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Fostering collective creativity through gamification

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Abstract: Collective creativity is a necessary quality in any innovative process which requires cooperation between groups or individuals. Gamification may be used as one of the possible methods for fostering collective creativity since it increases amusement of engagement/immersion into activities. The state of "flow" may be achieved during the participation in gamified experience and this leads to prolonged times while gathering the information about specific domain. This research serves as general review/viewpoint which seeks to examine collective creativity as a phenomenon and gamification as the tool for encouraging collective intelligence. Authors analyze scientific literature related to collective creativity, competitiveness in groups, computational creativity, computerised collaboration tools, engagement/immersion, flow, gamification, and, in some extent - game mechanics. Since this area of research is significantly new, it is important to determine main categories, according to which gamification may be applied in cooperative tasks.

Keywords: Creativity; collective intelligence; gamification; computerised collaboration tools; engagement; immersion; flow.

Introduction

Innovation management is closely dependent from collaboration of participants involved into product development or creation of organizational innovation. Common goals, tools, and working patterns do not ensure success of innovative outcome unless creative approach is applied. Creativity is a must in all related areas of innovation management starting from work environment factors (Mathisen and Einarsen, 2004), tools which promote creativity, and finalising with individual creative capabilities (Shin and McClomb, 1998). The success of innovation project depends from the creative efforts and original outcomes which should approach as a result of productive collaboration. Individual creative performance is strongly affected by the effectiveness of team members. According to Parjanen (2012) "it is impossible to trace the source of new ideas to an individual" in the case of collective work. The contributions of individuals are blurred, since members of the team release new ideas through interactions in creative quest. On the other hand, the individual contribution is none of the less important,

especially in those cases where creativity is understood as a set of personal traits. Considering the fact that dimensions of individual and collective creativity are interconnected it is necessary to examine both phenomenon with the respect to domain of application. Tools (brainstorming, portfolio management, virtual prototyping, ect.) applied in innovation management are used to embrace creativity, but their effectiveness is strongly dependent from cooperation level and creative efforts of a group. Gamification – is one of the methods, which could encourage collective intelligence through collective creativity. In this case, gamification is analyzed as "use of game design elements in non-game context" (Deterding, Dixon, Khaled, and Nacke; 2011). It is a relatively new concept which emerged considering the popularity of the games in knowledge society. Despite the fact that the main purpose of the games is to amuse audiences, some game design elements were transferred to other domains in order to keep activities more engaging. The gamified approach in problem solution and engagement is applied in many domains including education, management, marketing and many others, which require constant involvement into processes based on motivational stimuli. Despite that, there is a shortage of academic discussion which would consider gamification as one of the facilitators in raising collective creativity.

In the context of this paper, creativity is understood as "any act, idea, or product that changes an existing domain, or that transforms an existing domain into a new one" (Csikszentmihalyi, 1996). Collective creativity can be defined as processes leading to creative outputs when two or more people are collaborating or interacting while performing the task. This concept is not widely discussed in academia, however, it plays crucial role in innovation management and for fostering collective intelligence. The biggest ideas and inventions were created by a collaborative mind that is why encouraging productive interaction is one of the most actual issues in many domains.

The purpose of this paper is to examine the premises for gamification application in fostering collective creativity. Although the concepts of gamification and collective creativity are recognised separately, scientific approach which would examine their common application areas is lacking. This may be due to few factors: first of all, gamification, as a concept, is a relatively new field of research, on the other hand, creativity is a phenomenon, a trait, which cannot be defined in an easy way, and, according, to Boden (1994), the very concept is seemingly paradoxical, since it's based on intuition and strives to "create something from nothing". This knowledge gap leads to a main problematic question: can gamification be used in fostering collective creativity and how it could be applied in order encourage creative collaboration?

This research serves as general review/viewpoint which seeks to examine collective creativity as a phenomenon and gamification as the tool for encouraging collective intelligence. Authors analyse scientific literature related with creativity, collective intelligence, competitiveness in groups, computational creativity, computerised collaboration tools, engagement/immersion, flow, gamification, and, in some extent – game mechanics. Since this area of research is significantly new, it is important to determine main categories, according to which gamification may be applied in cooperative tasks. Based on the analysis, the premises for usage of gamification in collective creativity are determined, and a foundation for future empirical research is set.

