Business games and creativity stimulus: the behavior of three different teams in the ideation process

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Abstract

Creativity is considered the source of idea generation for new products and for solving problems. Due to this companies should implement actions and enable means that favor the practice, stimulation and development of people's creative potential. In recent years several business games have been developed and are used as a training and motivation tool, although few of these games explore the stimulation of their players' creativity. On the other hand, studies indicate that considering the use of a game for the purpose of generating ideas is an efficient and effective way to implement improvements and innovations in organizations. The objective of this article is to identify behavioral and attitudinal differences among participants of a business game whose aim is to stimulate the creativity of its participants. To do so, the research contemplated a literature review and a field research with experiments concerning the application of a business game. The literature review focused on the relation between business games and creativity. The experiments occurred with the applications of the STORM business game in three groups: undergraduate engineering students, undergraduate design students and professionals working in a creative industry. In order to gather information, we used: 1) observations of a control group, whose purpose was to observe the performance of the players and 2) a questionnaire to collect the opinions and impressions of the participants about the game. As a result we present that the STORM business game stimulates the creativity of its participants, with acceptance rate of 97.5% among the players, thus demonstrating that the relationship between business game and creativity is a beneficial practice. In addition, we identified that when used for idea-generating purposes the motivation and outcome of the players was positively similar, be it with engineering students or creative industry professionals. However, when used for product development the motivation of the players has declined, although the results have remained positive.

Keywords: serious game, organizational creativity, group creativity, motivation.

1. Introduction

In recent decades the development of new products, services and processes is continuous. Therefore, companies have a constant need to innovate and insert creativity into their organizational structure, to improve their results. In new product development for instance the design of a new project is result of the integration of innumerous ideas developed by a team in order to achieve a viable alternative that fills the necessary requirements. However, this is not the only application of creativity within an organization. Innovative ideas, among other utilities, are also necessary and can be adopted to implement rapid responses, improve processes and eliminate bottlenecks in manufacturing.

Since the ability to innovate constitutes a decisive factor for short-term and long-term business performance, there must be ways to provide an organizational culture of innovation in products, services and processes. In this context, creativity appears as a necessary and determinant skill for an organization's success (Anderson, Potočnik and Zhow, 2014; Appu, Sia and Sahoo, 2015; Hatcher et al., 2018), being considered as an initial source of the innovation process (Rosa, 2017).

Nevertheless this competence is still perceived as ability of exceptional individuals or exclusively of certain professions, especially those from the artistic branch (Ohly, 2018; Amabile, 2012). However, authors such as Amabile (2012) and Ritter et al. (2012) understand that creative potential can be developed and fostered by means of creativity techniques that can be used by any individual.

The business games are among these techniques and the use of a game for the purpose of generating ideas is considered an efficient and productive way to carry out the ideation process (Hesmer et al., 2011). Corroborating with this statement, Rosa et al. (2017) report that in the last decades there has been a growth in creativity related researches that seeks to investigate the cognitive and behavioral effect of games on players and its influence on individual and collective performance among organizations - as a way to stimulate creativity for innovation.

Thus, the objective of this article is to map the behavior and identify the attitudinal differences among people engaged in creativity stimulus activities. The sampling are from three distinct groups: engineering students, design students and creative industry professionals, with a total of 73 participants. In order to collect this data we developed a tool to stimulate the creativity of its users: the STORM business game. We chose to design this game due to the fact there were no business games specifically developed for this purpose, although some studies observed the creativity stimulus as a collateral effect of some games (Geithner and Menzel (2016); Gudiksen (2015); Agogué, Levillain and Hooge (2015); Ihamaki (2014); Kerga *et al.* (2014)).

The relevance of these articles lies in the presentation of: 1) a business game specially developed to promote creativity on its players; 2) mapping the response profiles of players from different areas when facing creative stimuli; 3) comparison of the obtained results, indicating the importance of motivation in the ideation process; 4) demonstration that business game is an effective tool in fostering creativity.

This article is configured as follows: this first section introduces the theme. In the second section there is a brief review of the theoretical framework on creativity and creativity techniques and in the third there is a review section on business games. The fourth section describes the research method. In the fifth section there is a description of the STORM business game used to collect the data. In the sixth section we present the detailed application of the game and in the seventh section the discussion about these applications is presented. Finally, section eight presents the final considerations of this study.

