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*MANAGEMENT OF INNOVATION
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**PREDICTING CREATIVE PROBLEM
SOLVING BEHAVIORS WITHIN TEAMS**

by

Min Basadur
Laurent Lapierre

Management of Innovation and New Technology
Research Centre
WORKING PAPER NO. 79
1998



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Predicting Creative Problem Solving Behaviors Within Teams

Working paper

Laurent Lapierre

Min Basadur

Michael G. DeGroote School of Business
McMaster University

Paper presented at the 19th Annual National Business Conference
Hamilton, Ontario, Canada

January 21, 1998

Abstract

This study attempted to test how specific attitudes towards creativity can help us predict the extent to which team members will actually use creative behaviours inherent to Basadur's (1996) creative problem solving process. Also, this research tested how these creative behaviours generated by individual team members contribute to overall team performance. A scale measuring 5 distinct attitudes on creativity was administered to members of 45 teams each comprised of approximately 5 first year undergraduate students. Members were also asked to evaluate each of their teammates on their use of specific creative behaviours while working on group projects. Results indicated that only one dimension of creative behaviour, *Focused Active Divergence in Problem Finding*, the first step in Basadur's creative problem solving process, could be predicted by attitudes on creativity. Furthermore, the attitude which best predicted this type of creative behaviour was identified as *(Not Feeling) Too Busy for New Ideas*. These findings set the stage for eventual research investigating the extent to which managers can use attitudes on creativity to forecast a team's likelihood of engaging in creative activity. Our results did not show any relationship between the creative behaviours assessed in our survey and overall team performance, though we hypothesize that such a relationship is probably contingent on the type of task being performed by a team. It is likely that the task our sample was asked to accomplish did not necessitate the implementation of the full creative problem solving process. Practical and theoretical implications are discussed.

Introduction

Popularity of Teams

Optimizing human potential in the workplace through the creation of an involving and motivating organizational environment is the goal of many organizations today (Lawler, 1992; Pfeffer, 1994). To this end, organizations are removing hierarchical layers, decentralizing and seeking to increase employee involvement and responsibility (Handy, 1989). One way organizations have tried to increase employee involvement, responsibility and motivation, while remaining adaptable to the changing business environment, has been through the use of autonomous work teams (Hollenbeck, LePine, Ilgen, 1996; Cohen, 1993). The use of such teams is increasingly popular in organizations (Metz and Simms, 1993; Cohen, 1993) and there is considerable evidence that they can produce dynamic benefits when implemented correctly (Jourden and Heath, 1996; Martha, Harker, Messerman, 1994; Morley and Heraty, 1995; Ferrero, 1994; Kirk, Meldrum and Fewsmith, 1995; Steven, 1995; Philips, 1994; Davenport, 1994; Buggie, 1995; Anfuso, 1994; Reiste and Hubrich, 1995). Unfortunately, though teamwork has become an increasingly popular organizational development tool, many organizations wanting to reap its so-called advantages are unfamiliar with the attitudinal and behavioral requirements for team members, and the necessity for the employing organization to offer appropriate support systems (e.g., team-based compensation, team member process training, etc.). As a result, more than 50% of team initiatives fail (cf., Advanced Concepts Conference, 1998). The current study attempted to investigate the validity of a creative problem solving process introduced by Basadur and his colleagues (1982) that we believe would be beneficial to the performance of autonomous teamwork.

Creativity and Team Work

The concept of creativity/adaptability has been shown as being a necessary requirement for organizational effectiveness (Mott, 1972). Basadur (1993) suggested that organizational creativity could lead to both economic and people outcomes. The latter can include increased job satisfaction, trust, motivation, commitment, involvement, and more importantly, group interaction, and teamwork.

Basadur also suggests that specific attitudes, thinking skills, and behaviors within and among individuals and groups are needed for effective teamwork and subsequent organizational creativity/adaptability and performance.

Basadur's Creative Problem Solving Process - Simplex®

Simplex® is a complete process of creative problem solving and innovation. It consists of four stages: finding and defining problems, developing creative solutions and implementing the solutions. Each stage requires creativity of a different kind yet all four stages are necessary for innovative performance. In order to make the team innovation process effective, members must learn and apply several specific process skills within each of the four stages. It has been theorized that knowledgeable people, the meeting process and meeting process skills, lead to innovative solutions and superior results.

