The effectiveness of the brainstorming strategy in achieving creativity in business organizations"

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"Theorical approach "

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Abstract:

The aim of this research paper is to identify the effectiveness of the brainstorming strategy in achieving creativity in business organizations. It is divided into five sections, in which the historical development of the brainstorming strategy is exposed in the first section, its definition and its benefits in the second section, the third section has been allocated to the study of the brainstorming principles and for the fourth section and the fifth section they have been addressed to all the brainstorming stages and its effectiveness.

Keywords: Brainstorming, innovation, creativity, innovative thinking, business organizations   .

ملخص :

تهدف هذه الورقة البحثية إلى معرفة فعالية استراتيجية العصف الذهني في تحقيق الابتكار في منظمات الأعمال.

تم تقسيم المقال إلى خمسة أقسام، حيث تم التعرض للتطور التاريخي لإستراتيجية العصف الذهني في القسم الأول و تعريفها وفوائدها في القسم الثاني منها، أما القسم الثالث فقد خصص لدراسة مبادئ العصف الذهني و بالنسبة للقسم الرابع و الخامس فقد تم التطرق من خلالهما إلى كل من مراحل العصف الذهني و فعاليته.

الكلمات المفتاحية : العصف الذهني، الإبتكار، الإبداع، التفكير الإبتكاري، منظمات الأعمال.

Introduction

The fast progress perceived in business organizations nowadays was only perceptible through the use of one's potentials, renewed capacities and creative ideas. In developed countries, organizations revealed a serious attention and an integral support to the new ideas, they encouraged and embraced their innovation and change, however, those in developing countries are in dire need to emphasize the importance of creative ideas and creativity of their personnel, as well as the need to find appropriate climate which encourages the creative capacity of workers, managers and decision owners.

Creativity is considered to be the mental capacity observed on the individual and the community and can be developed and boosted according to the capacities and abilities of both individuals and groups.

Multiple studies carried out in the field of creative thinking confirmed an important fact; that the human mind is still not fully invested. Developed societies realized that fact and started working in the investment of the human capacity of creative thinking individually and collectively. They also confirmed that the ability to creative thinking is common among all people and that the difference between them lies in the degree or the level of this ability.

From the prevalence of this ability of creative thinking among all people and the difference in the degree or the level of this ability, organizations become more concerned with the development of creative thinking of their employees trough the adoption of some strategies which contribute to the development of these capabilities, including the brainstorming strategy which is both a training and an educational method aiming to help individuals to search for innovative solutions to administrative problems in various fields.

On the basis of the above, we can put forward the following problem: What is the extent of the effectiveness of the brainstorming strategy in achieving innovation in business organizations?

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We will try during this research paper to answer the above question through broaching the following elements: The historical development of the brainstorming strategy, the definition of brainstorming and its benefits, the principles of brainstorming, the stages of brainstorming and the efficiency of brainstorming in business organizations and in developing creative thinking.

1. The historical evolution of the brainstorming strategy:

Alex OSBORNE (1888_1966) is the legitimate father of the brainstorming technique. He discovered it by 1938 as a reaction of his dissatisfaction with the prevailing traditional conference method which is held by a number of experts who intervene in the sequence or rotation providing the opportunity for discussion at the end of the meeting. This method proved its deficiency to find solutions to many difficult or complex abstract problems[1].

Osborn derived this new method from a previous Hindu way known as (Prai Barshana).The word (Prai) means outside yourself or outside the scope of thinking; (Barshana) implies the question, namely, the elaboration of many questions outside the self to generate many ideas. The use of this method was restricted to the religious field only[2].

Osborn revealed first edition book in 1953"The Applied Imagination" his brainstorming technique which is suitable for application in most aspects of life including administrative and industrial processes, specifically in all the areas that need to stir thinking among the individuals and the groups alike. This method aimed also at producing a list of ideas that will be straightened later, as well as the preparation of the creative capacities and their release, so, it is the process of individual and collective thinking put in to extract and produce, as much as possible, the greatest amount of ideas to a given problem in lack of obstacles[3].

In 1954, Osborne set up the "Creative Education Foundation" where he started to use this method (the brainstorming) systematically in the training of individuals and groups to resolve problems. In 1955, he established the first "Creative Problem-Solving Institution" in the city of "Buffalo" in New York where the Creative Education Foundation was settled[4].