2. Creativity

Creativity is studied by different areas and can be explained in several ways. As identified by Rosa et al. (2017) there is no consensus among authors regarding the concept of creativity, but there are two distinct strands to explain the issue: one understands creativity as intrinsic to the individual, the other that creativity can be learned and practiced and the creative potential developed. For example Gurteen (1998) understands the need to create is the guiding force of human-beings – who are naturally creative, while Amabile (1988) explains one of the ways to develop skills related to creativity is through experience with the generation of ideas. For the author, creativity is the product of new and useful ideas of an individual or small group of people working together (Amabile, 1988).

2.1 Creativity and innovation in organizations

Finke, Ward and Smith (1992) understand ideation as a creative process and argue that the purpose of this process is to provide a connection among different types of knowledge to form a new idea. In this sense the ideation process becomes fundamental to business success (Toubia, 2006) whereas the new ideas are considered original, with high quality and usability, being classified as concrete (eg: design and tangible technology) or abstract (eg: solutions to problems and new opportunities), as explained by Carruthers (2011). Such practice fosters innovation for the business environment.

Thus, the generation of ideas is an important factor in the innovation process and is directly linked to creativity. Anderson, Potočnik and Zhow (2014) state creativity and innovation are two distinct processes that complement each other. According to the authors creativity is the generation of ideas and innovation is the stage of implementation of ideas aiming for the development of new products, procedures or practices. However, within companies the process of ideation and consequently innovation is poor, leading to one of the greatest challenges faced in cooperative environments: the participation of employees in the creative process of generating ideas and solutions (Florida, 2003; Hesmer et al., 2011).

For the creative process to happen it's necessary not only the participation of the individuals involved but they must also be motivated (Sternberg and Lubart, 1991; Hesmer et al., 2011). For Amabile (1988) people show greater creative potential when they feel motivated. When engaged in activities of self-interest or in search for personal satisfaction, individuals feel intrinsically motivated, however if the motivational factors are external - i.e. involvement happens due to a goal outside the activity - people will be extrinsically motivated (Hennessey and Amabile, 1988). Therefore, whether it is intrinsic or extrinsic, motivation is important in the creative process, since it stimulates individuals to engage in the idea-generation process (Ohly, 2018). With this in mind it is plausible to state the motivation of an individual within a company does not always remain the same, varying not only from one sector to another but also among tasks, depending directly on the work environment (Amabile, 1988) and people's emotional state at that moment.

Thus, Wang (2014) asserts that to promote innovation through creativity companies must support this ability and provide: time, trust and resources for the creative effort. The author also reiterates such support represents the foundation to build an organizational structure and creative culture, which is conducive to new ideas and opportunities (Wang, 2014).

Araújo et al. (2017) emphasize that structuring the organizational environment is an important factor to foster creativity successfully when it concerns product development. Thereby, the creativity inherent to employees must be enhanced by tools and techniques viable to the organization and appropriate to the creative stimulate.

Another important factor that influences creativity in organizations are the work teams. Experiments carried out by Nijstad e Stroebe (2006) suggest using teams to generate ideas features better results, with more engaged, motivated and productive participants. In this sense, companies present a favorable environment for idea-generation process and solutions to

problems, since teamwork is a necessity of organizational strategy, culture and business communications (Hatcher et al., 2018).

So creativity presents itself as an important and cohesive factor within the organizations for providing innovative solutions and an environment conducive to the integration of people and ideas. However, this ability is conditioned by the way in which the company can promote and disclose opportunities, since on account of this the employees can become motivated and engage in the creative process.

2.2   Creativity techniques

Runco (2007) states every person has the potential to be creative, but not everyone has the opportunity or seeks to develop this potential. According to Scott, Leritz e Mumford (2009), in the last decades training has been perceived as an effective way to stimulate people's creativity and empower their creative potential. The stimulus of creativity and innovation through training is fundamentally based on the construction of intellectual capital within the organization, which will generate skills and abilities to develop the company's overall performance.

Leopoldino et al. (2016) emphasize that creativity stimulation techniques allow the promotion of idea-generation as a source of innovation. However, stimulation methods must be adapted to the environment's reality, taking into account that for effective use creativity techniques are influenced by process, people and technological factors (Wang, 2014; Leopoldino et al., 2016).

