

INNOVATION IN COMPANIES MAY BE INCREASED BY MANAGERS' CREATIVITY TRAINING

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ABSTRACT

The introduction to the text provides outputs of research of scholars who have dealt with similar problems. Research described in this text deals with evaluation of effectiveness of managers' training and with methodology which would guarantee a considerable improvement in the quality of a manager's work and work of his/her team. Further, work conditions in companies are evaluated, this being investigated by means of an interview and a questionnaire. It has been proved that training procedures make sense, that effectiveness enables all the components of creative activity to improve, however integration procedure developing not only divergent thinking but also convergent thinking has to be followed and not only quantity but also quality developed, attitudes also have to be changed and motivation strengthened. The company has to create atmosphere and conditions which support creativity. The most effective positive influence proved to be via support from a working group and by providing sources, further by increased rate of autonomy, and pressure, which however can be both of positive and negative nature. Rather a negative influence was shown in organisational obstructions and shortcomings, in conservatism, inflexibility and bureaucratism. At the end some recommendations are given, together with suggestions about how to train managers' creativity, considering the differences in scope of work and conditions under which the work is carried out.

Key words: Creativity, Innovation, Divergent Thinking, Convergent Thinking, Heuristic, Unstructured thinking

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1 INTRODUCTION

Creativity is a potential which must be developed as a source of further development. It is a source natural to all people, a source that has a motivational effect. (However, life itself is thanks to creativity not easier, it is the other way round.) Creativity may be developed. Constant education is required. This also applies to entrepreneurs and managers leading companies through open competition. It is necessary to remove barriers and establish opportunities for creative thinking, reduce habitual stereotypes, release space for searching and find further alternatives.

Creativity is our great potential and must be perceived as natural, true to each human being at a specific level and style (Isaksen, 1987). Creativity belongs among the most important personality characteristics of a successful entrepreneur, businessman and manager (Altink, Born, 1993). In history, various myths were made about creativity.

- 1) There was, myth that creativity is magical. When people begin to explore creativity, its magical power will disappear.
- 2) Creativity is a gift from God, something extraordinary.
- 3) To be creative also means to be, to a certain extent, mentally ill.
- 4) Creativity is the domain of men not women.
- 5) Creativity is a sudden brainwave which happens by accident.

At present, especially at higher education institutions dealing with managers' training, tuition is oriented on "skillful" training which is of a more instrumental nature. It is more complex training where knowledge integration and skill integration from a broad spectrum of fields is considered (interdisciplinary integration).

There are many well-known authors abroad who have devoted themselves to creativity and innovation in conditions of productive as well as unproductive organizations (Torrance, Amabile, McKinnon, Gardner, Treffinger, Parnes, Besemer, Geschka, Gilad, Fry, Whiting, Kirton, Runco, DeBono, Kim, Csikszentmihalyi, Basadur, Guilford, Osborn, Parnes, Isaksen, Dorval and Treffinger, Sternberg, Gardner, Giselín, etc.). In the Czech Republic there are mentioned such names as J. Hlavsa, J. Viewegh, K. Riegel, V. Smékal, M. Svoboda, in Slovakia M. Jurčová, E. Szobiová, Zelina, Zelinová and others. Caudron is for support of courses for companies which want to increase creative potential of their employees. It is