It has to be noted that "Osborn" was not a psychologist, but an operator in advertising and Publicizing businesses. He was the manager of an advertising agency in the United States of America called (BBDO) Batten, Barton, Durstine& Osborn, and one of the pioneers who used advertising as a means for the use of innovative techniques in solving publicity and advertising problems, and therefore did not care about wording the theoretical ideologies he established on his own way, then came after him another researcher (Sidney.J.PARNES 1922-2013) who made further adjustments and development relying on the members of the creative education foundation and trying to put those theoretical principles. It had been issued for PARNES in 1963 an article entitled " Do you understand what is really brainstorming" where he redundantly mentioned that theory of the brainstorming method[5].

Other psychologists concerned by developing creativity continued their studies on the development of the brainstorming method on the basic principles established by "OSBORN" then "PARNES" and his colleagues, therefore, this method has been used as an innovative way for solving problems in different fields; the most important of which are: The Administrative growth of the staff, the decision making in the industrial and the commercial activities, the engineering and the administrative professions, the economic, the social, the political, the legal affairs, and the publicizing and advertising businesses[6].

The rapid development of the Information Technologies and Communications field has directly contributed to the expansion of the brainstorming method to what has been called "The Electronic Brainstorming", for this latter is simply a set of computer programs that link personal computers or small mobile computers with a main station run by what is known as "the Facilitator", the participants in the brainstorming meeting sit before their personal computers that

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are either inside a hall or a room or dispersed in auditoriums or diverse rooms, or perhaps in different continents of the world[7].

Throughout brainstorming which is electronically done, all the proposals that may come to any participant's mind are inserted with no debating. When everybody has finally put his proposal anonymously, this stage comes to an end and then starts the process of analyzing the proposals, gathering them and choosing the most appropriate alternative by vote, therefore the decision-making process is made as soon as possible with all the participants'consultancy[8].

2- Definition of brainstorming and its benefits:

2.1-Definition of Brainstorming:

Arab researchers converted the English term "Brainstorming" and the French term "Remue-méninges) into several synonyms: Brain bombardment, brainstorming, reflection,brain seeding, the flow of ideas, the generation of ideas ... ,but we will adopt the one of "brainstorming" because the brain storms the problem, examines it and filters it in order to reach the appropriate creative solution to the problem[9].

There are many definitions which dealt with the subject of the brainstorming, among which:

Osborn's definition 1938: "It is a mental activity whereby the thought heads to make concepts or new appropriate ideas to face intractable problems or problems that seemed to be so at least"[10].

Gordon's definition1971: "That it is the adoption of the interchange in stimulating ideas between the members of a small group"[11].

It is defined in Yahya Mohammad Nabhan's book "Brainstorming and solving problems" as the generation and the production of creative ideas and views by individuals and groups in order to solve a specific problem, these ideas and views are good and useful. Namely, to put the mind in an incentive and readiness state to think in all the directions in order to generate, in such a free and open environment, a large number of ideas about the problem or the subject in question[12].

As for Dr.Affan Youssef Kotaite, it is defined in his book "Solving problems creatively" as the method used in the study of a specific problem or subject whereby a group of individuals meet in order to come up with ingenious solutions through debate and proposals of alternatives, and the main objective would be to reach the most possible number of ideas rather than discussing and criticizing the views[13].

Some authors consider brainstorming as an educational and training method based on the freedom of thinking and used for generating the largest amount of ideas to cope with a specific topic, among those open to discussion, by whom it might concern or interest during a short session[14].

Other researchers perceive it as an application used and designed for creativity training over brain stimulation or ideas flood and divergence; it helps one benefit from and built on ideas raised by others[15].

The researcher achieved one theoretical definition among the aforementioned, that brainstorming is an educational and training method which encourages a group of individuals under the control of a supervisor to generate freely and spontaneously as many divergent and innovative ideas as possible, in an open and uncritical climate which does not restrict ideas generation to a specific problem solving.