There are three challenges to making innovation a way of life using Simplex®. One must learn to use the process as a whole, get the process skills he/she needs to implement the process and demonstrate effective leadership using the process. There are four categories of process skills: Active divergence, active convergence, deferral of judgment, and vertical deferral of judgment. The process skills of deferral of judgment and active divergence are the keys to finding diverse options through ideation. The process skill of active convergence is the key to evaluation. These specific process skills include attitudes, behaviors and thinking skills and are summarized as the two-step Ideation-Evaluation mini-process. More specific details are as follows:

Active Divergence enables one to generate options. People with Active Divergence skills:

- ☉ Continually seek new opportunities for change and improvement
- ☉ View ambiguous situations as desirable
- ☉ Seek potential relationship beyond the known facts
- ☉ Show awareness and gaps in their own experience and tolerate situations in which things are less than clear cut
- ☉ Realize that the early stages of innovation require the patience to discover the right questions before seeking the right answer
- ☉ Extend themselves to seek out additional possible solutions to problems and additional factors for evaluating solutions beyond the obvious.

Active Convergence enables one to evaluate options. People with Active Convergence skills:

- ☉ Take reasonable risks to proceed on an option instead of waiting for the perfect answer
- ☉ Show a willingness to help their team reach consensus by viewing differences in opinion as helpful rather than a hindrance
- ☉ Follow through on implementation plans
- ☉ Do whatever it takes to insure successful installation of ideas.

Deferral of Judgment allows one to separate the opposing skills of Active Divergence and Active Convergence. People with these skills:

- ☉ Are open-minded to new opportunities
- ☉ Defer action on a problem in order to seek out facts
- ☉ Find alternative ways to define a problem
- ☉ Have a willingness to try unusual approaches to solve a problem
- ☉ Are open-minded to new solutions.

Vertical Deferral of Judgment helps all participants to work through the Simplex® Process steps in synchronization, rather than jumping to solutions or acting prematurely. This skill helps individuals avoid the urge of simply leapfrogging over steps in the Simplex® process. Basadur and his colleagues (Basadur & Finkbeiner, 1985; Basadur & Hausdorf, 1996; Basadur, Taggar & Pringle, in press) have discovered 5 distinct attitudes relating to the acceptance of the Ideation-Evaluation mini-process. They are: *Preference for Active Divergence*, *Preference for Avoiding Premature Evaluations*, *Valuing New Ideas*, *Belief that Creativity is Not Only for a Select Few*, and *Not Feeling Too Busy for New Ideas*. These attitudes are conceptualized as being antecedents or precursors to the actual practice of the behaviors relating to the Ideation-Evaluation mini-process within the Simplex® process as a whole (Basadur, Graen, & Green, 1982).

The Proposed Model under Investigation

The purpose of this study was to assess whether the five attitudes identified by Basadur et al. would in fact be related to creative problem solving behaviors of individuals within autonomous work teams, and finally, whether these behaviors do in fact account for better work team performance.

The study was exploratory in nature as little research had previously attempted to empirically test the validity of the proposed model. Furthermore, This study offered a first test of the psychometric properties of a new scale measuring creative problem solving behaviors among team members. This scale, the Basadur-Getto Creative Problem Solving Process Skills Questionnaire for groups and teams, was intended to measure the spectrum of behaviors required to support each of the four phases of the Simplex® process.

Method

Participants

238 first year commerce students enrolled in an 13-week introductory business course at an Ontario university took part in this study. Average participant age was 19.4 years, and there was relatively equal representation of male to female participants. Participants were instructed to fill out the questionnaires as a requirement for the class participation. These instructions were deemed justified given the course's content and that effective teamwork is considered an important consideration in today's organizations. After the elimination of missing cases, 225 participants were used for the study.

Measures

For the measure of attitudes, the five scales developed by Basadur et al. were used.

For the measure of creative behaviors, the authors modified the Basadur & Getto questionnaire (see Appendix 2) to permit each team member to assess every other member of the team individually rather than the team as a whole.

The measure of team performance was given by the grading of a final written team project and oral team presentation at the end of the course. Team projects were evaluated by teaching assistants, and the course instructor assessed the oral presentations.

Procedure

At the beginning of the course, all the participants were grouped together in teams varying from 3 to 8 members in size. Forty-seven teams were formed and remained intact until the end of the course. During the first two weeks of the course, all participants filled out the five attitude scales. One week prior to the end of the course, every team member evaluated each of his or her teammates on the extent to which they demonstrated creative behaviors while working on the final project and presentation by using the scale derived from the original Basadur-Getto scale. Team behaviors were calculated by averaging the individual assessments of each other by the team members.

