U-SIT And Think News Letter - 37

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:

Interested in a 3-day public USIT course this spring in Novi, Michigan? Send an email. Ntelleck@u-sit.net

In this newsletter:

- 3 attributes are used for inventing new drinking vessel concepts.
- Left- right-brain thinking in the hand-shake problem is continued.

3. Mini USIT Lecture – 37

USIT – a Method for Solving Engineering-Design Type Problems

1. Continuation of "**How to Invent a Better Drinking Vessel**"

Flexibility as an attribute (SCF-12) was treated in the last mini-lecture, NL_36. This lecture addresses three attributes, elastic range, SCF-13, brittleness SCF-14, and light weight, SCF-15 (NL_23).

SCF-13	large elastic range	• to reduce manufacturing damage during extraction from a mold

Presumably, if elastic range of a blow-molding polymer is too small a molded vessel may become stuck in the mold and require repair time, or bending during extraction from a mold may tend to fracture the polymer. **SC38** One solution concept for freeing a stuck vessel is to insert air passages into the mold to allow pressurization between the mold and its molding for blowing a vessel free. Another concept is, **SC39,** dope the material so that as blow molding is completing its cycle and the polymer is cooling, it is also shrinking and freeing itself.

If bending is causing fracture, **SC40,** reduce the cooling rate of the mold so that the molded vessel can be extracted while still hot and more elastic.

Thinking back to the discussion at the NATO Summer School, I believe the issue of large elastic range was picked as plausible root cause for allowing the vessels to be so easily crinkled and buckled, which is an unwanted effect. It would be useful, therefore, to reduce the elastic range. SC40 is one approach – select a polymer having a large elastic range at molding temperatures and a small elastic range at room temperatures.

SCF-14	brittle (no plasticity)	▪ a room-temperature property of the polymer. It has no obvious benefit and is another source of distracting noise during rough handling that causes sudden brittle fracture, ▪ shards have sharp edges producing some risk of personal injury in accidental contact (e.g., during clean up).

Brittleness can lead to noise and injury only when a vessel is fractured. The probability of fracture is decreased with increasing wall thickness – a shape attribute. A contrarian idea comes to mind. **SC41,** dope the polymer so that when it fractures it fails catastrophically shattering into small pieces. This is the ploy of automobile window design. (Cleaning up the resultant mess is a different problem!) It might subconsciously encourage more delicate treatment of drinking vessels.

SCF-15	light weight (relative to other vessels of comparable volume)	• (see #3), ▪ increases probability of being knocked over or off of a table.

The drinking vessels were so light that often they were found on the floor, once there they often were stepped on. An increase in mass is an obvious solution to this unwanted effect. Lowering the center of gravity would help also. This is a problem of empty vessels (uniqueness). Vessels are empty before and after use. Before use they can be confined to dispensers. So the more critical problem is when they are empty after being used. A whimsical concept: have them self disintegrate if laid down empty. (Another mess problem in the making.☺) Another idea, eat the unused part of the vessel like an ice cream cone.

An idea comes to mind: **SC42**, use a built-in tripod for stabilizing a drinking vessel. Legs could pop out automatically as a vessel is removed from its dispenser. They could be molded in an open position and then packed in a closed position. The legs would rotate on "living" hinges.

II. Continuation of **Hand-shaking Problem**

Left brain sees that right brain has finished the graphic drawing and has found a solution that produces the given set of numbers. Always the critic, left brain smells something fishy and proceeds to revisit the assumptions and the process. Meanwhile right brain moves on to determine who Bob and his spouse are.