Collective intelligence and creativity

The importance of collective intelligence (CI) in the context of modern society is growing together with expansion of the internet and the way in which CI is utilized and leveraged has been fundamentally altered. "What is new is the way in which the communication revolution is altering the channels through which information flows" (Wise, 2012). These new channels enable wholly new solutions for tapping into the

collective intelligence of broader groups of people in shorter amounts of time. They go beyond the "one-to many" strategies of the broadcast age, to enable the "many-to-many" and the "many-to-one" strategies of the Web 2.0 age (Malone, 2010). New forms of collective intelligence and creativity emerge because of the web 2.0, 3.0 and social media tools, no wonder that interest in the field is rising (Salminen, 2012), but the research examining usage of gamification in fostering collective intelligence is lacking. An indirect approach towards the issue analyses Computer Supported Cooperative Work (Borghoff and Schlichter, 2000) which covers the influence of ICT to collaborative performance. However it mostly focuses on message systems, group editors, electronic meeting rooms, ect., thus leaving the game-based approach outside the picture. Gamification is recognized more when cooperation in education is required. Cronk (2012) investigates the "use of gamification to improve college student in-class participation and engagement". According to author, students were attracted by the interactive model of virtual tree which developed in response to points assigned for participation in class discussions. The results of the study revealed that "the majority of students reported increased participation in class as a direct result of the virtual tree system". Domínguez et al. (2013) conducted an experiment with university students where gamified plug-in was used in famous e-learning platform. The research revealed that gamification in e-learning platforms seems to have potential to increase student motivation, but big effort is required in order to design and implement the gamified content. Fernandes et al. (2012) presents the game-based collaborative tool called "iThink" that aims at improving the participation in a requirement elicitation process. The results demonstrated a good number of contributions and that gamification approach may enhance the user involvement in common activities. Research show that motivation may be affected by providing gamified experience. This driver could be used in fostering creativity, since engagement leads to prolonged "flow" state, described by Csikszentmihalyi (1975). "Flow" emerges between the boredom and anxiety and keeps the group or individual involved into activities. Macdonald, Byrne and Carlton (2006) conducted a study designed to investigate the relationship between "flow" and creativity in the context of musical education. Authors revealed that "higher levels of flow are related in a number of important ways to higher levels of creativity and higher quality compositions". Gamification also strengthens the competitive environment among the participants. Such elements of game mechanics as levels or leader-boards encourage competition, which drives participants to seek for better results in the performed tasks. Although collectivistic culture is more popular in the organizational behaviour, the individualistic groups may achieve higher creative results since member differences may encourage new approaches towards specific problem (Goncalo, Staw, 2004). But there is a gap of knowledge on how exactly gamification helps to increase collective creative performance. In order to analyse possible application areas for gamification in collective creativity it is crucial to determine theoretical and practical limitations of the theories and tools applied thus seeking to understand the long term effects of the approach.

Gamification as facilitator for collective creativity

The usage of game mechanics elements for problem solution in non-game contexts arise from the gaming culture which is the one of the trademarks of Generation Y (Millennials), first time described by Howe and Strauss (2000). Nimon (2007) state that representatives of this generation were raised in ICT development era, when video game industry accumulated enough intellectual and financial resources to become one of the most influential in entertainment business. Success of gaming sector allowed exporting game thinking to other domains. From the essence - gamification is not something completely new since it takes some pieces from game design elements and applies them

to contexts which are not directly related to gaming. According to Zichermann and Cunningham (2011) gamification is relayed on three main pillars: game mechanics, game dynamics, and aesthetics. Game mechanics elements such as points, badges, leader boards and ect. define the main technical characteristics of the gaming world. Dynamics reveal how these characteristics interact in overall user experience. Aesthetical side wraps all of these pieces into visual package with feedback system. However, giving points for participating in the loyalty programs or awarding users with "status trophies" existed way before the term "gamification" went public. These principles were used in designing games, but it also worked significantly well in the physical world. Game creators took motivational patterns from the real world thus providing intrinsic and extrinsic motivators for the players. Gamification allows reversing this effect by providing game based environment for coping with real world problems. It works as a stimulus for performing certain goals which may be determined by game designer thus making the overall experience more engaging. Generally speaking, the key objective of gamification – is to increase engagement and immersion into activities thus expecting to reach the state of "flow". According to Douglas and Hargadon (2001) these categories are related since engagement is explained as more active, and immersion – more passive experience. Authors also note that games encourage "flow" characteristics to occur, and that "this state hovers on the continuum between immersion and engagement, drawing on the characteristics of both simultaneously". Brown and Cairns (2004) came to a conclusion that immersion is very similar to "flow" condition in some extent, but "the fleeting nature of total immersion seems to suggest that it is something distinct from flow in this context". At the final end, engagement, immersion and "flow" states are necessary for gaming experience to be uniquely valuable for the overall enjoyment of the gameplay, although it may be not directly associated with each of the elements separately, since people who reported being immersed in the game does not necessary describe this experience from the enjoyment standpoint (Brown and Cairns, ibid.). Despite that, tendency to be involved into gaming world may be explained through self-determination theory proposed by Ryan and Deci (2000). Przybylski, Rigby and Ryan (2010) used it in explaining engagement into gaming experience. Authors came up with the conclusion that autonomy, competence and relatedness are the key features for a player to stay in the game. Ability to influence the gameplay as well as sense of progression and involvement into gaming world, create environment where individual can fulfil ones psychological needs. This driver may be used in the case of collective creativity, since getting familiar with the problem and accumulating knowledge about the issues works as facilitator for more productive creative performance. The problem is that phenomenon of creativity is so complex, that defining it in all possible domains is a tremendous work. Creativity is related with novelty, originality, value, unexpected turns, and the knowledge base (Harnad, 2007), that makes it hard to define and assign common features, which would distinguish it from other cognitive categories. Moreover, creativity seems to be dependent from such factors as the environment, culture, and individual abilities (Sternberg, 1988). One of the arguable topics in creativity research is related with domain influence towards creative performance (see Silvia, Winterstein, Willse, 2008). The answer to the question "is creativity domain specific" may be varied, since in focusing on "creative product" creativity often appears domain-specific. If individual qualities are the target for the question, then creativity appears more as a trait (Plucker, 2004; Baer, 1993; Silvia, Kaufman, Pretz, 2009). Collective creativity makes things even more complicated since the dimension of social interaction is involved. In many cases innovations are created with the participation of many individuals. Sometimes creative collaboration is intentional, sometimes – invisible (Sawyer, 2007) thus making it even more complex. Despite the approach taken it is practically impossible to evade collective collaboration in innovation management. Yet, gamified content may serve as a useful medium in coping