Results

Before testing the statistical validity of the model, we conducted an exploratory factor analysis of the Basadur-Getto Scale. Three factors were identified accounting for 60.5% of the variance in the scale (see appendix 1 for factor analysis results). By analyzing the content of the items that most highly loaded on each factor we formulated tentative behavior factor labels: *Focused Active Divergence in Problem Finding*, *Tendency to Act Impulsively in Problem Solving*, and *Practicing Deferral of Judgment in Problem Finding*. Internal reliability assessment revealed Cronbach alphas of .89, .68, and .61 respectively.

A Stepwise Multiple Regression Analysis identified the *Not Feeling Too Busy for New Ideas* attitude as the best predictor of the *Focused Active Divergence in Problem Finding Behavior* ($F = 5.847$, $p = .016$). This would seem to indicate that the more a person feels they can put time aside for generating and formulating new problems and opportunities, the more that person would engage in focused active divergence during the problem finding stage of the creative problem solving process. The other four attitudes did not significantly contribute to the model. Please refer to Appendix 1 for descriptive statistics and a full correlation matrix.

There was no apparent significant relationship between either measure of team performance and any of the five attitudes or any of the three behavior factors. Both aggregate team attitudes and behaviors as well as proportion of high team member attitudes and behaviors within teams were used to test these relationships. Neither method revealed any significant findings.

Discussion

The results indicate that our model was partially supported. We have shown that one of the five attitudes associated with the acceptance of the Ideation-Evaluation/Deferral of Judgment concepts labeled *Not Feeling Too Busy for New Ideas* significantly predicts behaviors related to *Focused Active Divergence in Problem Finding* (the beginning portion of the Simplex® Creative Problem Solving process). We have therefore established a relationship between attitude and behavior. This relationship is not surprising however. Without a desire to spend the time to generate new opportunities, it would be very difficult to actively engage in divergence, especially in the early part

of the Simplex® Process. One would probably be prone to concentrating on solving already identified problems rather than seek out new opportunities and define them in insightful new ways prior to attempting to solve them.

Unfortunately, we were unable to demonstrate any significant relationship between behavior and overall team performance, the second half of our model. This may be due to error in the actual measurement of team performance. The team evaluators were not specifically trained to do their task, and the evaluation criteria were somewhat vague. The absence of any relationship could have also been due to the task given to the teams. Perhaps it was not a task that necessitated the full creative problem solving process. This is supported by Basadur's (1995) findings that show how people in different fields of endeavor emphasize on different stages of the creative problem solving process. He found that in the case of students, they tend to focus more on the Solution and Implementation stage. Since none of our creative behavior factors relate to this particular stage, our results are not surprising.

The importance of considering the type of task a team must accomplish when assessing the benefit of using creative behaviors was further demonstrated in a separate pilot study. Groups were comprised of second year MBA students who cooperated in a series of quantitatively scored exercises. The creative behaviors were shown to positively relate, albeit with a low level of significance, with the tasks requiring the groups to come up with creative solutions (e.g., bridge building), and not with those single solution tasks which discouraged creative thinking (e.g., solving a murder mystery). Thus, scholars and practitioners alike must consider the task to be accomplished by teams before encouraging the generation of creative problem solving behaviors.

Future Research

This study has set the stage for understanding the complexity of relationships between creative attitudes, creative behaviors, and team performance. Since the current version of the Basadur-Getto behavioral scale only appeared to measure behaviors related to Problem Finding and Problem Solving, future studies should try to develop a more comprehensive and complete scale to measure creative behaviors that would span across all stages of the Creative Problem Solving process. Furthermore,

the relatively weak alpha levels for the latter two factors would stress the importance of having a more complete list of items even for the existing scales. Also, future research should try to distinguish tasks that actually necessitate creative problem solving from those that don't when trying to relate creative attitudes and behaviors to team performance on those tasks.

Implications

Having established a significant positive relationship between attitude and behavior, and knowing that attitudes can be taught and/or modified (Basadur, Graen, & Green, 1982), we feel confident that this avenue of research will help practitioners devise attitude training programs that would help organizations become more adaptive in our rapidly changing work environment. Also, by establishing a clear link between attitude and behavior, the attitude scales would prove to be invaluable tools for assessing the impact of full-scale creative problem solving training programs.