We can conclude that there are similar aspects between the above definitions of brainstorming, as follows[16]:

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- They adopt freedom in expressing the ideas that come in the individual's mind whatever their diversity and their importance to the exposed problem.
- They boost the spirit of innovation by relying on one another ideas.
- They help groups gather the ideas and adjust them in order to reach the original thought
- All the ideas result from a given problem to which it is necessary to find the appropriate solutions
- Brainstorming does not mean finding solutions to all the problems, but it is rather used with problems that require innovative solutions.

2.2 Benefits of Brainstorming:

Many researchers state that the brainstorming technique has many benefits and an obvious impact on developing creative thinking to problem solving among the individuals, for the following reasons [17]:

A. Brainstorming is an intuitive process: the deferred judgment in the brainstorming technique provides a creative climate, because there is no criticism or interference, therefore, it produces a free climate to intuitive thinking.

B. The brainstorming method is a simple process: the absence of any kind of criticism, evaluation or special rules helps in simple working and free thinking.

C. The brainstorming method is a fun process: Everyone takes part in the group discussion or in the collective problem solving; the inspiration here is to share opinions or mix between strange ideas and structure them.

D. The brainstorming method is a remedial process: Each member in the group discussion has to speak freely and nobody should impose his opinion, his idea or his problem's solution.

E. The brainstorming method is a training process: It is an important technique to stir imagination, flexibility and training on creative thinking.

3 - The principles of brainstorming:

OSBORNE and then PARNES maintained that in order to reach new original (creative) solutions to the exposed problems during brainstorming meetings, two principles have to be followed: defer the judgment of evaluating ideas and quantity produces quality. These two principles are to be addressed in details hereafter:

3.1. Withhold criticism of ideas evaluation:

Both OSBORNE and PARNES insisted on the importance of deferring the judgment of evaluating the ideas produced by the group members during a brainstorming session for the sake of a spontaneous generation and construction of ideas, because if the individual feels his ideas might be criticized since they emerge, he will no longer produce any others. Also, putting off the judgment helps to expound the structures of the generated idea through a free and uncritical discussion that builds on this idea or a part of it, or that just ignore it if it has insignificant value, this is therefore what contributes to provide much more diverse ideas, so, thoughts and ideas that can at first seem a bit crazy can be crafted into originals and creative problem solutions, especially if they are used by others as a key to further thoughts and problem solutions as well[18].

The ingenious idea is really a one-off, i.e. it endorses all the features as those of a newborn; it is weak, incoherent and its bases are weak too, so obviously a first violent and critical confrontation will led to its decrease before its increase[19].

To comfort this principle, PARNES arranged a class and asked the students to think up the most possible solutions to specific problems and to evaluate them as long as they were

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performing, then in a later step, to focus on generating unusual ideas reserving criticism for a later "critical stage" of the process. The results of the study revealed that in the first case, the learners produced an average of (2.5) good original ideas, whereas in the second case (postponement of judgment), the average was (3.4) good unusual ideas.

Another study was conducted by "PARLOFF and HANDLON" in 1964, in which they exposed some problems to a couple of female students in order to solve them. The solution background was divided into two types: the first one was characterized by a strict and high degree of criticism, while the second by a slight and low degree of criticism.

The topic discussions and the ensued solutions were recorded, and then it was asked from each couple students to present their achieved solutions in a written form after analyzing and evaluating them.

After classifying the issued solutions, it was recognized that the group who worked in low critical circumstances produced a greater number of ideas, either in terms of absolute value or quality value.

The group who worked in hard critical conditions came up with less problem solutions than the one who worked in low critical conditions.

PARLOFF and HANDLON then concluded that the brainstorming method produces more good ideas because it allows the individual leave to others the power of criticizing his own ideas[20].

3.2. Quantity produces quality:

The researchers in this area are interested by the quantity of ideas generated during brainstorming meetings, believing that quantity leads to ideas diversity and consequently to its ingenuity and novelty. This matter provides to the participants in these meetings wider perspectives and a productive environment for generating new and original ideas which by the end will lead to produce more specific, efficient and definite ideas, and this cannot be reached through restricted ideas[21].