nothing new that creativity is very significant to work (Caudron, 1998). But companies come to realize that creativity has a financial value as well. The aim of Clapham's study was to compare the effectiveness of complex creative training with the training programme of practical creative thinking and how both these methods reveal in creative activity increase. The results showed that activation of creative methods appeared as effective in quite a number of creativity parameters. Only in some parts were the results unprobative. The objective of the study was to compare the effectiveness of the creativity complex training with development of ideational creativity in rise of creativity performance (Clapham, 1997). Ekvall and Ryhammar (1999) researched the influence of environment on the creativity level in comparison with the effect of personality features. The results showed that environment parameters have greater influence than personal abilities. Lapierre and Giroux (2003) specified six basic dimensions of work environment, which influence company's creative potential and innovation. This includes work atmosphere, vertical cooperation, autonomy, honour and respect, long-term organizational plan, and extended cooperation. The most important predictor of creativity from the environment is the work atmosphere. Organizational factors, working climate and motivation were addressed also by Baker, Sweeney and Winkovski (1967). Only a few studies dealt with the ways of how (approaches not only skills) are changing. Many studies focused their attention on brainstorming, but brainstorming is not a universal method. Some authors consider the evaluation to be more significant. Other authors put the emphasis mainly on the problem realization, i.e. implementation. Any preference for some part of the whole process is always detrimental rather than beneficial. Basadur, Graen, Green (1982) examined the effectiveness of managers creativity training on the quantity and quality of creativity skills and on product quality. Amabile (1988) paid attention in her research to the influence of environment. Dong Jung (2001) tested the impact of leadership style on creativity. McGuire describes heuristic studies (McGuire, 1997). M. Pollick and V. Kumar checked creative styles with 93 top managers (Pollick, Kumar, 1997). Similar researches were provided by J. Culvenor and D. Else (Culvenor, Else, 1997), and I. Nuetten (Nuetten, 1992). Strong motivation and non-conformism are distinct requirements for creativity (Barron, 1993). Csikszentmihalyi speaks about the so-called pleasure of creation (ref?). Creativity does not mean only divergent thinking how Guilford states (ref?). Convergent thinking has its place in the creative process as well. The creative process has a specific oscillatory form. In this form, phases of production of a number of various forms of solutions to problem situations interchange with

phases of focusing on some of the phases and searching the way of usage, detailing, elaboration and verification. Employees' creativity training has a number of unanswered questions and faces criticism. For example Dunnette and Campbell (1968) criticise school and laboratory forms of training because they do not provide any proofs of effectiveness in such forms of training. Criticism also did not leave out the fact that problem searching and solving referred to only fictitious situations, which were neutral and inapplicable in practice. As a matter of fact, there are only few studies in literature that relate to problems of the real world of work, and there are only a few studies which evaluate changes in behavior in the work environment.

2 METHODOLOGY AND WAY OF REALIZATION

The research was carried out with managers in terms of management skills training which had 20 hours dedicated to creative skills and leadership. In addition, managers completed another twenty hours regarding communication skills. A total of 48 persons from organizations which showed interest in the managers' training were placed into the research survey. Participants have been working as business managers, sales representatives and dealers. All attendants have such type of position where they can apply creative activities. All 48 participants were randomly divided into three groups, thus each group consisted of 16 members. Two groups were monitored as experimental groups and the other group as a control group. Solution results were viewed by independent reviewers in accordance with S. Besemer's assessment key (CPSS) (ref?).

Many tasks to be solved established the participants themselves as samples of practical problems in their company. Training attendants were initiated into the way of how the whole system of creative solving of a problem situation takes place. Further, they solved various problem situations individually and compared them with the others in order to realize the distinction of other effective procedures in a group.

The final interview with all attendants took place at the end of the training. They went through a psychological Keys method and a questionnaire as well. Two personal approaches, preference for active divergence and preference for avoiding premature convergence were measured in terms of a fourteen-point scale of ideation-evaluation (Basadur, Finkbeiner, 1985).

3 HYPOTHESES

Hypotheses were created upon expected results which will emerge from our experiment data.

Hypothesis 1: During the training the performance in problem generating will improve.

Hypothesis 2: During the training the performance in problem solving will improve.

Hypothesis 3: During the managers training the ideation will improve, which will be demonstrated by improvement in performance after the training, in comparison with the performance before the training.

Hypothesis 4: During the managers training the ideation will improve in the third phase of the creative process, i.e. in solution implementation.

