Creativity Techniques Using Online Facilities

Experimental Research on International Creativity Sessions via Internet

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Abstract

This paper considers the combination of creativity techniques and online technologies to conduct international creativity sessions. Using an action research approach, three combinations, namely the 6-3-5 Method and Wiki, Brainstorming and Chat Room, and Collective Notebook and Email, were implemented and thereafter assessed among different performance criteria. The paper shows that the performance of a creativity technique can significantly change when applied in an online setting.

Keywords: Creativity, Internet, Online, Action Research, Performance Measurement

1. Introduction

The continuous internationalisation of business (Gummesson, 2002) intensifies competition and drives rapid market changes (Siguaw et. al., 2003) thus requiring more flexibility and quick adaptation from businesses. While ideas for new products, services, processes and business models have been generated by individuals for a long time, the increasing innovation demand resulted in a focus shift from individual and in-house innovation to a more collective and open one (Chesbrough, 2006).Today, more and more organisations act no longer solely within their firm boundaries (internal innovation creation) but integrate an active search for and a commercialization of ideas outside the company, includinge.g. customers, suppliers and even competitors (Kuo-Ming Chu &Hui-Chun Chan, 2009).

While the need for open innovation has been widely accepted, the challenge of finding effective and efficient ways of exchange between the parties involved is still ongoing. As part of this, ideation processes and creativity techniques as the measures used to find and develop ideas (SDI Research, 2010) need to become more independent of time and place. Companies now have to use the profound collaborative possibilities of technology and, therefore, start to "recognize the power of the Internet as a platform for co-creating value with customers" (Sawhney et. al., 2005, p. 1).

With no time limits, there are various opportunities how the Internet can enable collaborative innovation. Online communities are commonly used to analyze customer satisfaction or to identify unanswered consumer needs. The creativity of networked consumers has been recognized as a high potential resource by businesses (Kozinets et. al., 2008). Ideas can also be generated online using existing creativity techniques. For example, the web offers multiple communication channels in virtual meeting rooms available for joint creative thinking. Web-based creativity techniques are seen as major/indispensable methods for innovation co-creation of the future decade. They facilitate easy and interactive availability from any point bridging time zones whilst also being cost and time effective. Hence, this expanded virtual application adapts perfectly to the highly competitive and fast changing economy. While knowledge on innovation and creativity has significantly increased over the last decades, research on online creativity techniques is still sparse. Hence, this paper aims to take a closer look at combinations of creativity techniques and online technologies. More precisely, the paper looks at the performance of these combinations and if the performance of a creativity technique might change when applied online as opposed to the original offline application.

2. Collective Innovation & Online Creativity

In the past, innovation was managed under new product development, including the five steps ideation, concept development, product design, product testing, and product introduction (Sawhney et al., 2005). Customers and consumers were rather regarded as passive recipients of innovation (Sawhney et al., 2005) whereas business now has moved from customer orientation to customer integration. Von Hippel (2005) recognized this process from closed information innovation (need and solution information) and called it "manufacturing-active paradigm". Regarding new product development the chance exists to use different tools at different stages of the innovation process to create synergies, i.e. have customer engagement more relevant for ideation and concept development in front-end stages (Sawhney et al., 2005). Hargadon and Bechky (2006) point out the importance of group work: Individuals are limited in their creative thinking due to the limited perspective. In order to ensure the market potential and effectiveness of the customer innovation collective creation is beneficial. The whole advance, also called open innovation signifies horizontal and vertical co-operation in order to create innovation (Chesbrough, 2003). Businesses integrate networks and apply internal and external ideas in order to progress technology (Laursen& Salter, 2006; Bröring& Herzog, 2008).

The Internet allows firms to engage customers in a more speedy, flexible and rich way. Many companies use ongoing customer dialogue to innovate and improve existing products. Special target for this purpose are online communities. As Kozinets and Hemetsberger (2002, p. 339) stat "the gathering of online communities (…) [and their innovations] are beginning to transform the world of marketing". According to Hagel and Armstrong (1997) the Web 2.0 exists for the sole reason of collective collaboration of online consumers supporting business development and innovation through the online leisure activities that may result in valuable information freely delivered to businesses.In the words of Kuo-Ming Chu and Hui-Chun Chan (2009) these community-based innovations created by customers serve a shared need. "They possess and exchange knowledge concerning specific product domains and often are virtual meeting places for innovative users to discuss opportunities for new products and ideas for product improvement" (Kuo-Ming Chu&Hui-Chun Chan, 2009, p. 497). Recognising this potential,many companies have adopted a strategy for collective innovation today (Kuo-Ming Chu&Hui-Chun Chan, 2009).

