

Brainstorming

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Abstract Creativity can be taught. Creative thoughts are often the fruits of extensive efforts. Several techniques are available to nurture those kinds of thoughts, especially in the decision making process. Some techniques focus on group interactions and others focus on individual actions. Many decisions are not made by individual managers but by groups of individuals. It is more appropriate for non-programmed decisions because these decisions are complex and no single individual has all the knowledge and skills necessary to make the best decisions. Groups can make decisions using a wide variety of techniques. Brainstorming is a group creativity technique by which a group tries to find a solution for a specific problem by gathering a list of ideas spontaneously contributed by its members. This paper divulges the prominence of brainstorming in the wake of group decision making in complex, comprehensive, competitive and corporate environment.

Keywords Creative Thoughts, Free-Wheeling, Group Technique, Idea Generation, Problem Solving

1. Introduction

The origin of brainstorming came from Alex Faickney Osborn, who has been called "the father of brainstorming", in 1939 as a method for creative problem solving. He was frustrated by employees' inability to develop creative ideas individually for ad campaigns. In response, he began hosting group-thinking sessions and discovered a significant improvement in the quality and quantity of ideas produced by employees. After organizing his discovery, Osborn then published *Applied Imagination* in 1953 in which he systematized his creative problem-solving methods. This book popularized the term brainstorming and received significant response in the industry[1].

Emily[2] pronounced that several popular and useful techniques can stimulate individual and group creativity. Among them brainstorming is one approach. Brainstorming is a group technique, in which any and all ideas are recorded, in a nonjudgmental setting, for later critique and selection[3],[4]. It permits people to interact in a free and uninhibited atmosphere[5]. It is most often used in the idea-generation phase of decision making and is intended to solve problems that are new to the organization. In brainstorming, the group convenes specifically to generate alternatives. A number of alternatives have been generated[6]. Each alternative is recorded in full view of all members, usually on a flip chart. To avoid self-censoring, no attempts to evaluate the ideas are allowed. Group members are encouraged to offer any ideas that occur to them, even those that seem too risky or

impossible to implement. In a subsequent session, the alternatives are evaluated[7].

2. Group Decision Making Technique

In brainstorming, teams of 5 to 10 members meet to generate ideas, usually following strict guidelines. The purpose behind the brainstorming session is to have as many ideas generated as possible and no idea is criticized no matter how absurd it sounds. Any truly mad suggestions can be eliminated at the evaluation stage[8]. This encourages free-wheeling, and one idea sometimes generates another[9].

Brainstorming works best when it is organized and well managed. At the Aloft Group Inc., a small advertising firm in Newburyport, Mass., for example, President Matt Bowen teaches employees how to properly brainstorm as a way to foster creative thinking[10]. His approach to brainstorming is: specify the goal – ideally in a sentence and distribute it a day or two ahead of the session; limit the brainstorming session to an hour; keep the group's small ideally 5-7 members; allow no criticisms there is no such thing as a "bad" idea; encourage everyone to build on one another's ideas; and, be sure to follow-up by implementing something from the brainstorming session[11].

3. Principles and General Rules

Osborn claimed that two principles contribute to "ideative efficacy". They are: 1. Defer judgment, and 2. Reach for quantity. These principles were followed by four general rules of brainstorming. The rules were established with intention to reduce social inhibitions among group members, stimulate idea generation, and increase overall creativity of the group.

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3.1. Focus on Quantity

This rule is a means of enhancing divergent production, aiming to facilitate problem solving through the maxim *quantity breeds quality*. The assumption is that the greater the number of ideas generated, the greater the chance of producing a radical and effective solution.

3.2. Withhold Criticism

In brainstorming, criticism of ideas generated should be put 'on hold'. Instead, participants should focus on extending or adding to ideas, reserving criticism for a later 'critical stage' of the process. By suspending judgment, participants will feel free to generate unusual ideas.

3.3. Welcome Unusual Ideas

To get a good and long list of ideas, unusual ideas are welcomed. They can be generated by looking from new perspectives and suspending assumptions. These new ways of thinking may provide better solutions.

3.4. Combine and Improve Ideas

Good ideas may be combined to form a single better good idea, as suggested by the slogan "1+1=3". It is believed to stimulate the building of ideas by a process of association.

