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CREATIVITY IN FACE-TO-FACE AND COMPUTER-MEDIATED BRAINSTORMING

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Abstract

The present paper focuses on the most popular form of group creativity, brainstorming. Both advantages and shortcomings of the method were examined. There are a number of factors which determine to a considerable degree the effectiveness of brainstorming. Novelty and variability of ideas exchanged, as well as the size of a brainstorming group are the most important ones. Analysis of scientific literature on this topic showed that inhibiting effects which often take place within a brainstorming session are small in dyads, but increase rapidly with group size. Face-to-face communication among members of a brainstorming group also plays an essential role in their creative performances. This role is rather controversial: face-to-face communication may either stimulate or impede individual creative activity. There are various modifications in traditional brainstorming based on mediated communication among individuals. Brainwriting and electronic brainstorming are the most popular. These methods have some advantages over traditional face-to-face brainstorming, such as a higher degree of anonymity, opportunities to contribute ideas simultaneously without waiting to articulate them, and a lower risk of the dominance of one or a few individuals. New methods of group idea generation, comprising advantages of various forms of brainstorming, tend to occur.

Keywords: creativity, brainstorming, electronic brainstorming, cognitive stimulation.

Group creativity

There are many theories and models of creativity. They focus on various aspects of this concept, such as physiological, cognitive, motivational, and social. Some of models pay attention to factors that stimulate individual creative performance. Nowadays various techniques and methods of creativity stimulation exist. Many of them consider the exchange of ideas, taking place within group creative activity, as a powerful means to enhance individual creativity. Research on group creativity concentrates on the analysis of the characteristics of a group (e.g. structure, diversity, size, cohesiveness, cooperation, autonomy, etc.) (Cooper & Jayatilaka, 2006) and a task (e.g. structure, time pressure, complexity, conditions, etc.).

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One of the most popular formats for creative activity is brainstorming, as it provides an individual with an opportunity to exchange his/her ideas with others and to become familiar with others' creative results.

Traditional brainstorming

Osborn (1957), the founder of this concept, regarded it as a method of group problem solving and idea generation which could considerably increase both quality and quantity of ideas generated. If creativity is seen as an ability to think in divergent ways, a group may be a source that provides individuals with opportunities to bring together their experiences, knowledge, and opinions. Hence, a brainstorming group can produce unique conceptual combinations.

Within a brainstorming session, members of a group can exchange ideas with each other. Various characteristics of this exchange determine to a considerable degree the effectiveness of this method. It was shown that "...cognitive facilitation' takes places when one brainstormer's idea serves to activate related ideas in the mind of his or her listeners" (Coskun, Paulus, Brown, & Sherwood, 2000, p. 310). Characteristics of ideas exchanged can be regarded as one of the most important factors of this facilitation.

Novelty of ideas exchanged. A number of studies investigated how the exposure of common/original ideas produced cognitive stimulation of creativity. The results of these studies are quite controversial. The study conducted by Connolly et al. (1993) showed that neither rare nor common stimuli affected the quantity of ideas produced by participants. They found no differences in the amount of produced ideas among groups whose members had been exposed to common and rare ideas, and the control group with no stimulation. Contrary to this, Leggett Dugosh and Paulus in their study (2005) revealed a strong positive effect of common ideas on idea generation. They explained it by the higher "memorability" of common ideas closely related to their accessibility. They also stated that common ideas are better exemplars of a particular category than uncommon ideas because they are more similar to each other; and they are more valid, as well (Stasser & Birchmeier, 2003). Leggett Dugosh and Paulus indicated that results of their study were inconsistent with a simple matching perspective supposing the generation of more uncommon ideas after exposure to uncommon ideas; and, vice versa, the production of more common ideas after the exposure of common stimuli.