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Appendix 1

Descriptive Statistics

	Mean	Std. Deviation	N
Focused active div. in PF	3.4152	.5983	225
Tendency to act impulsively in PS	4.1506	.3874	225
Practicing diferred judgement in PF	3.3865	.4635	225
Valuing new ideas	6.9437	.8415	225
Creative individual strereotypes	5.5577	1.0273	225
Too busy for new ideas	6.0342	1.2042	225
Active divergence	5.4582	2.4585	225
Preference for avoiding prem. eval.	4.8767	2.3474	225

Correlations

Pearson Correlation	Focused active div. in PF	Tendency to act impulsively in PS	Practicing deferred judgement in PF	Valuing new ideas	Creative individual stereotypes	Too busy for new ideas	Active divergence	Preference for avoiding prem. eval.
Focused active div. in PF	1.000	.154*	.276**	.062	.104	.160*	.029	.093
Tendency to act impulsively in PS	.154*	1.000	.328**	-.085	-.080	-.052	.072	-.051
Practicing deferred judgement in PF	.276**	.328**	1.000	-.001	-.084	.096	.092	-.025
Valuing new ideas	.062	-.085	-.001	1.000	-.391**	.034	.254**	-.121
Creative individual stereotypes	.104	-.080	-.084	-.391**	1.000	.317**	-.062	.087
Too busy for new ideas	.160*	-.052	.096	.034	.317**	1.000	.046	.132*
Active divergence	.029	.072	.092	.254**	-.062	.046	1.000	-.768**
Preference for avoiding prem. eval.	.093	-.051	-.025	-.121	.087	.132*	-.768**	1.000

Correlations

	Focused active div. in PF	Tendency to act impulsively in PS	Practicing deferred judgement in PF	Valuing new ideas	Creative individual stereotypes	Too busy for new ideas	Active divergence	Preference for avoiding prem. eval.
Sig. (2-tailed)								
Focused active div. in PF		.021	.000	.354	.120	.016	.662	.163
Tendency to act impulsively in PS	.021		.000	.203	.232	.437	.279	.443
Practicing deferred judgement in PF	.000	.000		.987	.210	.153	.167	.714
Valuing new ideas	.354	.203	.987		.000	.616	.000	.071
Creative individual stereotypes	.120	.232	.210	.000		.000	.351	.192
Too busy for new ideas	.016	.437	.153	.616	.000		.492	.048
Active divergence	.662	.279	.167	.000	.351	.492		.000
Preference for avoiding prem. eval.	.163	.443	.714	.071	.192	.048	.000	

Appendix 2

BASADUR / GETTO CREATIVE PROBLEM SOLVING PROCESS SKILLS QUESTIONNAIRE FOR GROUPS AND TEAMS

Purpose

This questionnaire is designed to identify the behaviors observed among your teammates that support the process of creative problem solving.

Instructions

Rate each of your teammates on the frequency with which they demonstrated the following 14 behaviours while preparing both your research report and your final in-class presentation. **Be sure to rate all teammates before going on to the next behaviour.**

All ratings should be based on the following scale: **1=Never, 2=Once in a while, 3=Sometimes, 4=Usually, and 5=Always.** Responses are kept confidential.

	Name ID	Name ID	Name ID	Name ID	Name ID
1. How often did the person make premature judgments of new or fledging thoughts?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. How often did you observe the person taking time to break down big, hard to handle problems into smaller, simpler parts before trying to solve them?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. To what degree did the person find him/herself solving the same problem over and over again because they did not take the time to define the problem well the first time?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. How routinely did the person question whether the assumptions they were making were still valid?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. To what degree did the person display an optimistic, "can-do" attitude about tackling problems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. How often did you observe the person reacting negatively to radical, new ideas?

☐☐☐☐☐

7. How often did the person seek out many different facts and points of view before determining what direction to take on a problem?

☐☐☐☐☐

8. To what extent did the person fail to generate several possible alternatives to a problem before choosing a solution?

☐☐☐☐☐

9. To what extent did the person discuss what was good about a problem as much as (s)he discussed what was bad about a problem?

☐☐☐☐☐

10. How often did the person create unusual, thought provoking ideas before deciding on the best solution to a problem?

☐☐☐☐☐

11. To what degree did the person clarify facts and take time to consider the most significant facts prior to deciding what the real problem was?

☐☐☐☐☐

12. How often did the person evaluate solutions with hidden motives and biased view points?

☐☐☐☐☐

13. To what extent did the person take personal ownership and responsibility for measuring the results of the solutions they implemented?

☐☐☐☐☐

14. How often did the person make hasty negative evaluations of proposals and ideas?

☐☐☐☐☐

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