4. Brainstorming in Functional Management

Brainstorming is a passionate technique for all functional areas of management to resolve critical problems. Group ideas of different departments are certainly yardsticks for better improvement in production quality and quantity. Brainstorming makes easy the task of new product development as well as modifications for existing product. The new paths of meeting sales targets are examined through line executive brainstorming sessions. Customer complaints are patronized properly in scheduled functional level brainstorming sessions so that customer retention would be kept at best. It is not uncommon that when things become worse emergency like situations crop up and leads beyond control. Brainstorming provides alternative solutions to resolve emergency like situations which arouse out of internal and/or external environmental factors. As if the maxim says that two brains are better than one brain for thoughts, groups generate diverse ideas for a specific problem and expedite alternative choices for decision making. As a whole, brainstorming is a powerful technique to make success of critical projects assigned at different levels of management.

5. Incentives and Brainstorming

Olivier Toubia's research gave strong indications that incentives can augment creative processes. Participants were divided into three conditions. In Condition I, a flat fee was

paid to all participants. In the Condition II, participants were awarded points for every unique idea of their own, and subjects were paid for the points that they earned. In Condition III, subjects were paid based on the impact that their idea had on the group. This was measured by counting the number of group ideas derived from the specific subject's ideas. Condition III outperformed Condition II, and Condition II outperformed Condition I at a statistically significant level for most measures. The results demonstrated that participants were willing to work far longer to achieve unique results in the expectation of compensation.

6. Criticism

Research from Michael Diehl and Wolfgang Stroebe[12] demonstrated that, given equal time, "real" groups, those that brainstormed together, produced fewer ideas than "nominal" groups, those wherein individuals provided ideas independently of one another and only existed as a group in so far as their work was considered as a whole by researchers. Their conclusions were based on a review of 22 other studies, 18 of which corroborated their findings. Further, brainstorming process is very time-consuming and it is quite possible that none of the ideas generated would be optimum[13].

7. Sources of Brainstorming Inadequacy

Diehl and Stroebe identified three processes that derailed brainstorming efforts. These processes were free riding, evaluation apprehension, and blocking. Other processes, such as the social matching effect and the illusion of group productivity, can also undermine brainstorming efforts.

7.1. Free Riding

Individuals may feel that their ideas are less valuable when combined with the ideas of the group at large.

7.2. Evaluation Apprehension

Evaluation Apprehension was determined to occur only in instances of personal evaluation. If the assumption of collective assessment were in place, real-time judgment of ideas, ostensibly an induction of evaluation apprehension, failed to induce significant variance.

7.3. Blocking

Blocking describes the reality that only one person may gainfully voice his or her ideas in a group at any given time.

7.4. Social Matching Effect

The social matching effect is the tendency for individuals in a group to match the level of productivity by others in the group. When one group members feel that they are contributing more to the brainstorming process than others, they express a tendency to reduce their contributions to the group's lower standards, as over-contribution is more

effortful than under-contribution[14].

7.5. Illusion of Group Productivity

Members of groups often overestimate their productivity, a tendency known as the illusion of group productivity. Members of groups working on collective tasks are likely to feel that their group is more productive than most. Further, individual members overestimate their own contributions to the group. In one research study, members who were asked to generate ideas in a brainstorming session were asked to estimate how many ideas they personally provided. Group members claimed to present 36% of the ideas on average, when they actually only contributed about 25% of the ideas[15].

8. Variations in Brainstorming

8.1. Nominal Group Technique

The nominal group technique is a type of brainstorming that encourages all participants to have an equal say in the process. Participants are asked to write their ideas anonymously. Then the moderator collects the ideas and the group votes on each idea. The vote can be as simple as a show of hands in favor of a given idea. This process is called distillation. After distillation, the top ranked ideas may be sent back to the group or to subgroups for further brainstorming. Under proper conditions, brainstorming groups can outperform nominal groups.

8.2. Group Passing Technique

Each person in a circular group writes down one idea, and then passes the piece of paper to the next person, who adds some thoughts. This continues until everybody gets his or her original piece of paper back. By this time, it is likely that the group will have extensively elaborated on each idea. The group may also create an "Idea Book" and post a distribution list or routing slip to the front of the book. On the first page is a description of the problem. The first person to receive the book lists his or her ideas and then routes the book to the next person on the distribution list. The second person can log new ideas or add to the ideas of the previous person. This continues until the distribution list is exhausted. A follow-up "read out" meeting is then held to discuss the ideas logged in the book. This technique takes longer, but it allows individuals time to think deeply about the problem.