Variability of categories. The essential factor in the effectiveness of group brainstorming is the variety of categories considered. Retrieval of information from long-term memory, taking place under the influence of exposed stimuli, leads to production of ideas that are semantically related to presented stimuli. Hence, the higher the semantic diversity of the exposed stimuli, the more intensive cognitive stimulation may be produced by these stimuli. Nijstad, Stroebe, and Lodewijkx (2002) showed in their experiment that under condition of exposure to stimulus ideas from a wide range of semantic categories, subjects generated more diverse ideas then they did so under condition of presentation of ideas from

one category. Similar results were obtained in Baruah's and Paulus's study (2011) borne out the importance of diversity of stimulus ideas as a factor of cognitive stimulation. They showed that groups of participants who had focused on a small set of categories produced more ideas and explored more categories than those whose members assigned to one category only. Kohn, Paulus, and Korde (2011) found that presentation of unrelated stimuli led to the increase of originality of participants' creative performances. In this context, the number of categories can play an essential role in the originality of ideas generated. It was shown in the study of Rietzschel, Nijstad, and Stroebe (2007) that concentration on a limited number of categories could lead to deeper exploration inside of them and, consequently, to generation more novel ideas. At the same time, that may be not the case for the great number of categories considered.

Shortcomings of traditional brainstorming

Brainstorming is the most popular method of group creative activity. However there are numerous shortcomings to the method. Among them are evaluation apprehension, free riding, production blocking, and matching (Diehl & Stroebe, 1991). One more disadvantage of brainstorming inherent in almost all kinds of group creative activity is that group members concentrate mainly on ordinary ideas and perspectives in their discussion. In this case unique ideas could be underestimated.

Numerous studies showed that brainstorming is not as effective as it was previously thought to be (Brown & Paulus, 2002; Craig & Kelly, 1999; DeRosa, Smith, & Hantula, 2007; Litchfield, 2009; Nijstad et al., 2002). Despite effects of inspiration and mutual emotional stimulation, creative performance in nominal groups (in which participants work alone) could be higher than in face-to-face brainstorming groups (Diehl & Stroebe, 1987; Lamm & Trommsdorf, 1973; Mullen, Johnson, & Salas, 1991).

The size of a brainstorming group appears to be also an important factor in productivity. Numerous studies on this topic showed that larger groups with 10 and more individuals are not as effective in brainstorming as smaller groups. At the same time, there is a slight discrepancy in the results of these studies. Aiken, Vanjani, and Paolillo (1996) showed that the optimal size of a group to perform verbal brainstorming is 6 or less individuals. Godwin and Restle (1974) revealed that in a larger group an output is bigger, but it is more difficult for participants in these groups to reach final decisions on the issue discussed. It was also shown that there is no improvement in group performance if the group size increased from 5 to 9 individuals (Bouchard & Hare, 1970). Numerous studies on this topic stated that inhibiting effects which often take place in brainstorming session are small in pairs, but increase rapidly with group size (e.g. Nijstad, Stroebe, & Lodewijkx, 1999; Coskun et al., 2000).

The role of mediation in brainstorming

Face-to-face communication among individuals within a brainstorming session is an essential factor to its productivity.

Compensatory adaptation theory (CAT) maintains that human brains are more effective in face-to-face communication (Kock, 2007). Communicating in this way, brainstormers get an opportunity to comprehend the meaning of others' ideas within the holistic conditions, comprising emotional and cognitive dimensions.

To the contrary, Thatcher and Brown (2010) assumed that the mediated communication can produce a positive effect on creativity. They hypothesized that the more mediated communications individuals are engaged in, the higher the level of creativity they have in comparison with those who are involved mostly in face-to-face communication. But results of this study revealed that the mediated communication only indirectly affected creativity.

So, within the particular conditions, mediated communication can also be regarded as a factor which enhances individual creativity. Some modifications of traditional brainstorming based on mediated communications among individuals have appeared, such as brainwriting and electronic brainstorming.

Modifications of traditional brainstorming

Brainwriting

Within a brainwriting session, individuals communicate with each other in a salient written way. This method has some advantages when compared with traditional brainstorming. These are as follows (Benedek, Fink, & Neubauer, 2006):

- participants can work simultaneously (they don't need to wait to articulate their ideas);
- ideas can be easily recorded;
- individuals are provided with more anonymity;
- there is no risk of dominance of one or a few participants;
- the risk of conflicts is lower than in face-to-face brainstorming (Heslin, 2009).

Inasmuch as computers have been playing an increasingly crucial role in human activity, making communication easier between people, the new modification of brainstorming combining the advantages of traditional brainstorming and brainwriting has appeared, electronic brainstorming.