Another approach is the use of creativity techniques applied in collectives. Garfield et al. (2001) state that overall work in groups is more successful than individual work. While Kuo-Ming Chu and Hui-Chun Chan (2009) use online communities to generate innovations at times, Garfield et al. (2001) emphasize the importance of applying techniques to find problem-solving ideas. Groupware-based creativity techniques are, therefore, seen as one of the factors besides personal attributes and motivational factors that affect idea generation (Amabile et al., 1996) and support the success of businesses (Garfield et al, 2001). Up to date there has been little activity in the (research) field of online creativity techniques. One of the rather standardized systems are online brainstorming and mindmapping with i.e. brainR or bubbl.us being successful tools using the Internet as virtual space to generate ideas.Today's idea management software covers the whole innovation process starting with the identification of (changing) needs and trends (Shockley, 2006). Hence, software and web-based creativity techniques are required to support the target-oriented generation of ideas to respond to these changes and to complete the advance in idea management software in other stages.

3. Methodology

In order to test the performance of different combinations of creativity techniques and online technologies, an action research project was set up within a Master Course of International Management at Münster University of Applied Sciences in Germany. Action research refers to an approach in which the researcher will not only observe and analysethe case study participants' situation, but also participate in the research process in order to improve the situation (Greenwood & Levin, 1998). The scientific method of action research roots back to Science in Education movement in the late nineteenth century (McKernan, 1991). Through active participation this methodology is also referred to as being a collective and self-reflective system. Participatory action research empowers the participants, serves as joint cooperation through the interaction, can be seen as a social platform and also provides in-depth knowledge. These four main concepts can be regarded as the benefits of action research whose process can be divided into the steps of "planning, acting, observing and reflecting" (Zuber-Skerrit, 1991, page 2), also applied in the work of Altrichter et al. (2002).Overall, 21 master students took part in the study and were involved in the planning, implementation and result analysis of the action research conducted.

Each of the students (hereafter called researchers)already hold either a bachelor degree, a foreign master degree or a German diploma in business or economics. The professional background of the researchers varied significantly ranging from no experience at all to senior management experience. In addition, the industry sectors and cultural influences differed considerably. Overall, the research groupcan be considered as very diverse in terms of their fields of knowledge, experience and cultural influences.

4. Action Research

4.1 Phase 1: Planning

Before starting the actual action research, the research team reviewed the literature and identified existing creativity techniques which might potentially be used in an online environment as well as key online technologies which could be utilized to perform online creativity sessions. Among the wide range of creativity techniques and online technologies, the research team chose 14 creativity techniques and 8 online technologies to be taken further into account.

In the next step, a set of assessment criteria has been developed. Based on a literature review, but also and especially derived from the research team's professional experience, the following performance criteria were identified to evaluate the different combinations of creativity techniques and online technologies:

- Anonymity: the extent to which participants can stay anonymous;
- Ease of evaluation: the extent to which efforts are required to evaluate the generated ideas;
- Organisational costs / complexity: the extent to which organisational efforts are required to organise and conduct the online creativity session;
- Language dependency: the extent to which the success of the online creativity session depends on the language skills of the participants;
- Technical costs / complexity:the extent to which technical efforts are required to organise and conduct the online creativity session;
- User-friendliness (usability):the extent to which additional trainings are required;
- Cultural acceptance: the extent to which the online creativity technique is accepted in cross-cultural environments (especially with respect to time pressure).

Following this criteria development, a matrix combining the selected techniques and technologies had been developed and each combination had been evaluated by the research team with respect to its likelihood to provide valuable ideas. The evaluation was primarily done intuitively (with the above mentioned criteria in mind) with more detailed discussions only taking place when the research team's opinions differed significantly. The following list outlines the six highest rated combinations.

- 6-3-5 Method / Wiki
- 6-3-5 Method / Workflow Management System
- Brainstorming / Chat Room
- Collective Notebook / Email
- Visual Synectics / Voice-over-IP Software
- Provocation technique by de Bone / Voice-over-IP Software

Following this pre-evaluation, the project team evaluated the importance of the criteria by means of the cross preference matrix, where basically each criterion was compared with all others. Criteria which were more important than others were assigned the value 3, criteria with the same importance were assigned the value 2, and criteria which were less important were assigned the value 1. The sum of all grades gained by each criterion (represented by the percentage of the total sum) reflected its weighting factor (e.g. anonymity: 0.17 or ease of evaluation: 0.08).

