actually this is one of the gamification goals – if possible, the behaviour of active participants should be changed by forming a new habit. For example, changing an organisational culture when the business is expanding internationally might not be successful if all employees don't change their personal cultural habits regarding working with people that are not from the same country or nationality. Gamified learning could be important in faster breaking of barriers among people.

We can extend one thought that games *and* gamification in entrepreneurship are doing two important tasks: a) they build real entrepreneurial culture of the 21st century and b) they develop creative potentials of an individual that will become part of his professional profile (Pompe, 2011).

What about the other two circle areas of knowledge management? After all people cannot get pushed beyond their reasonable levels of performance. Well, it's not hard to imagine how Information Management and Information & Communication Technology (ICT) would benefit with gamification. For the first the strategy of an organization could be revised in *loops* by gamifying information gathering from employees. Policy & Procedure information could be periodically refreshed in co-workers' minds by using a rewarding (thus gamified) process of reading documentation available on the intranet.

Finally, even ICT can benefit from integrated gamification. For example, enterprise search can be boring and time consuming. By adding clues, offering saving and intelligently adapting search queries the information can be retrieved faster and thus taking less productive time of employees.

3. GAMIFICATION IN ARTICLES ABOUT KNOWLEDGE MANAGEMENT

We have searched articles containing (both) terms "gamification" and "knowledge management" in Emerald Insight (2014) and ProQuest Platform (2014) research portals. Search results from both databases were limited to academic articles and further filtered for full text availability and relevancy as shown in Table 1. All articles range from 2011 to 2014, confirming gamification development as specific newcomer in the second decade of 21st century.

Table 1: Articles included in textual research

Database \ Articles	All academic articles	Full text not available	Non-relevant (calendar, news etc.)	Articles
Emerald Insight	19	3	7	9
ProQuest Platform	12	3	1	8
TOTAL	31	6	8	17

Source: Emerald Insight and ProQuest Platform, 2014.

The research question was "what is the frequency of gamification terms in articles analysed?". For gamification terms we have specified the broader set of terms since we expected that using just a "gamification" term first, won't be efficient, and second, article authors might not use established terms and game/play contexts due to short period of time.

Textual analysis was done using R statistical programming language (R Core Team, 2013). Specifically for text mining an additional package *tm* was used (Finerer & Hornik, 2014). The tm package offers several text mining facilities including text clustering, text classification and string kernels but we have only needed count-based analysis methods.

All 17 articles were read into R using tm's methods *readDoc* and *readPDF*, creating so called *corpus* in the computer's working memory. A corpus was then filtered first by initial prefiltering for stripping whitespace, converting uppercase to lowercase and removing numbers.

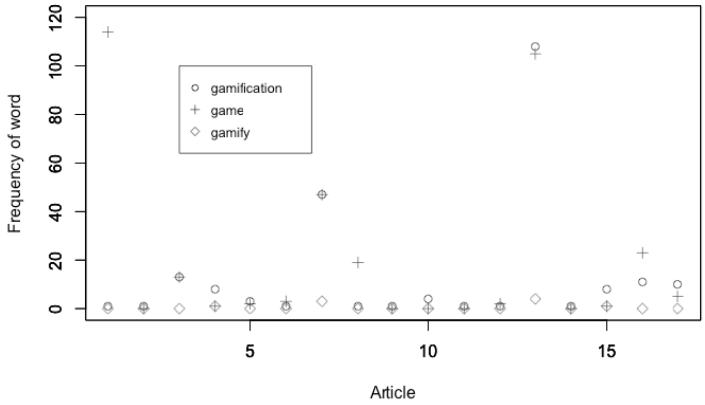
Further filtering included removing standard English stopwords like "my", "him", "being" etc. We could use stemming but since we hadn't expected many variants of root words we have left this out. So finally we had relatively clean text in corpus to analyse with a simple command available in tm package. This is *findFreqTerms* command which in the second parameter requires occurrence of the terms, for example terms that occur at least four times would be found with findFreqTerms(corpus, 4). For last analysis we searched for correlations for specific terms with the *findAssocs* command.

4. RESULTS OF ARTICLE ANALYSIS

Here are the results of our textual analysis of 17 articles with the terms "gamification" *and "*knowledge management" in the content.

Picture 3 shows frequencies of three most used terms directly involving gaming. It's clear that using terms "gamification" and "game" has strong correlation, with the only outlier being a first article that refers to a game organized in a library. Game description is main point of that article so this is logical. Generally "game" is used more than "gamification" with significant exceptions of documents 4, 10 and 15 that are more oriented towards knowledge management theories than more practical cases.