Hypothesis 5: Tendency to avoid premature convergence will lead to preference for active divergence, to improvement of ideation skills - quantity as well as quality, and also to the improvement of the evaluation quality.

Hypothesis 6: Improvement in personal attitude towards preference for active divergence will lead to increasing of the quantity of ideas.

Hypothesis 7: Increasing of quantity of ideation skills will lead to improvement of its quality and also to improvement of evaluation skills.

Hypothesis 8: Improvement of quality of ideation will lead to improvement of quality of evaluation.

4 HYPOTHESIS TESTING – DEVELOPMENT OF CREATIVITY FACTORS

Managers, who entered the one week training course, first solved two problem tasks and then completed a test of preference ideation-evaluation scale, Keys method. Next, the training itself began. They passed exercises with various tasks which were focused on general problems. But they chose more tasks related to their company and tried to elaborate them until the final virtual implementation. The real implementation should take place only after returning to the working process. Participants were trained to understand the correlation of the value of ideation-evaluation sub-phase. At the end they again took and passed the test of preference ideation-evaluation scale, solved two problem tasks and attended an interview. To view creative products a scale method CPSS (Besemer) was used for assessment of solved problems. Differences between groups in the pre-test were not probative in 5% of reliability

risk in any case.

The second procedural analysis is aimed at assessment of the training effect. This effect was verified through multivariate analysis of variance (MANOVA).

Tab.1 Results of Analysis Using Multivariate Analysis of Variance to Compare Values before and after the Training

Multivariate analysis of	Wilk's criteria (lambda): F (6,82) = 22,13, p < 0,05				
Ideation skills (quantity)	x	10,2	14,0	6,8	44,2
	δ	4,3	6,7		
Ideation skills (quality)	x	3,7	5,1	4,9	30,6
	δ	3,0	3,8		
Evaluation skills originality	x	1,3	2,6	4,6	21,8
	δ	0,6	1,2		
Evaluation skills unoriginality	x	1,9	2,0	0,5	0,3
	δ	0,3	0,5		
Preference for premature convergence	x	3,3	2,6	- 9,3	76,5
	δ	0,7	0,8		
Preference for active divergence	x	3,6	4,9	3,8	4,1
	δ	0,5	0,8		
Divergent thinking in the second phase of process	x	8,9	12,7	6,7	43,4
	δ	3,7	4,6		
Evaluation in the second phase of process	x	1,7	2,5	3,2	14,6
	δ	0,9	1,8		

Both performance controls proved satisfactory. The number of ideas increased dramatically from the average of 10,2 before the training to 14,0 after the training. This difference is probative in 5% of reliability risk. This result reflects the increase in creative alertness, and quick imagination during one week. Hypothesis 1 approved unambiguously. A dramatic increase took place in variable quality of the ideation skills from 3,7 to 5,1, which is also a probative result. This result may be specified as a predisposition to improve the quality of evaluation, improvement of convergent thinking quality. Hypothesis 2 was confirmed as well. After the training, participants more specifically experienced which of their ideas are original (increase from 1,3 to 2,6), but their sensitivity to unoriginal ideas stayed almost unchanged (increase from 1,9 to 2,0). They were not able to identify unoriginal ideas in a better way. Thus hypotheses 3 and 5 approved.

Both personal approaches showed significant improvement. Preference for active divergence illustrates that improvement is probative in 5% of reliability risk. Note that preference for premature convergence has an increased value. This is correct, because postponement of premature evaluation is positive. The result is probative in 5% of reliability risk as well. Achieved results showed training effectiveness in creative problem solving. This means that hypothesis 4 may be accepted since in comparing a number of ideas to solve the best selected alternative before the training and after the training and subsequently its evaluation is a probative difference in 5% of reliability risk.