In both literature and empirical practice there are several techniques used to enhance creativity. Garfield (2001) states different techniques can help individuals to see problems in different ways, providing a distinct way of idea-generation and resulting in varied ideas. In turn, Grube and Schmid (2008) report that creativity techniques can be differentiated among themselves depending on the context in which they are applied and the operationalization of the stimulus dynamics.

Fernandes (2014) presents a catalog of 74 creativity techniques and their recommended use according to the intended objective: 1) solve problems; 2) gather resources for new ideas; 3) generate ideas to create/improve products; 4) deepen the vision of the problem; 5) evaluate ideas; 6) identify areas/problems of where to innovate; 7) generate diverse ideas; and 8) develop a predefined concept. For Rosa (2017) achieving these goals is the result of the creative stimulus, but in order to reach them the individual is conditioned to persist in the face of obstacles, to seek different paths and to break mindset barriers. Therefore, either individually or collectively, these techniques require knowledge retrieval, association of ideas, knowledge creation (McAdam, 2004), synthesis, transformation and analog transference (Lubart, 2001).

Finally, the creativity stimulation techniques are an important strategy for developing the creative potential of its practitioners, potentiating idea generation and providing focus to reach creative solutions.

3.   Business game as a creativity tool

Business games are used as a tool for teaching, learning and promoting skills since the 1950s (Figure 1), and this is often perceived as its main purpose. However researchers have demonstrated the approach of different issues through this resource, exceeding the economic and financial bias towards which it was initially directed (Kutbiddinovaa *et al.* (2016); Lamb (2016); Keslacy (2015); Bogers and Sproedt (2012); Nakamura, Ohsawa and Nishio (2010); House (1970)).

These games (also called management games) are used to "foster experiences in which behavioral change and learning can be triggered in individuals alongside observing their management behavior" (Keys and Wolfe, 1990, p.308). They are also defined as activities whose primary purpose is learning through play (Charsky, 2010). Therefore, business games are

capable tools to stir learning and behavior change of individuals in various capacities through playful activities.
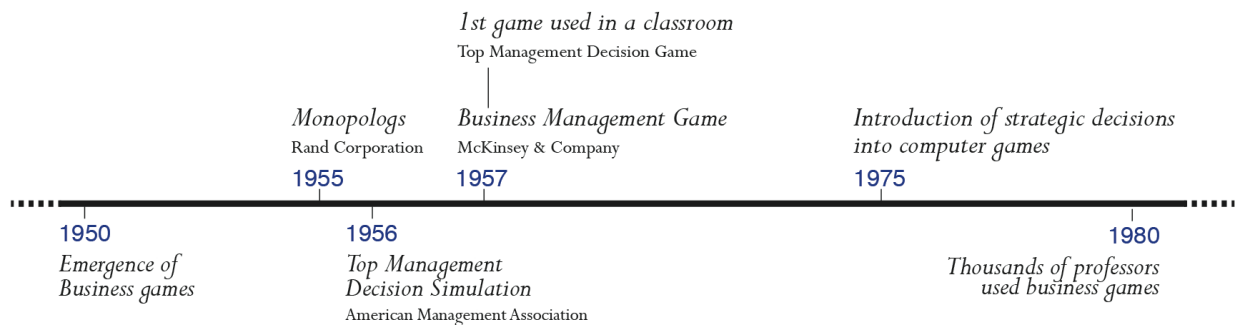

Fig 1. Business games origin

Some of the characteristics of these games are: 1) internalization of knowledge (Prensky, 2001); 2) communication improvement; 3) consensus building; 4) creativity stimulation; 5) understanding of complexity; and 6) commitment to action (Geurts, Duke and Vermeulen, 2007). These features fostered by business games are critical to business success and vital to organizational development and sustainability.

For Shahbazi and Yazdani (2017) the game's primary purpose is to empower people to solve problems. For example, the authors list games as one of the most important activities to stimulate creativity in children. This is in line with Gudiksen's (2015) vision, for whom games share common characteristics with the ideation process, thus acting as a facilitator for creative stimulation. The study by Mokhtari et al. (2016) corroborates with this statement and attests games enable original thinking, developing players' creative potential.