Picture 3: Frequencies of terms "gamification", "game" and "gamify"



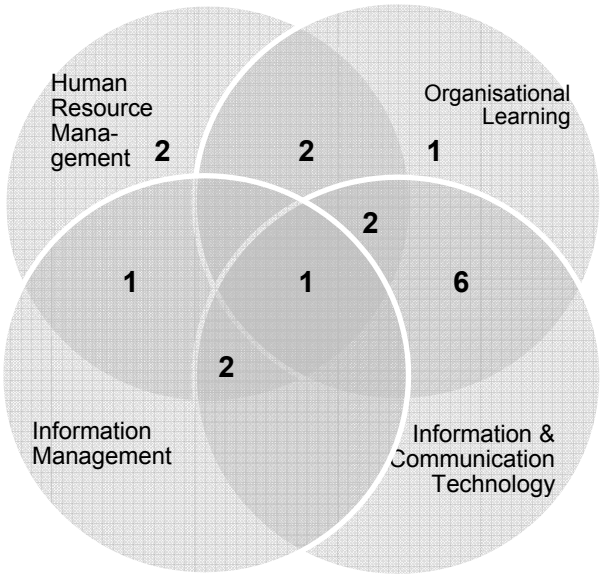
Another interesting analysis shows correlation of same three words used with other words in the same document. Table 2 shows that for "gamification" surprising word "callois" appears but we later found that several authors refer to a book from 1961 titled Man, Play and Games by the French Sociologist Roger Caillois (and his surname was spelled wrong in the article). Words mostly correlated with "game" were expected, mainly describing characteristics of game playing. For knowledge management the most important correlated words appear for a word "gamify", pushing theoretical gamification terms down with prominent business related terms like competition, discount, ethical, implementations and segmentation.

Table 2: Correlation of words "gamification", "game" and "gamify" to other words

>= 94%	gamification	>= 94%	game	>= 94%	gamify
callois	0.99	easier	0.95	competition	0.98
sale	0.99	appearing	0.94	nongame	0.98
sell	0.99	approached	0.94	appeals	0.95
suits	0.99	eliminated	0.94	bigger	0.95
win	0.98	harder	0.94	cutting	0.95
werbach	0.97	have	0.94	discount	0.95
winning	0.97	lose	0.94	ebay	0.95
last	0.96	pretty	0.94	ethical	0.95
bonus	0.95	printed	0.94	gamifying	0.95
big	0.94	removed	0.94	implementations	0.95
nongame	0.94	repetitive	0.94	justify	0.95
things	0.94	stuck	0.94	mayjune	0.95
		warcraft	0.94	philadelphia	0.95
				segmentation	0.95
				simplest	0.95
				wharton	0.95
				callois	0.94
				suits	0.94

The final analysis we have done was the classification of articles to fit one of the four knowledge management circle areas in this paper introduction. As we see in Picture 4 main assumption was correct – most articles intersecting gamification and knowledge management fall into Organisational Learning area, giving all together 12 of 17 or 71 % of articles analysed.

Picture 4: Classification of articles to knowledge management areas, ∑ = 17



ICT is the second category with most articles, 65 %, having most intersected articles and none discussing only pure ICT. This is mainly because gamification can be relatively easy implemented using ICT so several articles discuss relevant and practical case studies. The third category, Human Resource Management, is relying both on Organisational learning to change people's behaviour and on both technical areas: Information Management for records saving and ICT to drive HRM itself.

And last, Information management category at 24 % doesn't have many intersected articles as having the biggest "dull" factor among all four categories. Yet at least Strategy and Policy & Procedure elements would benefit organization more if they are accompanied by gamification enhancements as we have suggested.

5. CONCLUSION

As knowledge management is turning from buzzword to a regular keyword – meaning every day common term – so is a gamification with even shorter existence from 2011. We have shown what is the essence of gamification and where it can tackle knowledge management areas.

Academic articles incorporating gamification and knowledge management are still in their infancy. Nonetheless even short amount of available articles that were analysed shows a great potential and possible research in the future. In spite using simple gamification terms to be found in articles that describe its usage in knowledge management, authors, practitioners and researchers still don't use them well in descriptions though they have actually implemented or described their implementation in real-world scenarios. It is expecting that as gamification books, conference events and software implementations expand, so will the common knowledge of gamification terminology, gamification design and theoretical research.

In the future research we plan to analyse gamification models, their impact on organizations using knowledge management and propose organizational benefits oriented integration of these two worlds.

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