Upon the results achieved in the test of preference for ideation-evaluation scale (Basadur, Finkbainer, 1985), it was possible to compare changes of approach values before and after the training for both experimental groups and compare those with the control group as well. These results may be expressed in the form of causal model. We may see from the table above that in five cases correlation result relations did not. Actually, two of the cases have dependence (unprobative) a negative character. Relativity of individual elements was statistically evaluated in terms of χ^2 criteria.

If we result from the approach to preference for active divergence as presumption which could influence quality of creative activity, positive correlation (0,36) indicates the significance of influence of preference for active divergence. The influence of preference for active divergence on imaginative skills in form of quantity (0,18) is unproven. So hypothesis 6 was not confirmed. However, this approach influences the quality of imaginative skills in two ways. Conclusive dependence is influenced by direct influence (0,28) and indirectly through quantity of imaginative skills (0,79).

The key to creative activity development is the ability to create quanta of ideas. This ability also dramatically influences the ability to create high-quality ideas and recognize of those of lower quality. The approach to preference for active divergence positively influences quality of imaginative skills (0,28), which means that to train skills only is insufficient. The relationship to what is important right now is significant as well as the ability to find in ourselves the power to follow the way, which is in a given moment the most important. Avoiding premature convergence does not influence the skill to evaluate original ideas (-0,20) though this skill is positively influenced by imaginative skills in form of both quantity (0,22)

and quality (0,48). Creating new ideas is thus closely associated with the ability to evaluate which of the ideas are of high-quality and which are not. Thereby a mechanism is formed to avoid slight negative pressures which are emerging during premature convergence in recognition of original and high-quality thoughts (-0,33) and in recognition of lower quantity and original thoughts (-0,31). That way hypothesis 7 is confirmed. When there are not premature convergences, there are positive pressures to create new original thoughts and feelings of relief from easy visualization, so the correlation (0,30) indicates a different relation of preferences for active divergence and avoiding premature convergence. The approach to avoid premature convergence does not influence the quality of imaginative skills. The approach to avoid premature convergence influences the ability to recognize and evaluate unoriginal ideas (0,26).

We could have a discussion on the mechanism which prefers avoiding the premature convergence and may interfere with the ability to recognize new and high-quality ideas, thoughts and at the same time to evoke reluctance to our immediate evaluation. Similarly increasing ability to create high-quality, original thoughts could return and intervene in older, less-quality ideas. An individual who feels that s/he could improve some old thoughts will be, because of them, willing to quit the newest high-quality thoughts on the assumption that possibly something can be saved.

How practical are the evaluation and the implementation of ideas influenced by further observed changes? Imaginative skills in form of quantity have unprobative influence on practical evaluation and implementation of ideas (0,18). Nevertheless, imaginative skills in form of quality positively influence practical evaluation and implementation of ideas (0,32). The skill to evaluate unoriginal ideas is significantly influenced by a quantity of imaginative skills (0, 42). The quality of imaginative skills more or less decreases the ability to evaluate unoriginal ideas. But this relation is unprobative in 5% of reliability risk. Skills to evaluate original ideas increase the ability for practical evaluation and implementation of ideas (0,37). The training emphasises and leads the attendants to create habits for search and development of new thoughts in order to postpone evaluation in favour of new thoughts. This could explain why the improvement in reorganization of older thoughts is not visible after training. Improving abilities to recognize new and original ideas should be a priority in solving problem situations than improving rather abilities to recognize older and thus less usable ideas, which will be probably never used. It seems that more preference to avoid premature

convergence does not directly strengthen the ability to create high-quality thoughts, but indirectly through the ability to create quanta of ideas. It is well known to all that the knowledge of something positive does not necessarily mean that it will be used in our behaviour, just as opinions that avoiding premature convergence is effective for creative work do not mean that they will be used in the work itself. Thus, approach to premature convergence could directly relate to the ability to create quanta of new original ideas, but only indirectly to the ability to create high-quality original and useful ideas. Hypothesis 8 may be confirmed only conditionally, because conditionality is negotiated in terms of quantity. Further, an increased level of preference for divergence, which is apparently turned on by increased level of preference for avoiding premature convergence, indirectly increases the ability to create quantity (fluency) or quality (originality).