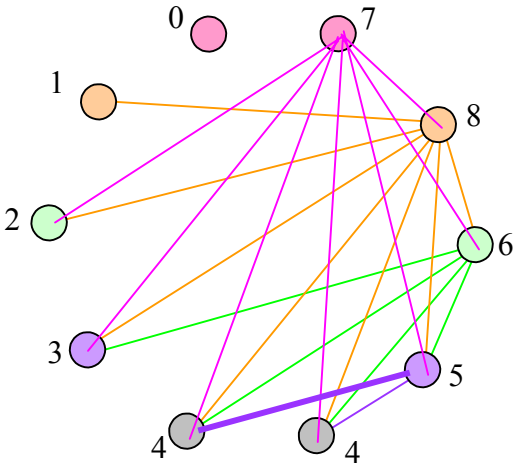
With a tinge of smug humor in its eye, right brain suddenly sees an explanation. Right brain can't verbalize its solution so it resorts to signing to communicate[1]. This it does well. But it is only useful when it can get left brain's attention. Right brain signs, "0 knows everyone while 8, the spouse, knows no one and has to shake everyone's hand. Let's make him the host, Bob, and make 0 the wife who has invited her club friends and their husbands, all of whom Bob has never before met."

While right brain waits for expected accolades, left brain, never able to cede defeat, suddenly has a change in attitude. "But wait, how do we know this solution is unique? Maybe there are other solutions if 8 had not been paired with 0 in the beginning. Ha! Got you there", left brain says. "So we have to start again and try other pairings of the numbers", left brain says as it resumes control.

Right brain just nods with impatient agreement.

Left brain makes the logical observation that if 8 had been paired with some other number then the above scenario explaining Bob as a host would not have worked. That means we would need to create a different scenario if Bob's spouse is not 0, reasons left brain. Right brain has already decided that creating stories to make mathematical situations into interesting puzzles is simply another problem, one that is separate from the mathematical one, the kind it enjoys solving.

Left brain then thinks of the double 4's that occurred in the solution. "What if 8 and 0 were not paired", it asks. "Would the repeat number be some other value?" Neither brain can let this challenge pass so they,



in their own ways, begin to solve the problem. (Note that this is a new problem.[2])

Left brain interchanges nodes 7 and 8, thus pairing 0 and 7. Right brain, meanwhile, has removed one line from the original 8 node and added it to the new one with a change in color. Again two 4's are found. Both brains are wondering if they have found an unusual result: namely, two 4's will always occur no mater how the other numbers are rearranged.

Then right brain sees an interesting test of this hypothesis by moving a single line. Left brain sees the simplicity of this ploy and takes charge. It moves the 4-end of the 5-4 connection to the 2 node. It skips the 3-node because it is 5-node's mate. This move creates three 3-nodes while eliminating a 4-node and a 2-node. The result destroys the original set of numbers: 0, 1, ~~2~~, 3, 4, 5, 6, 7, and 8. Two more tests and it concluded that moving one end of a line to a new node, not a mate, always destroys the original set of numbers. And this conclusion suddenly begs the question of what happens if a whole line is moved? Left brain subtracts 1 from both A and B which eliminates A and B and produces A-1 and B-1. Obviously the only way to recreate A and B is to replace the original link. Hence, even though this solution procedure began with an arbitrary choice of 0 and 8 as a pair of nodes, a unique solution was found on the first try (serendipity!).

Left brain has satisfied its curiosity and is ready to dismiss this problem and move on. But right brain has created other ways of stating the puzzle even though it already has a unique mathematical solution. It stomps its foot to get left brain's attention and signs its ideas.

with. How many individuals knew both members of one or more couples? With these ideas right brain closed the argument that hand shaking and Bob were two different issues, and made the point that by using multiple stories a single mathematical situation can be made into different puzzles.

This completes the discussion of the hand-shaking puzzle. The contrived dialogue between the brain hemispheres is intended to suggest how the hemispheres come into conflict while simply following their different but complimentary-problem solving techniques. Introspection applied while solving a puzzle, such as this example, serves to make one aware of the roles both brain hemispheres can play. It illustrates further how a more comprehensive view of a problem can arise with input from both hemispheres.

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1. "Spoken language tends to be processed mainly by the left cerebral hemisphere. When American Sign Language is used, structures in both the left and right hemispheres are activated." Reference: Newman, A.J., Bavelier, D., Corina, D., Jezzard, P. and Neville, H.J. A critical period for right hemisphere recruitment in American Sign Language processing. *Nature Neuroscience*, 5:76-80, 2002.

2. Every unanswered question can be treated as a problem.

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. This one is public.

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.