

Individual and Group Electronic Brainstorming in an Industrial Setting

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Verbal Brainstorming

- **Verbal brainstorming**
 - Group of individuals in a room generating ideas
 - Problems:
 - Blocking
 - Evaluation apprehension
 - Social loafing



Electronic Brainstorming (EBS)

- **EBS proposed to mitigate negative effects**
 - Involves groups of people brainstorming via a computer
 - No blocking
 - Little evaluation apprehension
 - Possible decrease in social loafing
- **Studies have shown EBS superior to verbal brainstorming**



EBS

- **Studies assessing EBS and electronic individual (nominal) brainstorming have mixed results**
 - EBS seems to be superior for large groups of people
 - Otherwise, nominal is just as good (if not better)



Limitations of Past Research

- **Research only done on college students in lab setting**
 - What about real-world industrial settings?
- **Brainstorming topics not very realistic**
 - What about problems that are “wickedly” difficult (ill defined with no ‘right’ solution) and complex?
- **Research done with small number of people per group**
 - What about larger teams with diverse skills and knowledge bases?
- **Research done in short, one-time session**
 - What about real-world situations where people brainstorm over several days?



Current Study

- Employees at SNL brainstormed on a topic over the course of 4 days
 - Brainstorming groups consisted of 30+ people
 - Topic was a “wickedly” difficult one proposed by Sandia’s president
 - Quantity and quality of ideas assessed



Hypothesis

- **EBS would be more effective than nominal brainstorming**



Method

- **120 employees/contractors volunteered to participate**
 - 69 actually submitted ideas
- **Participants randomly assigned to nominal or group condition**
 - 30 in group condition
 - 39 in nominal condition
- **Participants were recruited via advertisement**



Procedure

- Participants asked to logon to website and create *anonymous* user ID
- Participants asked to logon and submit ideas to question at least once a day for 4 days
- Participants in group condition could see other's responses

Display all submitted ideas Microsoft Internet Explorer

Back Forward Stop Refresh Home Favorites Search Stop Send

Google

Online BrainStorm

Display all submitted ideas

Session question or problem is:

Tom Hines is interested in the contrast between his models of how organizations relate to their people. One model views people, metaphorically, as just another natural resource, and like other natural resources, to be used (and extracted) for the good of the organization. If that model obtaining people is largely a financial provider and the company will derive whatever constitutes it can from their skills or expertise.

A second model suggests that people are an asset to be continually developed and the investment in their development will yield a dividend to the organization or even to the broader society.

Is combining these two models, Tom is greatly interested in your thoughts and ideas about:

- How employees establish an identity for themselves in relation to their work environment, i.e., how do they define their job?
- How to create the appropriate balance between the role of management and the sense of achievement of employees

He would like your comments and ideas about the above two questions, and also your insights into:

- What environment best supports the identification and development of leaders.

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There is a leadership paradigm, which is the most often invoked: 'What attributes define leaders?' It is the popular view that leaders are born, not made, i.e., the hereditary, the heretical, the genetic, the ability to find in others hierarchy!

It is a false dichotomy to claim that no motives determine the leadership. It is true, however, that the motives of leaders are often not the same as those of the people that you develop. When these systems work well, it is because the employees will believe it is needed when the company's self-interest is satisfied. Examples of this are: 1. The company's self-interest is satisfied when the company is successful, including a balance of basic needs and immediate needs. 2. That the company has a sustainable understanding of employees' dreams. 3. The company has a sustainable understanding of employees' needs. 4. The company has a sustainable understanding of employees' dreams and needs, and therefore that an employee's dreams are "achieved", and will change on the way to progress.

This is not the only leadership paradigm. The bright yellow background is a reference to my eyes. These are not the features of all web sites (see HTML77), am I really going to invest a cross-site scripting attack? Given that this is essentially a forum why not use one of the many existing forums of this type? I am not sure if I am going to use a cross-site scripting, and a reasonably good URL. Your due care to cross-infiltrating involves if a threat implications to anyone to express material, or even to group thoughts in paragraphs. Why not be honest, and use the results to your tool about the power of basic leadership.

ABCD's specific model is as follows, but I'd like to point out that "theory" is not the same as "model". A model is a way of thinking, a theory is a way of explaining. If the theory is good, then the model is good. With 80 sub-groups working independently we might expect 20% or more to be obtained.