In order for this objective to be achieved there needs to be attention to the process and interactions throughout the course of the game. Susi, Johannesson and Backlund (2007) comprehend the value of the game is not enclosed only in its final action, but also in its development process. In other words, we should not focus only on the final result generated by the experience, but on the experience as a whole, including the process and participation of the players during the activity. This reflection corroborates with Minina and Nikita's (2012) understanding that business game focuses on the development of professional creative thinking for the formulation and solution of cognitive tasks, being fundamental in the compliance with professional standards and game rules, either individually or in teams.

Despite the importance of games as a source of creativity there are not many reliable tools documented in the literature and available to act as facilitators of this creative environment in organizations (Alencar, 2012). Thus, new studies on techniques to stimulate creativity in organizations are necessary, as well as the measurement of their impact on people.

4. Method

This research can be characterized as experimental and to perform it we used the game STORM (Rosa, 2017) as the instrument. The research procedure is presented in Figure 2 and contemplated in 5 phases. First we performed a literature review on business games and creativity. Then, we planned the experiments, which contemplated the application of the game in three distinct groups (G1 - undergraduate students in Engineering, G2 - undergraduate students in Design, G3 - professionals in a digital marketing company belonging to the creative industry). In this second phase we also defined the themes that would be used by each group, places of application and number of participants.
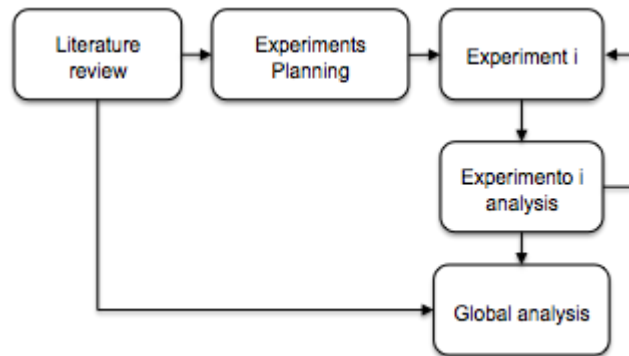
Fig 2. Research Process

The third phase consisted of the application of the game. Two mediators and one external observer carried out all applications and at the end of the game the participants answered a structured questionnaire about their perception regarding the game and the whole experience.

The fourth phase involved the analysis of the experiment. After each experiment and before the next application the mediators, external observer and two experts in creativity and innovation held a discussion panel to analyze the results gathered. From the considerations perceived by the group, improvements were inserted in the following applications, in a spiral movement. Besides this, they also detailed the description of each application.

In the final phase we performed a global analysis of the experiments considering the main findings of the literature review on creativity and business games and the data obtained through the application of the STORM game.

5. STORM Game

According to Rosa (2017) the game STORM was designed to stimulate the creativity of its players through idea generation and problem solving. The name of the game STORM derives from 'brainstorm', referring to its meaning of many ideas being generated at the same time, with a goal in mind. In order to do so STORM utilizes two moderators: one to steer the dynamics and another to assist in its application, distributing materials and counting points. Before the game starts it is necessary to define the number of participants (minimum of 6 people and a maximum of 15 for the standard time setting of 80 minutes) and the topic to be addressed, so that participants are organized in groups and each group receive a thematic card game. Preferably three groups of 4 people each are formed and any topic can be covered, which has been previously communicated to the moderator.

The game is organized in 11 phases that include: an initial presentation by the moderator regarding creativity and innovation; the formulation of questions by the players - not knowing its purpose or who they are intended for; rules; choice of questions; raffle of challenges; creative process; presentation of the response; evaluation of the response by the other participants; a new round; debriefing by the moderator; and final questionnaire.

During the creative process the players experience a phase of individual ideation to think of solutions and a collective phase to discuss and develop the answers. The generated ideas are represented in colored cardboard and for this the players have colored pens, markers and crayons. All stages of the game have a specific time lapse and are timed by the moderator and projected onto the screen to offer visual aid and encourage players to perform the activities within the time limit.

6. STORM Game application

The STORM game applications were done with three distinct groups: students of Production Engineering, students of the Bachelor in Design and professionals of the creative industry. In total, six applications were carried out with a total of 73 people.

The first group of applications was held with students of the Bachelor of Production Engineering. The theme addressed by the game was energy efficiency, in accordance with the project the students would develop during the course. From this broad theme three subtopics were chosen: 1) reduction of electric energy consumption; 2) University illumination; and 3) acclimatization of environments.