Evaluation skills in assessment of original and unoriginal ideas probably differ because there is discrepancy in a way of approach and ideation skills. This increases the likeliness that various assessments of tasks depend on approach variability and on behavior. Relationship between the actual assessment of quality and quantity of each participant in creative problem solving and average assessment of other participants. The dependency coefficient 0,63 is probative. Within this criterion, recorded changes on one's improvement and increase of quantity of ideas in creative problem solving are expressed by coefficient 0,64. Changes recorded by the others are expressed by coefficient 0,57.

Change in greater mind openness to new ideas and approaches. The dependency coefficient between self-assessment and assessment provided by the group is 0,55, which is also a probative result. Within this criterion, recorded changes on one's self in greater mind openness to new ideas have a coefficient of 0,39. Changes recorded by the others in greater mind openness to new ideas are expressed by coefficient 0,41.

Change of ability to come up with a creative idea on evaluation of already defined problem. The dependency coefficient between self-assessment and assessment provided by the group is 0,69, which is also a probative result. Within these criteria, recorded changes on one's self in ability to come up with creative idea on evaluation of an already defined problem are in the form of coefficient 0,36. Changes recorded by the others are stated by coefficient 0,42.

Creativity was qualitatively more distinct in well defined problems (probative at 5% level). In this measurement the median for the experimental group was significantly higher than for the control group.

Individuals, who completed the creative skills training, especially those having relatively low level of imagination, prefer imagination in problem solving, but not at such level in problem generation. According to our research, the impacts of training appear in general as positive. There are proofs of such changes, for example, time spent by different ways of thinking, openness to bilingualism and new ideas, and a number of negative and positive opinions.

The influence of the work environment on the development of creative potential was evaluated in terms of the Keys method (Amabile). This method was assessed only for the purpose of the drafting of the project, which is a part of a broader research approach. The results of this method were not applicable to other methods because the environment where the training took place was not assessed. Each participant's company environment was evaluated individually. Thanks to completion of each of the listed elements it was possible via interview to verify which aspects of each observed factor are insufficient. There were the following aspects: support of an organization, support of superiors, support of work group, autonomy, sources, organization obstacles and deficits. Internal disputes, conservatism, formal organizational structure, inflexibility, and bureaucratism are among those mainly criticised the most.

Manager problem solving in particular has scarcely ever a linear character. Thus, managers should try to acquire as much information as possible in order to understand the problems and also to be aware of prejudice or mistakes. Frequent occurrence of remarkable, well-known events and information at the expense of less noticeable and less popular ones is often overestimated. Information gained previously is very often of a greater value in decision-making. In many cases, managers tend to categorize problems according to the field of their own original activity and own experience. They frequently discover what they expected. If they compare some values, they attach great importance to the total amount of successes rather than to the ratio of a number of successes to a number of failures. If a manager expresses some opinion in form of proposal or project, it is unlikely that s/he will be willing to change his/her view. There is often a tendency to continue in using an alternative

which has been used so far, even though it is not suitable anymore. Managers are liable to illusions of control.

A creative work environment plays a very important role in the development of the creative potential of workers in the whole organization. Creative workers must be supported by the organization, the support of creation of ideas must be more effective and a certain space for risk taking must be respected as well. In the whole organization, all employees must be led to respect creative and innovative activities in order to motivate all employees and increase participation of all departments. (It is identified as proposal programs.)

The course of training should be designed in a way to create support of the habit-forming forms of behavior and it is essential to mention that it is special training:

- 1) Cognitive phase – a beginner gradually develops his/her knowledge.
- 2) Associative phase – when the participant begins to integrate and test gained knowledge.
- 3) Model behavior training – such approach to training, in which model situations are stabilized by something attractive in intended behavior.
- 4) Autonomous phase – it is the final phase in gaining skills, the performance becomes smooth and the participant by repeating model behavior acquires a habit which may be in the highest rate of habits identified as automatic.