This is where lies the role of fluent ideas multiplicity which plays an important role in most human thoughts, particularly innovative thinking, for fluency of visual forms coheres with creativity in fine arts, fluency of audio forms coheres with creativity in the musical field, fluency of symbols in its linguistic side coheres with inspiration in poetry, story and mainly the study of linguistics richness. In its sportive side; it coheres with creativity in mathematics, as for fluency in meanings and ideas coheres closely with scientific and literary innovation, also, fluency has a close relationship with some professions and business affairs such as: marketing, advertising and publicizing, discourse and teaching, instructive and administrative jobs[22].

Osborn suggested four principal rules ensuing from the former two principles that should be followed during a brainstorming session, and these rules are:

A- The necessity to avoid criticism (excluding any kind of judgment or criticism or evaluation):

OSBORNE and PARNES claimed that any kind of judgment, criticism or evaluation should be avoided during brainstorming meetings[23]. The responsible for the application of this rule is the chairman who warns any member as soon as he violates the rule. This violation concerns any person's criticism of another person's idea or any attempt to evaluate this idea, and sometimes, this violation may come from the person himself, i.e. the one who generates the idea, when after expressing his thought he would somehow try to criticize it or to apologize about it, or even ask to withdraw it from the other ideas or solutions proposed to be recorded during the session[24].

B- The release of freedom of thinking and welcome of all ideas:

The objective of this rule is to assist the individual or (the groups) to be more relaxed and less reserved, and thus more efficient in using his capabilities in imagining and generating ideas under fully free conditions from criticism and evaluation apprehension[25].

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C- Quantity of ideas is required:

This rule maintains the second rule of brainstorming; it means that the greater the number of ideas generated by the group members, the most likely is to achieve greater original or specific ideas of creative problem solutions. In this regard, "Sayed Khair allah" claimed that on many scientific occasions, fluency is the bank of innovation[26].

D. Building on and developing others' ideas:

This rule is used to enhance stimulation among the participants within the brainstorming meeting in order to add to the others' ideas and to come up with all that can improve, develop or refine those ideas so as to form with the previously generated ideas during the session new solutions or any other form of addendum and development (ideas development)[27].

Generally, we can say that the basic objective of the previous rules is to remove embarrassment and apprehension from the souls of the participants in the brainstorming meetings and eliminate the sensitivity of criticism or evaluation, as when the person will legally use the others' ideas, he will then be freed from the fear of being accused of ideas robbery.

The ultimate objective of the brainstorming sessions is to achieve innovative (new) solution to the problem raised, regardless of who resolved it or came up with the right original idea, for the final issue will be attributed with all its particulars to all the group members.

4-Stages of brainstorming:

There are several stages to be followed during the problem solution process in a brainstorming session: The statement of the problem, the restatement of the problem, the generation of ideas that reflect the problem solution and evaluation of the ideas that have been reached and, finally, the preparation of the ideas implementation.

We are to present here after a brief explanation of these stages:

4.1 The stage of problem statement:

The leader at the brainstorming session (the Facilitator) states the problem and explains its dimensions to the participants. He should do some preliminary work to assemble data about the exposed problem to present to the participants through audio, visual or written media, besides discussing briefly that problem to make sure all the participants have assimilated it[28].

Some participants may be overly familiar about the topic details while others may have simple idea about it, and thus the leader of the meeting must give the minimum information about the subject to the participants, because giving further details may significantly restrict the participants 'thinking capacities and bound them in restricted and narrow fields[29].

4.2. The stage of problem recapitulation (restate):

In this stage, the restatement of the problem is done in many different ways and its recapitulation must begin with these questions: How can...?

The restatement of the problem may itself present acceptable solutions with no need to conduct further brainstorming processes, also, the initiation of all rephrased expressions with those words (How can...?) ensures the exclusion of solutions in that stage, and thus the problem is subject to more study and examination from different aspects and sides[30].

It is not required from the participants in this stage to propose solutions to the problem but to rephrase it through asking questions on the subject, and these questions should be written on a flipchart so that to be seen by everyone[31].

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4.3. The brainstorming to one or more restated problem expressions

This is the main part of the brainstorming session in which a flow of free ideas is stimulated in accordance with the criterion of "quantity without quality", and in order to urge an absolute free atmosphere, the following aspects should be taken into account[32]:

A. Holding a short refreshing session (warm up session).

B. The fourth brainstorming rules should be captured for all the participants to see trough out the session, and the responsible at the meeting has to focus on them, especially if any criticism is noticed from the participants to their own ideas or to the others.