Three applications were carried out and 97.5% of the participants considered that the game stimulated creativity, with a total of 19, 13 and 5 ideas generated in each one of the applications. We noticed the game occurred naturally and consistently, without difficulties. The participants interacted with the raised issues and debated the themes, being engaged in the game and generating ideas during the application.

Also, the participants emphasized that the debate among groups was one of the best aspects of the game (42.8%) with special attention to "feedbacks, which helped to reformulate the ideas generated" and "the discussion of ideas in both collaborative and competitive ways". In addition, other aspects of the dynamics were praised such as drawing the answer, variety of themes and answers, formulation of the question without thinking about the solution, the individual thinking before interacting with the group and "the competition between the groups benefits the overall result".

The second group of applications was held with students of the Bachelor in Design. The theme of the game was also in agreement with what was being studied in the program and proposed the design of a social defense aircraft (AEDES) with FLIR cameras to orbit the University for the purpose of defending students at risk. With this in mind the following themes were addressed: 1) product autonomy; 2) technologies; 3) forms of storage; and 4) materials.

In this group two applications were done with a total of 3 and 6 ideas generated in each one, and despite the low number of ideas compared to the amount of players (Table 1), these were well substantiated and developed. We noticed the participants demonstrated low engagement in the dynamics, demonstrating difficulty in perceiving STORM as a game but more like an exercise for product development.

In the applied questionnaire 100% of the respondents stated the game stimulated their creativity, although 20% suggested turning the game into a less competitive and more collaborative form, assuming even the formation of a single team. The participants considered the debate among groups one of the best aspects (37.5%), but other characteristics were also mentioned such as "finding solutions quickly" and "stimulating to think outside the box".

The third group of people was comprised of members of Company X, a marketing and technology company that offers creative and design services, digital marketing, content marketing, marketing strategies and web design, social media and network projects. The themes used for this application were related to the company's internal activities and processes, being: 1) endomarketing (internal communication); 2) relationship with the client; and 3) new business solutions for customers.

In total 12 ideas were generated and 100% of the participants stated the game stimulated their creativity. All the players demonstrated that they were engaged and participative in all stages of the game. It was possible to perceive the importance they addressed to the construction and development of ideas, analyzing the practical content of the idea for the improvement of the company's processes.

During the debate and according to the answers obtained in the applied questionnaire the players highlighted the following positive aspects: "team integration", that the game "engages people to make quick decisions" and mainly the debate "generating reflections in the team"," [helping] bring business problems to the discussion", and "bring important points to light. It's the creation

of a space". One participant stated what he liked best in the game was "how a game brought up real debates within a company: day-to-day problems, solutions to problems, solutions to conflicts with the client, etc.".

Thus, Table 1 details all the applications and classifies the players' engagement in the dynamics according to the perception of the mediators and external observers.

Table 1. Overview of game applications

Area	Theme of the game	Application	Nº of participants	Age range	Ideas generated	Players' commitment
Engineering	Energetic efficiency	1	11	18 a 35	19	High
		2	12	18 a 29	13	High
		3	14	18 a 29	5	High
Design	Product development	1	9	18 a 29	3	Low
		2	20	18 a 35	6	Low
Digital Marketing	Business marketing	1	7	18 a 40	12	High

In conclusion 97.5% of the players who engaged in the applications and answered the questionnaires considered that the STORM game in fact stimulated their creativity. This reveals a positive result in which the game was able to stimulate a creative experience through the established environment. Also, we've identified that when used for idea-generating purposes the motivation and outcome of the players was positively similar, be it with engineering students or creative industry professionals. However, when used for product development the players' motivation declined, even though the results remained positive.

7. Discussion

Evaluating the data obtained in the field we analyzed the STORM business game and its relevance to the proposed goal of stimulating its players creativity. A priori the game achieved the established objective and provided an environment and experience conducive to the emergence of creative ideas – according to the opinion of the players, observers and experts consulted. However an interesting feature of this game is each experience is configured differently, depending on the participants involved (quantity and profile). This flexibility allows applying STORM in different situations with different audiences and approach varied themes.

In this paper we examined two ways of using the game. The first is for purposes of ideation and the second for product development. We could observe although the results were good in all groups, engineering students and Company X employees were more committed to winning the game, while for design students this was not an important factor, being even uninteresting. In addition, paradoxically engineering students and employees of Company X drew more than design students and became more involved with the experience as a whole.

