U-SIT And Think News Letter - 35

Updates and Commentary

Unified **S**tructured **I**nventive **T**hinking is a problem-solving methodology for creating unconventional perspectives of a problem, and discovering innovative solution concepts, when conventional methodology has waned.

Dear Readers:

- I began discussing left-brain and right-brain influences[1] on problem solving in the last mini-lecture without giving you some idea of why. I begin this letter with some explanation.
- In the ensuing mini-lectures I will continue discussion of how to invent using the example of the drinking vessel. Also the topic of left-brain and right-brain participation in problem solving will be given space.

3. Mini USIT Lecture – 35

"USIT – an Alternative Method for Solving Engineering-Design Problems"

Where this discussion is headed: When I began writing the ebook, "Heuristics for Solving Technical Problems – Theory, Derivation, Application"[2], I immediately encountered the need of a model with which to rationalize the thought processes used in creative problem solving. Prior to that I had used the idea of seeding the subconscious to spark new ideas. It seemed to be adequate, to a degree. However, decades ago I had read about the Nobel Prize work on brain hemispheres (R. W. Sperry, 1981[3]), and now I was bothered by the thought that that work offered the basis for a better model than I was using. So I decided that after finishing the HSTP ebook I would devote some time to developing an improved model, one based on the role of brain hemispheres.

Why I'm addressing this topic: I have discussed in previous publications how ambiguity can be used to suppress filters (business and engineering-like rationale) and pave the way for creative thinking. Ambiguity is an effective heuristic for technologists to adopt. Its basis is an obvious extension of left-brain right-brain conflict. Which suggests that further development of a left-brain right-brain model for the mental process of problem solving could uncover other heuristics for creative thinking. The fact that it has been applied successfully in art gives me further motivation to investigate this subject. In addition, I enjoy understanding (or trying to understand) our mental processes used in problem solving.

What about our ongoing problem of inventing a new drinking vessel? Since these mini-lectures are done "live", so to speak, I haven't planned a graceful ending for the drinking vessel exercise. My initial idea was to give a few examples, but not a comprehensive discussion, of how to use each strategy of invention. This would leave openings for classroom use by those readers who use this material in their classes. So, for the time being, I'll continue the drinking vessel problem and the mental-model problem.

Mini USIT Lecture 35

Recap of Mini USIT Lecture 34

On our journey to innovate drinking vessel concepts through analysis of plausible functions of artifacts we arrived at [SCF10] (ref. NL_23). For this characteristic, "polymer", two functions were listed both having the word "cost" in them. I vented my feelings about "cost" not being a well-defined problem. Then I started a discussion based on left-brain analysis and aborted it to entertain a right-brain analysis of the problem.

I. How to invent a better drinking vessel

We will now address SCF-ll (NL_23), which deals with the characteristic *shape* and its attribute *transparency* and assumed functions of making contents and quantity visible in order to remove uncertainty.

SCF-11		transparent	• to make contents visible and identifiable eliminating uncertainty, • to make quantity of contents visible eliminating uncertainty.

It is evident that our strategy for invention here should be to find new uses for transparency and/or to address the issue of eliminating uncertainty regarding identity and quantity of a vessel's contents.

The attribute transparency brings to my mind a lens. Fast food restaurants often have novelty toys or tableware for entertaining children. This sparks an idea for transparent liquids: **SC32** Emboss one or more lens-shapes into the transparent walls of a drinking vessel to serve as lenses for projecting images of bright objects and for looking through.

Forming images with drinking vessels for entertainment brings to mind the phenomenon, seen in some aerated fluids, of bubbles going down the sides of the container rather than up. This is readily visible in some beers, especially those containing a widget that releases copious quantities of fine gas bubbles when the beer can is opened and its contents poured immediately into a transparent mug, also in beer freshly drawn from a tap. **SC33** Place a light-emitting diode in the base of a transparent vessel so as to transmit its light around the vessel through the wall of the vessel (see the light pipe concept in SC24, NL_31). This would provide entertaining illumination of the falling-bubble phenomenon.

Since a liquid in contact with a transparent body changes the reflectivity of the liquid-solid interface a quantity-of-contents gauge can be created. **SC34** Fabricate a transparent drinking vessel with a slightly roughened interior surface to create random scattering of light. Then, when liquid contents are present, the extent of the region wetted by the contents will become visible as a result of the differing reflectivity of the wetted surface. **SC35** Faint, smooth patterns in the rough interior could be introduced for visible artwork or advertising.

II. Left-brain / right-brain participation in problem solving.

It is evident that some problems are solved almost solely using right-brain's spatial visualization skills. Consider this example:

> "An archeologist discovered an ancient city complete with roads, city center, quarry, church, etc. It was he who discovered that the people who lived in this city drove their carts on the left side of the road. How did he know?"[4]

In this problem there are no numbers for mathematical operations. There are only objects for visualization. It is ideal for right-brain thinking. An eighty-year old friend of mine solved this problem within a few seconds of my telling it.