Displaying the submitted ideas, note that this is the top of a long list, with the standard menu at the bottom of the list, ShowAvailableIdeas.php



“Wickedly” Difficult Question

- All participants brainstormed about “wickedly” difficult problem raised by president Tom Hunter
 - 4 parts to question
 - Empowerment
 - Definition of “we”
 - Leadership
 - Model of management



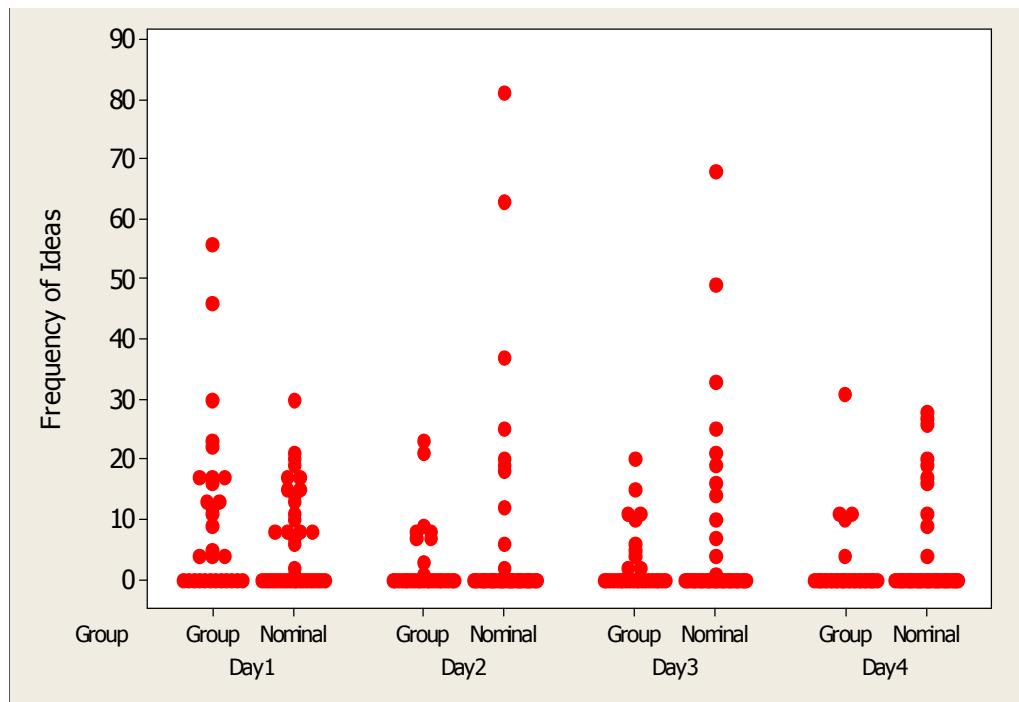
Results

- **Quantity analysis of ideas**
 - Number of ideas
 - Number of cumulative ideas
 - Number of words and sentences
- **Quality analysis of ideas**
 - Independently assessed by 2 raters
 - Originality – novelty of idea
 - Feasibility – ease of implementation
 - Effectiveness – ability to solve problem



Quantity Analysis

- **NO significant effect by group for number of ideas, cumulative ideas, words or sentences**



Number of Ideas by Day of Study



Quality Analysis

- Each response was evaluated by 2 raters
- Maximum averaged rating was used
- Compared nominal vs. EBS responses for 3 quality dimensions
 - Originality
 - Nominal responses superior to EBS responses ($p < .001$)
 - Feasibility
 - Nominal responses superior to EBS responses ($p = .02$)
 - Effectiveness
 - Nominal responses superior to EBS responses ($p = .01$)



Summary

- **Current experiment expanded literature:**
 - Industrial setting
 - Large group of 30+ people
 - “Wickedly” difficult real-world question
 - Brainstorming period of 4 days
- **Nominal brainstorming as effective as group brainstorming (at very least)**
 - No difference in quantity of responses
 - BUT difference in quality of responses
 - Perhaps more important?!
 - Perhaps 30 people too large for successful group brainstorm



Future Research

- Different computer-mediated technologies and interfaces
- Other “wickedly” difficult questions
- Alternate industrial settings



Thank You and Any Questions?

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