8.3. Team Idea Mapping Method

This method of brainstorming works by the method of association. It may improve collaboration and increase the quantity of ideas, and is designed so that all attendees participate and no ideas are rejected. The process begins with a well-defined topic. Each participant brainstorms individually, then all the ideas are merged into one large idea map. During this consolidation phase, participants may discover a common understanding of the issues as they share the

meanings behind their ideas. During this sharing, new ideas may arise by the association, and they are added to the map as well. Once all the ideas are captured, the group can prioritize and/or take action.

8.4. Electronic Brainstorming

It is a computerized version of the manual brainstorming technique typically supported by an Electronic Meeting System (EMS) but simpler forms can also be done via email and may be browser based, or use peer-to-peer software. With an EMS, participants share a list of ideas over a network. Ideas are entered independently. Contributions become immediately visible to all and are typically anonymized to encourage openness and reduce personal prejudice. Modern EMS also support synchronous brainstorming sessions over extended periods of time as well as typical follow-up activities in the creative-problem-solving process such as categorization of ideas, elimination of duplicates, assessment and discussion of prioritized or controversial ideas. Proponents such as Gallupe[16] argue that electronic brainstorming eliminates many of the problems of standard brainstorming, including production blocking and evaluation apprehension. A perceived advantage of this format is that all ideas can be archived electronically in their original form, and then retrieved later for further thought and discussion. Computerized brainstorming on computer network systems is proving worthwhile now that sophisticated groupware is available[17].

8.5. Directed Brainstorming

Directed brainstorming is a variation of electronic brainstorming. It can be done manually or with computers. It works when the solution space is known prior to the session. Each participant is given one sheet of paper (or electronic form) and told the brainstorming question. They are asked to produce one response and stop, and then all of the papers (or forms) are randomly swapped among the participants. The participants are asked to look at the idea they received and to create a new idea that improves on that idea based on the initial criteria. The forms are then swapped again and respondents are asked to improve upon the ideas, and the process is repeated for three or more rounds. In the laboratory, directed brainstorming has been found to almost triple the productivity of groups over electronic brainstorming[18].

8.6. Guided Brainstorming

A guided brainstorming session is time set aside to brainstorm either individually or as a collective group about a particular subject under the constraints of perspective and time. This type of brainstorming removes all cause for conflict and constrains conversations whilst stimulating critical and creative thinking in an all engaging, balanced environment. Innovative ideas consistently emerge. Participants are asked to adopt different mindsets for pre-defined period of time whilst contributing their ideas to a central

mind map drawn by a pre-appointed scribe. Having examined a multi-perspective point of view participant seemingly sees the simple solutions that collectively create greater growth. Action is assigned individually.

8.7. Individual Brainstorming

It is the use of brainstorming in solitary. It typically includes such techniques as free writing, free speaking, word association, and drawing a mind map. It is a visual note taking technique in which people diagram their thoughts. It is useful method in creative writing and shown as superior to traditional group brainstorming[19].

8.8. Question Brainstorming

This process involves brainstorming the questions rather than trying to come up with immediate answers and short term solutions. Theoretically, this technique should not inhibit participation as there is no need to provide solutions. The answers to the questions form the framework for constructing future action plans. Once the list of questions is set, it may be necessary to prioritize them to reach to the best solution in an orderly way[20].

9. Research Enthusiasm

Brainstorming has become a popular group technique and has aroused attention in academia. Multiple studies have been conducted to test Osborn's postulation that brainstorming is more effective than individuals working alone in generating ideas. Some researchers have concluded that the statement is false (brainstorming is not effective); while others uncovered flaws in the research and determined that the results are inconclusive. Additional research, however, showed that in some situations the group approach may work well[21]. This may be the case when the information is distributed among various people or when a poorer group decision is more acceptable than a better individual decision which, for example, may be opposed by those who have to implement it[22]. Furthermore, researchers have made modifications or proposed variations of brainstorming in an attempt to improve the productivity of brainstorming. However, there is no empirical evidence to indicate that any variation is more effective than the original technique.

10. Conclusions

Brainstorming is a popular method of group interaction in both educational and business settings. Even though there have been arguments about its productivity, brainstorming is still a widely used method for developing creative solutions. It's an area that is under research and improvements or variations are still developing. Many of these methods claim to be more efficient than the original brainstorming. However, there are too many factors that can alter the outcome of brainstorming. Nonetheless, brainstorming can be of great

utility when the group accounts for, and works to minimize, the group processes that decrease its effectiveness.

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