Using the above mentioned criteria and their weightings, the six "best fit" combinations from the pre-evaluation have been evaluated in detail. The following list shows the three highest rated combinations which were then implemented.

- 6-3-5 Method / Wiki
- Brainstorming / Chat Room
- Collective Notebook / Email

4.2 Phase 2: Implementation

Having finished the planning phase, the research team was split into three groups of 7 persons to implement the three combinations of creativity techniques and online technologies. The by far least complex and least time-consuming implementation was found in the combination of Collective Notebook and Email. The group leader just had to collect the Email addresses of the group members and send one Email to them outlining the topic to work on as well as the time frame. It was agreed that the members should first send all their initial ideas in one Email with new ideas arising afterwards being immediately (as soon as an Email client was available) send to the group leader. The group leader was then responsible for structuring and evaluating the ideas submitted. The implementation of a Brainstorming session using an online Chat Room had also been found to be straightforward and quick. The group decided to test this combination without a group leader / moderator in place simulating a situation in which a company organizes a brainstorming sessions without active participation, but with a later analysis of the chat protocol taking place.

The by far most complex and most time-consuming implementation was the 6-3-5 Method in combination with a Wiki, since a suitable software package had to be found first before it could be configured and tested. Since the standard configuration of the chosen software package (MediaWiki)was not optimal for its usage as a platform for conducting a 6-3-5 Method, changes had to be done (e.g. the file upload function was disabled in the standard configuration but was expected to be useful if a participant would like to use visual images or other documents to give more detailed information on the idea). After finishing the software set up, the group leader wrote one article explaining the session's topic. Due to the fact that it is hard to verify if participants exceed their time limit, the time factor was not considered as much as in the classic 6-3-5 Method. To simplify the organizational complexity, the next round of generating three new ideas started every ten minutes and every user was able to see and refine every idea (in the classic method you can only take a look at ideas on the paper you get in a round). After the session the group leader reviewed the ideas.

4.3 Phase 3: Results

This paragraph presents the assessment results of the implemented online creativity techniques. The assessments are based on discussions of each group following the techniques successful implementation. Each group stated that the quality and quantity of the generated ideas were very satisfiable. While this is an important prerequisite of the assessment, it was not further detailed in the project. Rather, the assessments separately presented hereafter focused on the prior mentioned performance criteria.

4.3.1 Brainstorming / Chat Room

Anonymity

The action research showed that participants can be identified much easier than expected. Especially the style of writing meaning the way in which participants express their ideas allows identification. In view of the dynamic creativity technique in which participants should express their ideas in the moment they got it, it is not possible to simulate another style of writing to reduce the likelihood of being identified. Obviously, the likelihood of getting identified would be significantly reduced in larger online brain storming sessions.

Ease of evaluation

Since all participants stated their ideas and improved and commented other ideas in an unstructured way, the ideas hadfirst to be separated from each other before the actual evaluation took place. According to this, the evaluation was found to be complex and time-consuming.

Organisational costs / complexity

The organizational costs and complexity of organizing and conducting a brainstorming session in an online chat room was considered as rather low since only the meeting time and topic as well as the chat room to be used needed to be agreed upon.

Language dependency

Considering the speed of action in a brainstorming session and the opportunity to write quickly within a chat room, the study found that all chatters should be fluent in the language used to quickly express their ideas and comment on and improve the ideas of others.

Technical costs / complexity

Due to the large amount of free and password-protectable chat rooms available as well as the fact that no specific client software was required to access these chat rooms, the technical costs and complexity wereseen as rather low. However, the costs and complexity might rise considerably if a password-protected Chat Room or one that is installed on a firm's own server is required.

User-friendliness

Brain storming sessions in chat rooms were found to be rather user-friendly due to the simple structure of a chatroom (simple input field plus reading area) and the simple instructions of the creativity technique.

Cultural acceptance

Performing a brainstorming session in a Chat Room enables and requires the immediate input of the participants. Since some cultures, such as the Japanese, rather prefer to think about and/or discuss an issue before presenting it to a group, the cultural acceptance of this combination was regarded as rather low.

