

## Overview of Creative Methods

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### Objectives of this report

- To research the availability of various methods dealing with creativity, innovation and problem solving, for the purpose of understanding the market.
- To identify the key players and the way in which they could be linked and/or positioned.

### Introduction

There are three connected (and partially overlapping) areas of human activity related to any kind of development:

- ⇒ Creativity
- ⇒ Problem solving
- ⇒ Design

According to James M. Higgins, creativity is the process of generating something new that has value<sup>1</sup>.

Problem solving is the process required when we seek some kind of a resolution, such as removal of a drawback or achievement of a specific enhancement or improvement. Problem solving usually includes creativity as a part of the process.

Design activity is necessary when we are dealing with any kind of a project. The design process can include problem solving and, if necessary, creativity<sup>2</sup>.

Traditionally, each of these activities has its main focus, that is, creativity focuses on the human, problem solving is built around a problem, and a design (or project) is built around a system to be developed or improved. However, there is a definite trend toward mutual penetration of these activities. For example, many creative techniques include preparation or implementation phases, while some problem-solving techniques include problem verification, reformulation, etc.

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<sup>1</sup> James M. Higgins. *101 Creative Problem Solving Techniques* (New Management Publishing Company, 1994).

<sup>2</sup> John Christopher Jones. *Design Methods* (John Wiley & Sons, 1997).

In general, each process can be a multi-step procedure. Two very different types of steps required can be identified, as follows:

- Well-defined, organized and controlled; easy to explain, learn, and utilize with predictable results.
- Difficult to explain, hard to follow, poorly controlled, containing many uncertainties, lacking a guarantee of results – in other words, those requiring creativity.

Steps of this second type have always attracted scientists and practitioners, who have attempted to formalize them to the extent that they become predictable and controllable as are the steps of the first type. The history of the development of various creative problem-solving techniques extends back to the 4<sup>th</sup> century of the Christian Era, with Papp in Alexandria, Egypt. Papp was searching for a science of invention; he even found a name for this science: *heuristics*. For centuries, however, there was no real demand for such a science – until the 19<sup>th</sup> century when the industrial revolution started. Moreover, it seemed fairly obvious that creativity was a product of the human brain, and thus the main approach to creativity was focused on attempts to enhance the creative process by facilitating an individual's mental processes, that is, psychology-based approaches to creativity.

Studying the natural creative process, psychologists defined it as the *trial-and-error method* and have identified the phenomenon of *psychological inertia* (see Figure 1). Hence, breaking psychological inertia and various techniques for stimulating creativity became the main target, along with the development of various procedures and processes. In summary, these efforts were aimed at the following:

- Unleashing natural creativity, eliminating mental blocks
- Stimulation and mobilization of resources helpful for generating ideas by a group or individual
- Knowledge-based support, including various analytical steps to organize, restructure and exploit available knowledge and experience and, eventually, utilize specially-developed and structured external knowledge (*innovation knowledge base*).

## **Classification of creative techniques**

Depending on the methods and means utilized, creative techniques can be categorized as follows:

### **1. Conditioning/motivating/organizing techniques**

The techniques, procedures and/or special conditions and means belonging to this group help create an environment that facilitates the removal of various mental blocks, unleashes natural creativity, etc.

*Examples: Napoleon technique, listening to music*

Other techniques from this group merely suggest the use of various helpful tools such as notebooks, stickers, boards, flip charts, etc.

## **2. Randomization**

Since psychological inertia usually keeps an individual “inside the box” of his/her paradigms/perceptions/assumptions, forcing an individual to make more random attempts to solve a difficult problem were found to be very helpful. Randomization makes the search more chaotic.

*Example: Brainstorming*

## **3. Focusing techniques**

Many people have difficulty with random idea generation when no guidelines or focusing steps or subjects are offered. Special focusing techniques are used to help an individual focus on one issue at a time and avoid frustration. Focusing elements (steps) may be presented with or without any particular order (random focusing).

*Example: Attribute listing*

## **4. Systems**

A system contains a set of focusing or random steps to be followed in a specific order.

*Example: QFD*

## **5. Pointed techniques**

These techniques offer single or multi-step recommendations following a pre-determined, promising direction. This direction may be identified as useful based on intuition, experience or documented knowledge.

*Examples:*

- *Problem reversal (single step)*
- *ARIZ (multi-step process targeting the ideal solution)*

## **6. Evolutionary directed techniques**

These techniques offer directions according to fundamental patterns of evolution.

*Example: Utilization of the TRIZ Patterns/Lines of Technological Evolution*

## **7. Innovation knowledge-base techniques**

These techniques utilize structured knowledge derived from the past human innovation experience.

