U-SIT And Think News Letter - 48

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:

. Beginning with the mini-lecture below plastic heuristics and left-brain right-brain participation in problem solving are combined into one topic called cognitive plasticity in problem solving.

. Apologies to my readers: Earlier this week a false mailing of the newsletter was accidentally sent. I apologize for this error.

3. Mini USIT Lecture – 48 USIT – a Method for Solving Engineering-Design Type Problems

Cognitive Plasticity in Problem Solving

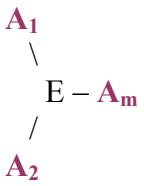
This ongoing discussion of plastic heuristics with the parallel discussion of left-brain and right-brain participation in problem solving began with the definition of plastic heuristics. *A plastic heuristic has trappings that cue to applicable problems and ambiguity that preempts bias.* This definition conveys the idea that plastic heuristics have broad application (no bias) resulting from their inherent ambiguity. They offer new perspectives for creative thinking and they simplify one's toolbox of solution methodologies.

The concept of brain hemisphere plasticity is introduced here. However, I wish to use the word plasticity, in this discussion, in a somewhat different sense than it is used in the medical profession. There, brain-hemisphere plasticity refers to one hemisphere taking over the duties of the other following loss of function of a brain hemisphere. Here, I wish to use brain hemisphere plasticity to convey the concept that both hemispheres participate in problem solving by simultaneously applying different but complementary approaches to understand and analyze a problem, and to proffer solution concepts. Their functions are not rigid but are adequately compliant to the information available for each specific problem.

It will simplify future discussion to combine the concepts of plastic heuristics and LB/RB plasticity in problem solving into a single concept. For this purpose I'll use the phrase cognitive plasticity in problem solving (CPPS). Cognitive plasticity in problem solving uses plastic heuristics as thinking guidelines to spark simultaneous, complimentary LB and RB insights.

This dual-topic discourse has presented a number of demonstrations of CPPS in various forms.

1. Omission of objects in order to focus on attribute connectivity through heuristic effects.



To illustrate that the brain can generate new perspectives from object-disconnected attributes an arbitrary list of attributes was created without concern for associated objects. Members of the list were randomly paired and then the brain challenged to find a third attribute associated with a given pair through a logical effect (USIT_NL_41). The random pairing served to reduce, but not eliminate, the influence of LB's logic in accepting the pairs while giving RB's creativity more influence.

2. Three generic strategies for resolving an unwanted effect (solving a problem) were reviewed (originally presented in "Heuristics for Solving Technical Problems – Theory, Derivation, Application"). The three strategies can be portrayed using the above graphic heuristic with E replaced by U, an unwanted effect.

   Utilization converts the unwanted effect into a function; U ➔ F.
   Nullification counters the unwanted effect; U ➔ F.
   Elimination annihilates the unwanted effect: U ➔ (_).

   The first level of attack in these three strategies uses the attributes joined to U. In the next level their associated objects are used. For quick access to new perspectives it is recommended to start with attributes and later examine the objects (USIT_NL_42).

3. The theory content of (1) and (2) above lacked convincing evidence. This led to three important questions:

   1. Do randomly associated pairs of attributes generate creative associations of a third attribute?
   2. Do logically associated pairs of attributes generate relevant associations of a third attribute? The issue here is not to solve a problem but to identify plausible root causes of its unwanted effect.
   3. Do logically associated pairs of attributes from an unwanted effect generate creative associations of a third attribute that sparks solution concepts; i.e., do they solve problems?

   The answer to question (i) was demonstrated as a triplet-attribute exercise in NL_41. Question (ii) was demonstrated in NL_42. The third question (iii) was demonstrated with the real-world seawall problem (NL_44). It was again demonstrated in the creative solution for redesigning an underground sprinkling system (NL_45). Focusing on attributes to resolve an unwanted effect was also demonstrated with a human interaction problem, the "reluctant contractor phone call" (NL_45).

4. I tend to think of plastic, the adjective, as implying moldable, deformable, and being of ill-defined shape. This is just what is needed for cognitive plasticity in problem solving. As demonstrated in NL_46 and NL_47, it is achieved through ambiguity in the naming of objects, attributes, and functions – the complimentary constituents in a problem statement. Each constituent can be abstracted via one of its two complimentary constituents. The possible paths of abstraction are shown in the following heuristic.

Problem-statement-constituent abstraction heuristic

	Problem-Statement Constituents		
	Objects	Attributes	Functions
Abstraction via Complimentary Constituents	▼	▼	▼
	Attributes	Functions	Objects
	Functions	Objects	Attributes

5. Complimentary LB and RB insights are the goals of cognitive plasticity in problem solving via USIT. It has been argued that conscious effort should be exercised to prevent LB domination in problem solving that preempts recognition of RB concepts. The structure of USIT was tabulated to demonstrate the encouragement of brain-hemisphere participation in problem solving (NL_46). Awareness of hemisphere activity in structured problem solving is encouraged to allow more thorough investigation and more resulting concepts.

My experience with brainstorming-type problem solving, especially in team exercises, is that it fosters a high level of LB-type logical criticism or filtering of ideas. CPPS, on the other hand, encourages RB-type open, uncritical thinking.

_____ To be continued _____

Update on Exercises

In USIT NL_47, readers were invited to try their hand at abstraction through ambiguity. The following ideas were submitted by Juan Carlos Nishiyama and Carlos Eduardo Requena, our USIT Spanish translators.

1) Abstraction of an object, hose/tube, as a function:
   Examples:
   a) To allow flexible transmission, example: bike brake cable.
   b) To measure level, as with a builder's level using a curved transparent tube of liquid containing a bubble.
   c) To contain and mould, as in sausage production.

2) Some examples: Abstraction of an attribute as a function

Abstraction of an attribute as a function	
Attribute	**Function**
	To slow evaporation of liquids.
	To store liquid (paint roller).
	To spread liquid (paint roller)
	To reduce the density of solids.
	To increase the surface of a catalyst.
	To absorb noises (polyurethane foam).
	To damp mechanical vibrations (polyurethane foam).

	To abrade (pumice stone, sponge to bathe).
	To filter liquids (filter paper).
	To produce osmosis.
	To produce dialysis.
	To produce capillarity.
	To increase friction and avoid slipping (mouse pad).
	To avoid explosive instability using porosity of diatomaceous earth to divide an explosive chemical into small cells. Example: nitroglycerine with diatomaceous earth = dynamite.
	To retain the oil in self-oiling bearings. Example: phosphor brass.
	To improve grasp in manual tools.
	To muffle intense sounds.
	To conform to human body shape (mattress).
	To isolate heat.
	To absorb gases. Example: gas masks.
	To absorb liquids (absorbent paper, newspaper paper).

Perhaps you found even more examples.

8. Other Interests

1. Have a look at the USIT textbook, "Unified Structured Inventive Thinking – How to Invent", details may be found at the Ntelleck website: www.u-sit.net (*Note*; not at www.ic.net)
2. USIT Resources Visit www.u-sit.net and click on Registration.

Publications	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**" -- **HSTP**	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.
Mini-lectures from NL_01 through NL_47	Spanish	Juan Carlos Nishiyama y Carlos Eduardo Requena	www.u-sit.net click on Registration

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

To be creative, U-SIT and think.