with complex challenges in innovation quest. This may be achieved with the respect to Amabile's (1988, 1997) Componential Model of Organizational Innovation. According to author, the influences on creativity include three within-individual components when speaking about team-based creativity: "domain-relevant skills (expertise in the relevant domain or domains), creativity-relevant processes (cognitive and personality processes conducive to novel thinking), and task motivation (specifically, the intrinsic motivation to engage in the activity out of interest, enjoyment, or a personal sense of challenge)". The social environment serves as outside component. According to this theory, the person is most creatively productive when one has high domain expertise, is intrinsically motivated, as well as proficient in creative thinking. Games allow creating engaging environments and this may be used as stimuli generator for creative performance. Yu, Nickerson, and Sakamoto (2012) classify games as collective creativity systems thus stating that games may serve as better creativity facilitators in coping with high demanding complex tasks. However, in some cases games may serve as a constraining factor, since they are developed in order to fulfil certain sets of rules and requirement. Gamification features may be optimal in given situation, since they do not have the burden of the gaming world limitations. In this case, only some elements of game mechanics are taken as the basis for increased engagement. Immersion, engagement and "flow" are three main categories towards which gamification process is focused. The sense of "flow" is the most desirable outcome. During this state outside world fades away for some period of time, during which, knowledge absorption rates are increased. Since individuals are spending more time with the problem, their knowledge base is improving in the range of the specific domain. According to Componential Organizational Innovation theory – this is one of key issues in creativity-relevant process. Alahuhta, Nordbäck et al (2014) noted that virtual worlds can function as environments for collaborative teamwork that focuses creative outcome. It is also revealed that certain features of virtual worlds can contribute towards team level creativity. Gamified environment is based on the virtual worlds, where pieces from the game mechanics are stringed together in order to encourage greater engagement/immersion, and, finally – "flow". Despite that, there are some limitations to this approach. When intrinsic motivation is supported by extrinsic stimuli, individuals may feel less motivated to work without the boost from the outside sources. The quality of gamified content is also an issue, since poorly designed gamification platform may lead to demotivation in creative performance.

Conclusion and discussion

Creativity and collective creativity have common elements which are related with the accumulated knowledge, used for creative solutions. Gamified experience may provide increased engagement into activities through engagement, immersion, and "flow" states. Increased engagement prolongs the time periods spent while performing the task. The additional time (in the "flow" state) allows accumulating more knowledge and thus improving the creative problem solution. Game design element may ensure competitive environment, which in some cases encourages individualistic approach towards the issue and to prolong time while creatively coping with the problem. On the other hand, competition inside creative team may lead to negative results, since situation is less controllable than in the case of collectivistic approach. The effectiveness of collective creativity is also dependent from the domain gamification quality. Since the problems and working areas may be completely different from one another, it is practically impossible to create effective gamification experience based on the same pattern.

Innovation management is strongly dependent from the effective work of project teams. Creativity is one of the fundamental requirements for innovation to be successful.

Knowing what tools and techniques may encourage collective creativity allow finding more efficient ways towards problem solution. Gamification may be used as one of the methods in the field of innovation management, since it already proved the effectiveness in other domains.

The application of gamification in fostering collective intelligence through cretivity is a relatively new concept which lack academic community attention. After determining the main premises for applying gamified experience in the context of collective creativity it is possible to design empirical research which would validate or reject the correctness of the presumptions.

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