*Example: Contradiction Table and 40 Innovation Principles*

## Results

Traditionally, techniques belonging to the first five groups were psychology-based. Today, with the development of knowledge-based approaches (groups 6 & 7) they may be combined with (supported by) knowledge.

Exhibit 1 lists over 90 techniques classified according these seven groups. Some techniques use combinations of approaches.

## Summary

Significant work in the direction of unleashing natural creativity and other psychological mobilization was done by A. Osborn (“Osborn’s” direction). Other important techniques that followed this direction are:

- Synectics (Gordon)
- Fundamental design method (Matchett)
- Complex of techniques by E. DeBono.

The most successful technique for operating with available knowledge was offered by L. Miles (Value Engineering). Other important techniques following “Miles’ direction” are:

- Morphological Analysis (Zwicky)
- Quality Function Deployment (Akoa)
- FMEA

The innovation knowledge-base approach to creativity is relatively new (beginning in the mid-1940s) and can be divided into two stages. First, there were attempts made to elucidate the intuition of successful inventors in a general way (Osborn’s control questions, for example). The next step was made by Genrich Altshuller, who embarked on a direct analysis of inventions documented in patents and other sources of technical information, with the purpose of revealing so-called “patterns” of invention and of technological evolution. (“Altshuller’s direction”).

The basic advantages of the innovation knowledge-base techniques are the following:

- Accumulation of the best practices in creative problem solving is possible
- Proved knowledge can be assessed
- Results are repeatable and do not depend on personal (psychological) issues

The most significant result of “Altshuller’s direction” is TRIZ.

The Ideation/TRIZ methodology is a natural extension of Altshuller’s TRIZ. The main objective was to identify the most effective techniques covering all necessary components/issues, such as mobilization of personal capabilities, problem and system analysis,

the innovation knowledge-base approach, etc. and integrate them into a single, powerful methodology capable of addressing any problem/situation. As a result of this integration, the following components were selected:

From “Osborn’s direction”:

- Methods of reducing psychological inertia
- Team work

From “Miles’ direction”:

- Methods of collecting and organizing knowledge about a problem and the system in which it resides (Ideation’s ISQ)
- Functional analysis (enhanced and implemented in the technique of Problem Formulation)
- Morphological approach (used to ensure the exhaustiveness of the ideas developed)

From “Altshuller’s direction”:

- Evolutionary approach (Patterns/Lines of Technological Evolution)
- Innovation knowledge-base approach (various knowledge-base tools)
- TRIZ analytical tools

## **Conclusion**

1. To date, TRIZ (and the TRIZ-based Ideation/TRIZ methodology) are the only innovation knowledge-base and evolutionary-directed techniques that can provide the user with the accumulated power of the world’s best inventors and innovations.
2. The Ideation/TRIZ methodology is the result of integrating a carefully selected set of the most powerful, productive, and proven techniques.
3. The integration process is an inherent element in the development of the Ideation/TRIZ methodology, and one which guarantees its superiority and competitive advantage.

### Comparative Analysis of Creative Methods<sup>3</sup>

Method	Group							Source/Reference
	1	2	3	4	5	6	7	
1. Random input (feature transfer, focused-objects technique, organized random search, picture stimulation)		X	X					
2. Problem reversal				X	X			
3. Questions Ask			X	X	X			Alex Osborn
4. Question Summary			X					
5. Lateral Thinking			X	X	X			
6. The Discontinuity Principle				X				
7. Thinkertoys			X	X				
8. Brainstorming		X		X				
9. Forced Analogy		X	X					
10. Attribute Listing			X					<ul style="list-style-type: none"> <li>• Robert Platt Crawford</li> <li>• <i>Creating Workforce Innovation</i>, by Michael Morgan</li> </ul>
11. Morphological Forced Connections				X				Koberg and Bagnall
12. Morphological Analysis				X				Zwicky
13. Imitation					X			
14. Mind Maps *			X	X				Tony Buzan
15. Storyboarding	X		X	X				<ul style="list-style-type: none"> <li>• Sergei Eisenstein</li> <li>• Walt Disney, 1928</li> <li>• Mike Vance, <i>Creative Thinking</i></li> <li>• J. Higgins, p.166</li> </ul>
16. Synectics **			X	X	X			William Gordon
17. Lotus Blossom Technique			X	X				Matsumura Yasuo, Clover Management Research
18. In the Realm of the Senses			X	X				Mike Vance, <i>Think Out of the Box</i>
19. Drawing and Visual Thinking	X		X					Betty Edward and Robert McKim's <i>Experiences in Visual Thinking</i> , Stanford

<sup>3</sup> The information presented here was researched and compiled by Rod Kornienko.