4.3.2 6-3-5 Method / Wiki

Anonymity

Applying the 6-3-5 Method applied in a Wiki the research team found that it was hard to identify the participants, since no Email addresses, user names or similar have to be saved. Since the 6-3-5 Method as applied in the Wiki did not focus on putting the participants under time pressure (as usual in the original method), idea owners were able to take some time to think about how to express their idea so that it was hard to recognize the submitter. According to this, the anonymity was assessed as rather high.

Ease of evaluation

TheWiki was found to be a good system for applying the 6-3-5 Method since idea improvements – one of the key focuses of the method – are done in the same Wiki article. Participants just wrote additional text to an idea they wanted to improve or they created a new version of the Wiki article. Articles could even be linked to each other. Hence, the ideas were easy to evaluate since ideas related to each other were stated in the same Wiki article. However, it has to be stated that not all participants were able to keep track of all articles in the system (due to the unclear article structure), so that they added new articles even if the same or similar idea was already added to the Wiki. Hence, the group leader still das to structure the ideas and search for doubles.

Organisational costs / complexity

The organisational costs and complexity of the 6-3-5 Wiki session as applied in this research project were medium. On one hand, only the meeting time and topic as well as the Wiki website address had to be agreed upon. On the other hand, it was hard for the group leader to start and end each round since no direct connection to the participants was possible (each participant had to keep track on the time by their own).

Language dependency

With a speed of action being significantly lower than in aBrainstorming Chat room, the language dependency was found to be lower as well. However, participants also had just 10 minutes to express their idea – still putting them under pressure to do it well.

Technical costs / complexity

As opposed to Chat Rooms, Wikis are not publicly available to be used for a specific time frame. Hence, organizations need to set up their own Wiki. The set-up of the Wiki software was not found to be that difficult, whereby it has to be noted that a researcher with an IT background conducted this task. Rather than the initial installation of the system, the optimal configuration was found to be difficult to find.

User-friendliness

The 6-3-5 Method applied in a Wiki was found to be rather user-unfriendly. The system does neither provide a good structure to submit new ideas nor a good overview of the ideas already submitted. Hence, the optimal storage of ideas requires knowledge of the system to facilitate an easy and quick idea evaluation.

Cultural acceptance

The Wiki integrating the 6-3-5 method did not show major problems which might arise due to cultural preferences. While the system still puts the participants under time pressure, this was not felt as a problem for the participants.

4.3.3 Collective Notebook / E-mail

Anonymity
The combination of Collective Notebook technique with Email performed very poorly with respect to the anonymity criteria because of the easy identification of a participant through the Email address he/she used to submit the idea. While there is still the possibility to give each participant an anonymous Email address, this would have a negative effect on the organisational and technical costs and complexity.

Ease of evaluation
The evaluation of the ideas was found to be rather easy because the group leader was able to organize incoming Email in folders in the Email client software used. Ideas around one theme were collected in the same folder allowing a quick evaluation after the end of the submission phase.

Organisational costs / complexity
The organisational efforts to perform the Collective Notebook technique via Email were found to be very low since the group leader only had to collect the participant's Email addresses and send them the time period and topic. Since the method requires dedication over a period of time, the organizer might have to send reminders in order to keep the participants involved. This task has not been performed in this research project, however, it has to be noted that it would increase the organizational efforts.

Language dependency
With no direct communication between the participants as well as no timepressure for the idea evaluator, the language dependence was seen as low. While the submission of ideas in foreign languages might increase the complexity of structuring the ideas in the first place and evaluating them afterwards, this has not been seen as a significant problem by the research group.