C. Many funny and unfamiliar ideas could be encountered, but they should be faced by welcoming and encouraging, and an opportunity should be offered to the participants to laugh with the person who proposed the funny idea but with quite abstention from any derision or mockery.

D. Record and display by the recorder of all the ideas (proposed solutions to the problem) so that all the participants could see them.

E. When the process of generating ideas ends, the facilitator closes the session and claims a moment for silent assimilation and requires no more ideas soon after, but he rather allows the participants to reread the ideas recorded or displayed before them, then after that starts again his session.

It has been noticed that after the period of assimilation, ideas start to flow freely once again and right away about 20 to 30 more ideas are added to the list of solutions.

Regardless of that moment of silent assimilation, the leader of the session has a number of factors that excites the flow of ideas, including:

- The leader could also share his ideas with the participants.

- He could focus on an idea that was previously stated or proposed, and restates it for example by the expression "In how many ways can we execute this idea?"

- The facilitator at the brainstorming meeting must be prepared to determine the work process of the session, and in particular the task of addressing those persons who criticize the ideas and do not restrain their judgments.

- In some stages of a brainstorming session, participants may feel somehow frustrated, and this should be warmly received as a usual feeling during the phase preceding the generation of ideas that represent a variety of solutions to the problem raised at a brainstorming session.

4.4. Evaluation of the achieved ideas:

Most of the brainstorming sessions lead to the generation of a large number of ideas to the problem raised, and these ideas can be categorized as [33]:
- Useful and applicable ideas
- Quirky and unusual ideas.
- Useful ideas but irrelevant or in need of further research.

There are two evaluation methods: Evaluation by the small team, and evaluation by all the participants.

A-Evaluation by the small team:

The ideas that have been generated during a brainstorming meeting can be evaluated by a small team composed of: The leader of the meeting as well as two or three participants at the session to be chosen in the light of the leader's view or according to the participants approval.

This evaluation is done in the light of several steps:

- Making an examination or a quick review of the lists of ideas (solutions) which were subject to evaluation in order to ensure there was no omission of any of the ideas produced in the meeting.

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- Put criteria for selecting ideas, and there are some general criteria for the quality of these ideas (Solutions) such as: Originality, authenticity, modernity, coherence of solution, cost, degree of acceptance and implementation schedule.

- Exclusion of any idea which does no cohere with any of the previous criteria.

- Classification of the remaining ideas into small groups, and each of them include a number of associated ideas so that to deal with them easily. There is an example which illustrates this step: in one of the brainstorming session that was allocated to find ways to encourage customers to visit the shops and purchase more goods, the classification of ideas in the groups was as follows: The customers, the staff, the class of goods to sale, the planning of the shop, the facilities provided by the shop, the promotional activities, and of course in every group, there was a number of ideas which belong one to another.

The best ideas were gathered in each of the previous groups and the earlier criteria were to be applied once again until reaching the best ideas.

B- Evaluation by all the participants:

The method of evaluation by all the participants exhausts extended time; also it may engender sharp debate if one of the members tries to defend his favorite idea. Generally, there is a compromise solution to this problem which is the contribution of all the participants, but by providing each of them with a printed list of ideas, and every participant is asked to choose 10% of the ideas which he considered to be the best solutions, and then they are given to the leader of the meeting.

Therefore, the ideas that were selected by most of or all the participants are the top ones, and in this case, the appropriate statistical methods can be used in order to reach this result (classification of the top ideas).

It should be noted that both previous methods can be used to reach the best ideas, and this by conducting a combination between the best ideas reached through the first method with the ones reached through the second way, and in the light of agreement of both ways, the ideas which are considered to be the best problem solutions are released and notified to the participants[34].

4.5. The preparation of ideas for application:

The evaluation of idea and the selection of the best ones as being the most effective solutions is not the end of the problem solving process through brainstorming, because after reaching the best idea, there will remain the challenge of their possible acceptance and execution within the institution where the problem lies, for the process of executing the idea may incorporate the necessity to make further changes, and from that point we should go back to search for thoughts in order to develop the execution plans of the idea. It is also necessary to think about the possible results as well as the obstacles that may emerge or occur during the application and execution of that idea, and there is no doubt that all of those considerations will lead to the achievement of a successful action plan[35].