20. Camelot					X			James Higgins 101
21. Checklists			X					James Higgins 101
22. Limericks and parodies		X						James Higgins 101
23. Role playing		X						
24. Workout/retreats	X	X						
25. Kepner-Tregoe			X	X				
26. Draw a picture			X					
27. Experience kit			X	X				IdeaScope, Cambridge
28. Fishbone diagram			X	X	X			Kaoru Ishikawa
29. King of the mountain		X						
30. Redefining a problem/opportunity		X		X				
31. Squeeze and stretch			X	X	X			
32. What patterns exist?					X			
33. Why-why diagram			X	X	X			
34. Assumption reversal					X			
35. Associations		X						
36. Circle of opportunity		X						
37. Deadlines	X							
38. Fresh eye	X							
39. Idea bits and racking	X							
40. Idea notebook	X							
41. Input-output				X				
42. Listening to music	X							
43. Name possible uses		X						
44. The Napoleon technique	X							
45. Product improvement checklist		X						Arthur B. VanGundy
46. Relatedness		X						
47. Relational words		X						
48. Reversal – dereversal					X			
49. 7x7 technique				X	X			
50. Sleeping/dreaming on it	X							
51. The two-words technique		X	X		X			
52. Visualization		X						
53. What if?			X					
54. Gordon/Little			X	X	X			
55. Group decision support systems	X							Wilson Learning Systems, Minnesota
56. Idea board	X							
57. Idea triggers	X							
58. Innovation committee	X							
59. Intercompany innovation groups	X							
60. Lion's den	X							
61. NHK method		X		X				Hiroshi Takahashi

62. Nominal group technique	X	X		X				
63. Phillips 66	X	X		X				Don Phillips, Michigan
64. Photo excursion		X	X					
65. Scenario writing		X	X					
66. SIL method (combining)		X		X	X			Batelle, Germany
67. TKJ	X	X		X				Tokio Institute of Technology
68. Delphi	X			X				
69. Neuro-Linguistic Programming (NLP)	X							Robert Dilts
70. Assumption Smashing					X			
71. DO IT				X				<i>The Art of Creative Thinking</i> , by Robert W. Olson
72. LARC	X							<i>Unleashing the Right Side of the Brain</i> , by Robert Williams and John Stockmyer
73. Unconscious Problem Solving	X							
74. Basadur Simplex process				X				<a href="http://www.basadurimplex.com/">http://www.basadurimplex.com/</a>
75. Fuzzy Logic (Fuzzy Thinking)				X				Lotfi Zadeh. <i>Fuzzy Thinking</i> , by Bart Kosko; <i>Fuzzy Logic - The Revolutionary Computer Technology that is Changing the World</i> , by Daniel McNeill and Paul Freiburger
76. SERENDIPITY	X	X						
77. Wallas' model				X				Graham Wallas (1926)
78. Rossman creativity model								Rossman (1931)
79. Working Paper: Models for the Creative Process								<a href="http://www.directedcreativity.com/">http://www.directedcreativity.com/</a> DirectedCreativity is a trademark of Paul E. Plsek & Associates, Inc.
80. Barron's Psychic Creation Model	X			X				Henri Barron (1988)
81. Creative Problem Solving				X				Parnes (1992)



(CPS) Model								Isaksen and Trefflinger (1985)
82. Koberg and Bagnall's Universal Traveler Model			X					
83. Robert Fritz's Process for creation	X		X					
84. Seven Steps by Roger von Oech			X					
85. TRIZ Contradiction Table and 40 Innovation Principles	X		X	X	X	X	X	
86. TRIZ Ideality Concept	X		X	X	X	X	X	
87. TRIZ System Approach	X		X	X	X			
88. Ideation/TRIZ Patterns/Lines of Evolutions	X		X	X	X	X	X	
89. Ideation/TRIZ Problem Formulation	X		X	X	X			
90. Ideation/TRIZ ISQ	X		X	X	X			
91. Ideation/TRIZ ARIZ	X		X	X	X	X		
92. TRIZ Substance-Field Analysis	X		X	X	X			
93. TRIZ 76 Standard Solutions	X		X	X	X	X	X	
94. Ideation/TRIZ System of Operators	X		X	X	X	X	X	
95. Ideation/TRIZ IPS	X		X	X	X	X	X	
96. Ideation/TRIZ DE	X		X	X	X	X	X	
97. Ideation/TRIZ AFD	X		X	X	X	X	X	

\* **Software:** <http://www.ozemail.com.au/~caveman/Creative/Software/swindex.htm>

\*\* Software: [Axon Idea processor](#)  
[Hypercard Software](#)

Other software:

Mindlink  
IdeaFisher