This situation is consistent with Ritterfeld, Cody and Vorderer's (2009, 4) perception that "the source of satisfaction [from the game] can be multiple and strongly dependent on the situation and the user ... while some find competition to be a satisfactory factor, others find it in creative, repetitive and low-grade challenge activities". However the application of the game in different areas, with different profiles of players and purposes was important to determine the reaction the game arises in each situation, according to each variable.

With design students the game was applied for a specific purpose of developing a pre-established product, and therefore players were more concerned with development, technical and economic

viability and applicability of the idea in real life. In general these groups proposed an idea and developed it in more details. With engineering students the game was used for ideation purposes regarding a larger problem and as a result players generated several ideas at a time, with a lower degree of depth. The same approach was used with Company X and the ideation environment created by the game was used to discuss specific daily problems of the organization, being applied to solve real problems of the company. The players presented problems of their daily lives and were eager to solve them, taking advantage of the situation to widely discuss the solutions proposed by colleagues and generate positive returns.

This finding led to a comparison between a creative process driven by a theme and delimited by a theme, where the difference lies in the constraints presented to the players' creativity. Although the ideation phase is present in the early stages of product development, design students did not perceive the game as part of this ideation process, but rather as an equivalent to a later stage of product development, analyzing ideas about the requirements, constraints and viability of the idealized product. All the experiments presented the same stimuli for participants to be creative but in the applications delimited by a theme participants brought up many technical aspects that inhibited players' free ideation, compromising the supportive environment ideal for idea generation.

According to Alencar's (2012) study, the greater the prior knowledge the easier it is to establish links between the generated ideas, which can result in aggregated ideas of greater value and adequate to the creative session's need. However, experts run the risk of being fixated on technical aspects, not effectively contributing to the generation of new ideas (Sternberg, 1996). This critical analysis is not in accordance with the atmosphere free of judgments and filters consistent with "brainstorming" and, therefore, tends to generate a lower number of results - although well directed.

In this way we identified two key issues for this study. The first is motivation has a direct impact on player's performance and experience as a whole, as identified in the studies of Collins & Amabile (1999); Lewis (1999); Alencar (2006); Hesmer *et al*. (2011); and Ohly (2018). The second is that the STORM game is more motivating when used for ideation and problem solving purposes. Thus we suggest detailed technical aspects should be left out at this stage so it does not inhibit participants' creativity.

Furthermore the experiments with three different groups demonstrated in practice Amabile's (1988) theory that people show greater creative potential when they are motivated primarily by internal factors such as satisfaction, pleasure in the task or challenge found in the action, rather than external motivations such as incentives or pressures. We noticed players' motivation had a direct impact on the overall experience of the game, both in terms of immersion and idea generation. An example is that idea generation happened more spontaneously in engineering students groups and more enthusiastic in Company X, which generated multiple ideas for the same problem.

Thus, we can observe the players' level of motivation delineates their engagement degree with the experience. High motivation results in high engagement and vice versa. In addition, we observed engagement in experience tends to result in a larger number of ideas generated, as observed in Table 1. Also it is important the ideation methods employed must be adequate to the organization's capacity and configuration in order to provide support and focus on creative knowledge (Leifer, O'Connor and Rice, 2001). In addition, for creativity to be rooted in organizational practices and not just in a particular individual (Walfisz, Zackariasson and Wilson, 2006) it would be ideal that the organization be configured in the process of knowledge management and idea generation and prepared to stimulate this type of initiative and environment.

8. Final Considerations

From the data and discussions presented here we have reached three conclusions. First, we accomplished the main objective to map the behavior and identify the attitudinal differences among the participants engaged in the STORM business game. The results obtained in the experiment (section 6) were grouped by area and further compared to reach conclusions (section 7).

Second, we showed the use of games to stimulate creativity is capable of achieving positive results, both for individual and group creativity. More than that, we visualized in the field the impact of motivation in the players' engagement with the experience and, therefore, in the generated results.

Third, we also identified that when used for idea generation the motivation and outcome of players engaging in the STORM game were positive for both engineering students and creative industry professionals. However, when used for product development the motivation of design students declined, although results remained positive.

This finding led us to hypothesize that technical restraints inhibit players' free ideation and association of ideas, compromising the supportive and free of judgment environment ideal for idea generation. Although this is true to this experiment, it needs to be further investigated in greater scale.

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