5. The effectiveness of the brainstorming strategy:

The effectiveness of the brainstorming method can be highlighted through two levels: The organization level and the innovative thinking level.

5.1. Effectiveness of the brainstorming strategy in the business organizations:

The studies carried out in the field of brainstorming proved the efficiency of this way to reach new and innovative solutions in the area of production, and there is a study (KERWIN.R 1983) which confirmed the usefulness of the brainstorming method in the area of the administrative growth of the staff, decision-making in the industrial business activities and means of communication, and the study of (PAUL HARC, A 1982) which demonstrated the usefulness of this method in solving economic, social, political and legal problems, as for the

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area of propaganda, advertising and marketing, there were the results of (Osborn) studies in 1953.

(RAWLINSON - 1981) presented some results examples of the brainstorming meetings in the area of industrial or either productivity companies, as follow[36]:

A- A shoe industry company wanted to enquire for new raw materials to its future manufacture of shoes (new models), so it held a brainstorming session which lasted three hours, and the members who took part in this meeting came up with a huge amount of ideas counting 400 ideas of which one was considered as odd, but at the end it proved to be a new innovative solution. This idea consisted in the use of the eyes black iris provided from the animals' slaughterhouses as a raw material for making shoes, thus the result was the conception of a shoe from a reflective material which is self-cleaning.

B. Another company used brainstorming to discuss its long-term plan activities and its work during the ten coming years, so during the brainstorming session, it reached 400 ideas in relation with its future activities, however, they were confronted to the problem of reducing the cost of these activities, so the participants were divided into two groups and each group held a brainstorming session which lasted by coming up of 900 ideas, of which 16 were good ideas and really represented new solutions for reducing the cost.

C - A computers company was making a specific computer system so that it could agree with the customers conditions and specifications, for one of the problems experienced by this company was the variation of the specifications given irregularly by the customer making it reaffirm the hardware programs so that to fit these changes, so it instituted a brainstorming meeting to solve that problem, in which 139 ideas were generated in 45 minutes, and the number was reduced to 23 ideas after being sifted for studying and possible implementation.

D- A food company wanted its announcements to reach the housewives in an interesting and attractive way so that to make them like its products within its specific advertising budget limits, so, it made a brainstorming session during which 200 original ideas were generated and which contributed to attract the customers toward the food company products.

E-A design company too held a brainstorming session aiming at searching on the issue of cost reduction while maintaining the quality, with the participation of 12 artists.

At the end of the meeting, they recognized the importance of involving members out of artists and from different areas; however, they came up with 200 ideas of which 16 ones were derived in order to be studied and implemented.

Relying on the aforementioned samples of brainstorming meetings, it becomes obvious that these meetings were important to achieve problem solutions in the arena of productive enterprises, and despite the emergence of some strange ideas during these meetings; this had not constituted an obstacle, but rather released the atmosphere of the meeting besides leading occasionally to achieve new problem solutions. Also, these meetings provided an analytical idea to the responsibles and administrative officials on various aspects of the raised problem within the institutions where they work.

5.2. The effectiveness of the brainstorming strategy in developing the innovative thinking:

We commonly use brainstorming as a method of collective thinking, especially in the field of the innovative thinking development as many studies had proved, and we are to address some of these studies briefly, here after:

A- The study of "TAYLOR 1985":

"TAYLOR" held a study targeted to identify the methods of problem solving through brainstorming, so he chose as a sample for his research 96 students from Yale University. The sample was divided into two groups: empirical and hypothetical comprising 48 subjects, then, one of the groups was divided into 12 groups and each one consisted of 4 students involved in the problem solving process by means of the brainstorming technique; this group was called "the

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real group", while the other group members of 48 students were asked to carry on their thoughts about the problem intermittently, and this group was named "the nominal group".

The researcher then concluded that the average number of ideas provided by the real group was more than the ones produced by the nominal group, and that their ideas were more diversified and also more abundant [37].

