Metaphorical Observations -

Viewpoints Conducive to Innovation

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The pivotal difference between a simple idea and an innovative one often is insight - literally, penetrating mental vision. To see things in a new light; to see things differently from previous investigators; to see things from an unusual penetrating perspective; is a prerequisite of innovative thinking. Given this premise, it behooves the creative thinker to go the extra mile and find a new vantage point solely for the potential value of the new perspective it provides.

Sir Isaac Newton gave credit, for his scientific success, to his historical mentors in saying, "If I have seen farther (than you and Descartes) it is by standing upon the shoulders of Giants." While bearing its intended compliment, and sharing of the glory, his statement is a beautiful metaphor for a perspective that no one else had.

Creating new insights, new viewpoints, and new perspectives, is within the grasp of every technologist preparing to solve a problem. However, to create new insights, requires intent, and execution. Unified structured inventive thinking (USIT) is a problem solving methodology having tools and a fundamental philosophy that focus on metaphorical observations to induce innovation. This includes both verbal and graphic metaphors. As a discipline for problem analysis, USIT gives the analyst the structure and procedure to generate a variety of new perspectives along the path from a problem to its solution.

Metaphorical observations, as insights to innovation, applies to both the "graphic-minded" and to the "abstract-minded" thinkers. Structured problem solving methodologies, such as USIT, are effective first because they lead the analyst to new vantage points quickly. This is accomplished in one part of USIT through generification of object names. By naming objects by their functions, and not by the words used to find them in catalogs or dictionaries, they instantly take on broader meaning in the innovator's mind. A nail may be referenced better as a "clamp", a "peg", a "hook", a "punch", a "pin", a "fastener", or another name, depending on its application.

Consider the following elements and procedures of USIT and their roles. Note how, as the sequence of steps progresses, the potential for new views of the problem situation are created. Note also that all procedures are based on one or more of the three key elements of USIT: objects, their attributes, and the functions they support. Finally, it should be noted that the process is first to develop sharpened focus, then breadth, and then the unusual insight - i.e., metaphors for unique perspectives.

USIT Procedures (see textbook for details)

1. A simple, single-problem statement involving objects.

Key to initiating an effective problem analysis is to "see" the problem to be analyzed. Selection of objects required for writing the simple, single-problem statement creates the first mental images for the subsequent process. At this early stage of a USIT analysis, these images are apt to be the more obvious, and the more conventional (i.e., technically correct), than the unusual and the thought provoking - as will be seen.

2. A simple sketch.

Simplification of the above verbal metaphors is accomplished by requiring a simple sketch of the problem situation [as described in (1)]. This is an invaluable exercise that forces one to take a rather hazy, and perhaps too complex of a concept, and draw it as a simple sketch. In this process, complexity wrought of unnecessary components is readily reduced to necessary essentials - the beginnings of clear insight.

3. Reduction of objects to a minimal set.

A still sharper focus is encouraged by requiring the original objects to be reduced to a minimal set. This exercise induces consideration of important functions versus those of lesser importance. The object culling exercise changes one's perspective of the problem.

4. Generification of object names.

This step highlights the creativity of the metaphor. Objects are named for their functions - an effective image-shifting process.

5. Object-function-object connectivity of the closed-world diagram.

Constructing a CW-diagram, with a one-object, one-function restriction, is always an insightful exercise and often produces unexpected perspectives.

6. Object-function-attribute statements.

Two conditions are invoked in this exercise: (1) that two objects interact to modify an attribute of an object, and (2) one attribute of each interacting object supports the function. Generating O-A-F statements, while complying with these conditions, quickly presents new views about the workings of the selected objects.

7. Qualitative-change graph.

Association of attributes of each object of the minimal set with an unwanted effect quickly pinpoints where to look for solution opportunities. If the O-A-F statements have been limited to desirable functions, the graph will reveal any conflicts of attributes - more locations in which to look for solutions.

8. The "ideal" solution.

This is an image of a unique, unreachable target that challenges the analyst's creative focus.

9. The morph-cartoon.

The morph-cartoon is pure imagery of a simple transition from a problem situation image to an ideal solution image.

10. Particles.

Particles are powerful metaphors having unlimited capabilities and embodiments unique to the inner thinking of each analyst.

11. Particle placements in the morph-cartoon.

Localizing the action of particles, by assigning them specific sites in the morph-cartoon, forces the analyst to create an image for each particle action invented.

12. And/Or tree.

Combining or contrasting (and/or) particle actions at a given site in the morph-cartoon, causes the analyst to draw logical observations about the proposed actions of the yet to be defined solutions.

13. Uniqueness.

Uniqueness brings the analyst to consider temporal and spatial characteristics of each function identified. Mental visualization of temporal and spatial characteristics is unique to each analyst. When these images are executed as sketches, considerable clarification of vision can occur.

14. Dimensionality.

The mapping of attributes encourages the analyst to visualize unusual mappings that can have surprising results.

15. Pluralization.

Multiplication and division of objects leads to many new images of a problem situation. Systematic consideration of each opportunity invokes new viewpoints.

16. Distribution.

New distributions of functions require deactivation and activation of attributes. The mental processing of this exercise involves transitions among viewpoints.

17. Transduction.

Attribute-function-attribute links are unique perspectives of how attributes can be mapped to create new solution concepts.

18. Generification of solution concepts.

This exercise entails the visualization of the essence of a solution to see what makes it work. When this insight is visually generified it becomes a new solution template.

19. Energy flow.

When an analyst recognizes that a particular problem involves a specific kind of energy flow, this can lead to new focus with considerable problem simplification.

20. Objects, attributes, and functions.

Perhaps the most powerful and effective metaphors are the basic elements of USIT, objects, their attributes, and the functions they support.