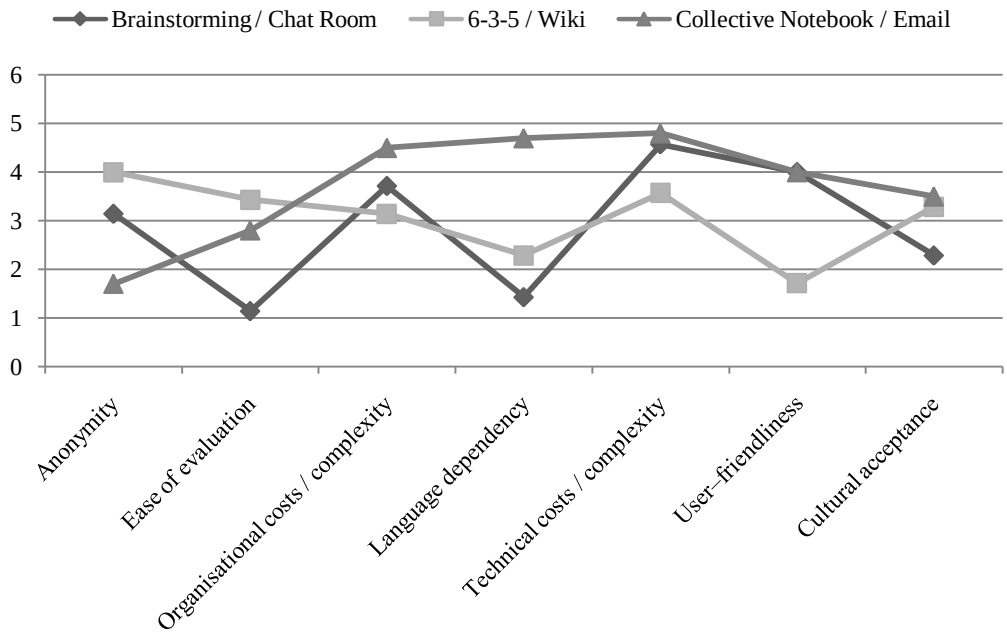
Technical costs / complexity
The technical costs and complexity were be considered as very low because sending and receivingEmails is a common and widely accepted form of communication in today's business environment.

User-friendliness
While the usage of email clients can be considered as widely known and user-friendly, the access needed was found to be troublesome when performing the creativity technique. Lacking an Internet connection just in the moment when the idea was generated, the idea had to be written down to submit it further when an Internet connection was available. While this is a rather annoying procedure, the research group perceived the method in general as rather user-friendly.

Cultural acceptance
The cultural acceptance was seen as rather high since the method applied is independent of time, not putting any pressure on the participants. However, it has to be noted that the participants might feel the need of Internet access to submit the idea nerving. This might not be a problem in the most connected countries around the world, such as South Korea, Hong Kong or Singapore, but in less connected ones such as many developing countries.

4.3.4 Comparison
Figure 1 shows the quantitative assessment results of the three combinations graphically (appendix 1 provides a table with the actual assessment values). The quantitative assessments were also gathered during the group discussions following the implementation phase.

Figure 1: Comparison chart



5. Conclusion

This experimental research looked at the applicability of combinations of creativity techniques and online techniques to foster international creativity sessions.Starting with a wide range of possible combinations, the project identified three promising ones. Implementing these, the research showed that all were not only feasible to implement but also provided valuable results for the given task of developing ideas for a university alumni network

A key result of the research is that the performance of a creativity techniquemight change significantly when combining it with an online technology. For example, the original, paper-based 6-3-5 Method does not provide any anonymity and can be considered as user-friendly (due to the clear structure of the paper). However, applied in a wiki, the ability to stay anonymous is given whilst the performance in terms of usability is significantly reduced due to the unclear structure and navigation of the Wiki system.Hence, online technologies do not only allow to internationalize creativity sessions, but might also be used to purposely change some performance criteria making the creativity technique more applicable to a specific local environment (e.g. firms in which employees value anonymity). While this can be considered as an advantage, it has also to be noted that an online application of a creativity technique might also have negative impact on a performance criteria (e.g. through dependences of criteria). Hence, an online application of a technique should always be evaluated prior to an implementation / investment.

While this research provides interesting insights into online creativity sessions, it also outlines various areas for future research. First, further combinations of creativity techniques and online technologies might be researched in order to give a better overview of possibilities to be used in practice. Especially Web 2.0 technologies, such as social network, data sharing portals or micro blogging tools, might be taken into account. In addition, further communication channels, such as SMS (Short Message Service), could be integrated. For example, a combination of SMS and Email could be imaginable to address the problem of connectivity in the shown Collective Notepad example. Second, further studies might compare the original application of a creativity technique with an application in an online setting to further determine the performance changes of a technique when applied online. Lastly, further investigations are required with respect to the question how online creativity techniques perform on a large scale. While our research gave insight into a small group setting, it is not clear how the performance would change in significantly larger groups.

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Appendix 1:Quantitative Assessment Results

	Brainstorming / Chat Room	6-3-5 / Wiki	Collective Notebook / Email
Anonymity	3,1	4,0	1,7
Easeofevaluation	1,1	3,4	2,8
Organisational costs / complexity	3,7	3,1	4,5
Language dependency	1,4	2,3	4,7
Technical costs / complexity	4,6	3,6	4,8
User–friendliness	4,0	1,7	4,0
Cultural acceptance	2,3	3,3	3,5