On the other hand, some problems can be solved using the skills of both hemispheres. Consider this example:

> "Ten people (five married couples) attend a party. People who don't know each other shake each other's hand. At the end of the party Bob asked everyone there, including his spouse, how many people they shook hands with. He got the answers, 0,1,2,3,4,5,6,7 and 8. How many people did Bob's spouse shake hands with?"[4]

I solved this one graphically, a right-brain exercise. The graphical solution was reduced to numbers only at the conclusion. However, logical reasoning was also used during the process – left-brain work. My son solved this problem using a spreadsheet on a computer. He worked with the desired numbers from beginning to the end of the solution. However, the spreadsheet served as an "easel" on which to track his reasoning visually. We both used both hemispheres to solve the problem.

Finally, there are problems that are solved using left-brain's logic without spatial visualizations. Consider this example:

> "Find the five-digit number in which the first digit is two more than the second, the second digit is two more than the third, the fourth digit is two less than the third, and the last digit is two more than the fourth. The sum of the third, fourth, and fifth digits equals the first. The sum of all the digits is 19."[5]

Personal experience in problem solving, such as the above three examples, and experience teaching physics, engineering, and USIT classes has convinced me of the dual role of brain hemispheres. It has also become evident on occasions that some people seem to be more left-brained and others more right-brained in problem solving. However, it is not clear if this is always true for a given individual or if it can vary because of the first way a person happens to look at a problem or for other reasons. One thing that I learned as a professor was the difficulty of writing fresh quiz problems. It seems that on nearly every quiz I wrote one or more students could see a particular problem in a totally different, unexpected way than I had intended. My rationalization of this occurrence is that it was a result of hemisphere influence.

The value of these observations for constructing a model of the technical, problem-solving brain is the realization that the structure of our brains may offer multiple views of a given problem.

An observation that causes me to marvel brain function in problem solving is its speed. It is noted in the following quote:

> "The data indicate that the mute, minor hemisphere is specialized for Gestalt perception, being primarily a synthesist in dealing with information input. The speaking major hemisphere, in contrast, seems to operate in a more logical, analytic, computer-like fashion. Its language is inadequate for the rapid complex syntheses achieved by the minor hemisphere."[6]

I find that ideas come to mind faster than they can be understood. By "understood" is meant left-brain endorsement. An idea is first verbalized in logical statements and then tested with filters: does it violate a physical principle, or, if this is true then are the necessary consequences evident, and other filters. It is especially frustrating in the early stages of thinking about a new problem that ideas queue faster than they can be addressed – right-brain creativity without filtering outpacing left-brain criticism. Consequently, some ideas are forgotten before they have a chance to be tested.

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1. The use of *left* and *right* references to brain hemispheres is not quite correct regarding their dominance. A better designation is minor and major hemispheres. This is because the dominant hemisphere is the right hemisphere in a small fraction of people. However, the use of left and right terminology has become popular.
2. "Heuristics for Solving Technical Problems – Theory, Derivation, Application", is available free at www.u-sit.net. It will be referred to as HSTP.
3. Sperry, R. W., "Hemisphere Disconnection and Unity in Conscious Awareness", American Psychologist **23** (1968), 723 – 733
4. From the "Car Talk" radio program broadcast on NPR (www.npr.org).
5. The MENSA 365 Brain Puzzler Calendar (year 2005).
6. Levy, J., "Differential Perception Capacities in Major and Minor Hemispheres", Proceedings of the National Academy of Science, **61**, 1968, 1151.

8. Other Interests

1. Regarding inquiries about ordering the textbook, "Unified Structured Inventive Thinking – How to Invent", details may be found at the Ntelleck website: www.u-sit.net. The cost of the book is US$44.50 plus shipping and handling. See the website for S/H charges. Send a check made out to **Ntelleck, LLC** for the proper amount, drawn on a US bank, to
   Ntelleck, LLC, P.O. Box 193, Grosse Ile, MI 48138 USA

2. A **Public USIT Course**. If you are interested in a public 3-day USIT course to be taught in Novi, Michigan (convenient to Detroit Metro Airport) please send an email. (Recent courses have been taught as on-site events in private corporations.)

USIT Resources

Publication	Language	Translators	Available at …
1. Textbook: Unified Structured Inventive Thinking – How to Invent	English	Ed Sickafus (author)	www.u-sit.net
2. eBook: Unified Structured Inventive Thinking – an Overview	English	Ed Sickafus (author)	www.u-sit.net
	Japanese	Keishi Kawamo, Shigeomi Koshimizu and Toru Nakagawa	www.osaka-gu.ac.jp/php/nakagawa/TRIZ/
"Pensamiento Inventivo Estructurado Unificado – Una Apreciación Global"	Spanish	Juan Carlos Nishiyama y Carlos Eduardo Requena	www.u-sit.net
3. eBook "Heuristics for Solving Techncial Problems – Theory, Derivation, Application"	English	Ed Sickafus (author)	www.u-sit.net
"Heurísticas para Resolver Problemas técnicos – Teoría Deducción Aplicación"	Spanish	Juan Carlos Nishiyama y Carlos Eduardo Requena	www.u-sit.net
4. U-SIT and Think Newsletter	English	Ed Sickafus (Editor)	www.u-sit.net
	Japanese	Toru Nakagawa and Hideaki Kosha	www.osaka-gu.ac.jp/php/nakagawa/TRIZ/
	Korean	Yong-Taek Park	www.ktriza.com.

Please send your feedback and suggestions to Ntelleck@u-sit.net and visit www.u-sit.net

To be creative, U-SIT and think.