Electronic brainstorming

Within an electronic brainstorming session, members of a group can exchange ideas with each other using various computer-based technologies, such as e-mail, chat, social networks, group support systems, based technically on local networks or the Internet (Dennis, Minas, & Bhagwatwar, 2013; Gallupe et al., 1992). Similar to brainwriting, electronic brainstorming is free of many drawbacks inherent in traditional brainstorming. Members of electronic brainstorming groups can communicate in parallel ways, they are free from apprehension effects. Kerr and Murthy (2009) in their study examined the role of computer-mediated communication in the performing of tasks involving both divergent and convergent processes. Results of the study showed that individuals who were members of computer-mediated teams produced more ideas working with the divergent components of the tasks; while individuals communicating with each other in the face-to-face

format outperformed their counterparts while working with the convergent components of the tasks.

Contrary to traditional brainstorming, decision quality is higher in large computer-mediated groups, and these groups generated more alternatives than smaller ones (Hwang & Guynes, 1994). It was shown that large electronic brainstorming groups are more effective in generating ideas than nominal groups, whereas small nominal groups outperform electronic brainstorming groups (DeRosa et al., 2007). Various personality factors determine individual performance within an electronic brainstorming session, such as domain knowledge, personality type, cognitive ability, and creative skill (Dennis et al., 2013; Paulus & Yang, 2000).

Numerous studies comparing the efficiency of traditional and electronic brainstorming methods obtained controversial results. On the one hand, electronic brainstorming looks more effective because of numerous factors, including those mentioned above (Connolly, Jessup, & Valacich, 1990; Valacich, Dennis, & Connolly, 1994). On the other hand, face-to-face brainstorming groups support emotional contacts, nonverbal communication, there being no necessity for their members to type new ideas, etc.

There are some other forms of group creative activity involving computer-mediated communication among individuals. One of these forms is VTASIs (Virtual Teams with Anonymity and Structured Interactions) (Chang, 2011). These teams provide individuals with anonymity, a possibility to communicate with each other via electronic means, to apply a set of streamlined ideas, and to participate in structured interactions facilitated by an experienced team leader.

Conclusion

In fact, brainstorming has been the most popular method of group creativity so far. There are some essential factors to stimulate idea generation within a brainstorming session. Various combinations of these factors can be regarded as an additional source of the increase in a group creative performance. At the same time, brainstorming possesses some negative characteristics which may inhibit the process of idea generation. To compensate for these shortcomings in the initial method, various modifications of traditional brainstorming have appeared, such as brainwriting and electronic brainstorming. Further research on more effective methods of idea generation with elements of brainstorming and other forms of either individual or group creative activity can be a challenging mission.

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Креативность в классическом и компьютерно-опосредованном мозговом штурме

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Резюме

В статье анализируются преимущества и недостатки одной из наиболее популярных форм групповой творческой деятельности – мозгового штурма. Его эффективность детерминируется целым рядом факторов, наиболее важными из которых являются размер группы, а также оригинальность и вариабельность идей, которыми обмениваются ее участники. Анализ научной литературы свидетельствует о том, что негативные факторы, снижающие эффективность мозгового штурма, практически не проявляются в диадах, но их влияние заметно усиливается по мере увеличения размера группы. «Живое» взаимодействие между участниками мозгового штурма также играет важную роль в его успешности. Но эта роль во многом противоречива: в одних случаях такое взаимодействие стимулирует, а в других — угнетает креативность отдельных членов группы. Существует целый ряд модификаций классического мозгового штурма, основанных на опосредованном взаимодействии между его участниками. Наиболее популярными среди них являются «письменный мозговой штурм» (brainwriting) и «электронный мозговой штурм» (EBS — electronic brainstorming). Эти методы обладают рядом преимуществ по сравнению с классическим мозговым штурмом, среди которых более высокий уровень анонимности; возможность записать возникшие идеи без задержки сразу после их появления без необходимости ждать момента, когда закончит озвучивать свои идеи другой участник группы; низкий риск доминирования одного или нескольких участников группы. В самом ближайшем будущем могут появиться новые формы мозгового штурма, объединяющие преимущества его проанализированных выше модификаций.

Ключевые слова: креативность, мозговой штурм, электронный мозговой штурм, когнитивная стимуляция.