B-The study of "Parnes and Meadow 1959":

Both S.J. PARNES and A.MEADOW studies targeted to learn about the effects of brainstorming on creative problem solving by the university students.
The study sample consisted of 52 subjects, and the results of the survey revealed that the individuals produced more good ideas under brainstorming instructions[38].

C-The study of "Parloff and Handlon 1964":

Both PARLOFF and HANDLON studies targeted to know about the possibility of using brainstorming in the process of problem solving, so, they presented a series of problems to resolve to a pair of females.

Two distinctive solutions were achieved then; the first one was characterized by a high criticism degree, whereas the second by a low criticism degree.
The research discussions and the achieved solutions were recorded, and then it was asked from each couple female to present its solutions in a written form after being evaluated and criticized. After having classified the provided solutions, it was evident that the group that had worked in low critical conditions produced more good ideas than the other group[39].

C- The study of "Zine el abidine Darwish (1978)":

It is one of the first Arab studies about the topic. It was conducted on the first secondary school pupils with the intention to develop their innovative capacities through a training program that included a set of activities, amongst which brainstorming was the most significant. The researcher realized that there was an effective impact on the pupils as they carried out different training experiments which improved their innovative capacities performance, and there was also an impact of training on the existing divergence between the individuals, and another one on the intellectual conformance specific to innovative capabilities targeted to be stimulated[40].

E-The study of "Abdu Nour and Shimon 1994":

The Researchers Abdu Nour and Shimon made a study under the title of "the effectiveness of the brainstorming principles on the quantity and quality of ideas produced by the eminent students in the city of Baghdad» targeted to reveal the impact of the brainstorming rules on the quantity and quality of ideas produced by the eminent students compared with their followers who did not use them.

The sample study consisted of 79 distinguished students (males and females), who were divided randomly into two groups, empirical and hypothetical, and the most important results of the study were:

That the principles of the brainstorming method stimulated the groups who used them which thus contributed to increase the quantity and the quality of the produced ideas compared to the groups who did not use those principals, besides the preeminence of the male students over the female students in both the quantity and quality of ideas either in the empirical or hypothetical groups[41].

Conclusion:

We conclude from this paper that the brainstorming strategy in regard to the studies conducted in this field, proved its effectiveness in developing creative thinking in many business organizations and also among individuals and groups.

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It should be also noticed that the great use of brainstorming is not sufficient in itself to achieve innovative ideas, but it is rather a means to encourage innovative thinking which is in its turn one of the innovative system basics. Therefore, to use brainstorming successfully depends to a large extent on the availability, the integration and the interaction of the elements of this system, which are: The creative person, the creative process or the mental processes which are correlated to ideas generation, the creative atmosphere, the stimulating means of innovation including the brainstorming method and innovative product.

We are to present here after a set of recommendations which are associated to the use of the brainstorming strategy in business organizations:

1- A good choice of the individuals who participate in the brainstorming meetings

2- In order to develop the creative capabilities of the selected individuals, they should be trained on what follows:

- How to apply the brainstorming principals besides providing them with scientific materials and models of discharged outputs of some successful training or realistic sessions
- How to generate ideas or the stages of the creative process.

3- The administration of organization should provide the appropriate innovative climate which is characterized by the following:

- Adoption and support of unusual ideas until their implementation.
- Encourage individuals to think up by providing the appropriate physical and moral incentives.

4-With regard to brainstorming as a means to encourage innovation, it is recommended to be applied in its fully integrated form which consists of:

- Arrangement of the meeting: the participants are notified about the date and the place of the meeting and provided with some scientific matters or any data or information that could help them understand the nature of the problem to be solved.
- Arrangement of a warmth session where the work is done on one or some imaginary problems to prepare the participants morally and mentally to the intellectual release and the use of creative imagination.
- Holding of the actual meeting: Where the work is to be done on the real problem to be solved.
- Supervision of the participants: the day after holding the actual meetings, the participants are gathered in order to collect the ideas that might continue to come up into their minds after the end of these meetings.
- Evaluation of the ideas: Where all the ideas generated by the participants throughout the full problem solving process are compiled and evaluated, and after a cautious evaluation, there would be the identification of the genuine ideas which deserve to be implemented, thus the factors of the innovative system in the business Organization are accomplished.

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