The entire training methodology should be focused on:

- How a manager can prove leadership ability in innovative changes, work improvement, organization, problem solving, new trends and opportunities; his/her ability to solve specific company cases,
- his/her ability to work with information and communicate on the topic of information with colleagues, i.e. to collect, compare, select information, and decide on its use, if his/her acting is obliging when supporting and motivating co-workers, his/her ability to create an atmosphere of cooperation, manage interactive problems, to be reflexive,
- his/her ability to define problems from various points of view and penetrate into their roots,
- ability to analyze and detail the problem in order to decrease restraining barriers of knowledge,
- ability to persuade work teams to solve problems in ways which exceed solving by an individual,

- ability to create further new suggestions, unusual and provoking potential solutions, come up with more alternatives for team decision-making, and transform procedures, ability to work with promising creative people, develop their creative potential, train them, prepare conditions for good focusing on work which they are all excited about, motivate them, ability to eliminate and transform premature negative assessment of proposals into a positive form and negate lost motivation. But there is something that can not be possibly learned in the course, which are knowledge and skills of its professional specialization, some personal skills and partially the way of world perception as well.

The whole training methodology should be based on a three-phase scheme where each phase consists of two sub-phases. This means that it always begins with ideation and then separate evaluation follows. In these individual phases various aspects of creative abilities are tested such as flexibility, fluence, originality, analysis, synthesis, designing, changing, systematization, combining, transforming, organizing, adjusting and implementation.

At first, each employee selects actual problems of his/her company (problem selection – ideation). They may be in the form of a so-called “anger list”, all that makes him/her upset, which will be immediately evaluated afterwards (problem searching – evaluation). It may be forming a list gradually written and considered and assessed with the use of various combinations regarding limits of options. It may also be morphological synthesis, which requires coordination of two or more dimensions.

CONCLUSIONS

The aim of this paper was to search possibilities of making innovation processes more effective by training, outline possible procedures primarily in approaches to creative and innovation policy, create motivational atmosphere, characterize what is the most important in organizations for creation of creative climate and gradually to place all workers into training programs. These training programs should start from the top management and continue to ordinary employees. The fact that creativity and innovation are very significant has been confirmed by many reputable personalities from various fields. These include economists such as Drucker, Adair, Watterman, Mansfield (1963) and sociologists such as Merton, psychologists such as Guilford, Torrance, Lodge and others. Creativity and innovation are significant for national economic recovery as well as for an increased quality of life.

However, there are many companies that have ignored technological progress. According to research (Knight, 1967), it has been confirmed that innovation processes are of an evolutionary nature rather than a revolutionary one.

The research results showed that approaches to preference for active divergence and approaches to avoid premature convergence influence creative skills both in quantity and quality, although in a different way. The most important fact is that approaches and skills have positively influenced practical assessment of creative problems from work environments, including the final implementation.

Many organizations do not create the best climate for creative work. They attract young creative workers through advertisements, but they actually force them to complete routine tasks. Most of the remarks are on insufficient support of creation of ideas and on risking. Innovative cohesion from the highest degree to the lowest one is missing. (Negatively was also assessed high criticism rate and mistrust to creators.) There was a critique of insufficient participation on creation of ideas, leadership and decision-making. Support in form of assessment of new ideas is not clear as well. Superiors who are open to co-operation see the significance of support during the creative process that is connected with appraisal. The rate of such understanding after completion of the course is increasing. It shows that allocation of sources to a project is directly connected with the level of project creativity. The approach rate to sources determines specific limits for work, even motivational enthusiasm. It should be neither discriminating, nor extremely relaxed and exaggerated. The criticism is focused on internal disputes, conservatism, forming of organizational structure, inflexibility and bureaucratism.

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