U-SIT And Think News Letter - 50

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.

Updates and Commentary

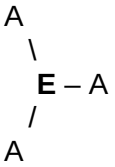
Dear Readers:

APOLOGIES!!!! No newsletters since July 22 requires some explanation: (1) Travel in Ireland, Missouri, and Massachusetts. (2) I had the honor of being named a Fellow of the American Vacuum Society at their annual international meeting in Boston. (3) Vacation with grandchildren in Michigan. (4) Houseguests. (5) An exhibit of my photography at a local library. (6) Dropped all other projects to develop a new problem-solving methodology that is easier than USIT. It's "in the works" and I'll let you know when (and if) it will be released.

* Thank you for your inquiries concerning my continued existence. ☺

3. Mini USIT Lecture – 50 USIT – a Method for Solving Engineering-Design Type Problems

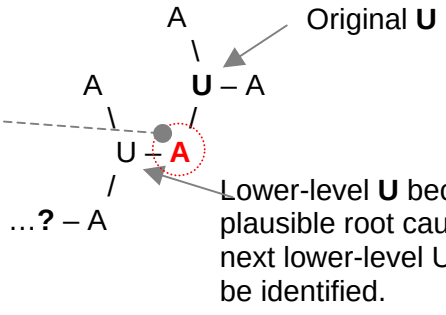
Plausible Root Causes lead to new Concepts



The three-attribute, effect-diagram forms a key element for finding paths to plausible root causes.

In searching plausible root causes the effect, **E**, becomes an unwanted effect, **U**. Paths to plausible root causes are formed of cause-effect links to deeper levels of understanding of the unwanted effect.

Links are connected to each other through a causal attribute of the unwanted effect becoming the affected attribute of a lower lever causal attribute. Such a path is illustrated in the figure.



The nature of the original unwanted effect keeps the relevance of the developing path within rational bounds of science. The procedure begins with the original unwanted effect for which an active attribute is to be found.

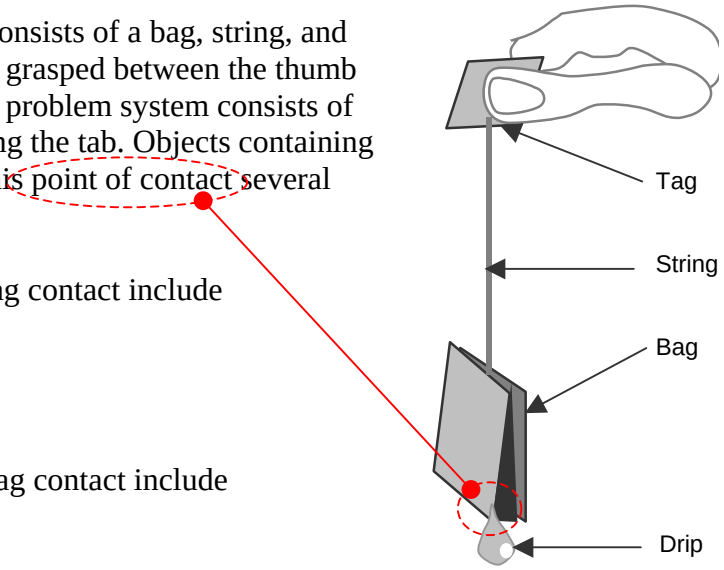
Active attributes are to be found in pairs and associated with the unwanted effect by belonging to the objects that contain the unwanted effect. Begin by selecting an obvious causal attribute and then find a second one that can interact with it. This pairing justifies both attributes as being plausibly active. The pairing of causal attributes must fit your understanding of the unwanted effect. That is, the process is tailored to your personal level of understanding. Let's test this model in order to understand

better its utility. For that we need to start with an unwanted effect.

Unwanted effects can be found in any problem situation. They can also be created as an initial step of invention. I asked my wife for something she would like to see improved, something needing an invention. She suggested a tea bag that doesn't drip when removing it from a freshly made cup of tea.

Consider the following unwanted effect: *A tea bag drips when removed from a cup of tea*. Fix it.

First a simple sketch. Our model tea bag consists of a bag, string, and a tag. When lifting it from a cup it may be grasped between the thumb and forefinger. In the process it drips. The problem system consists of these objects plus a drip and fingers holding the tab. Objects containing the problem are the bag and the drip. At this point of contact several attributes of the two objects are active.



Potential active attributes of bag at drip-bag contact include

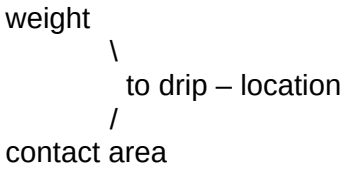
- porosity
- surface tension
- dampness (with hot liquid tea)

Potential active attributes of drip at drip-bag contact include

- surface tension
- weight
- contact area (with bag)
- viscosity

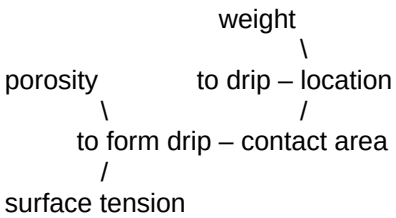
These attributes are called potentially active until each can be paired with another in a plausible interaction supporting dripping. By selecting a plausible pair we begin the thought process of understanding the phenomenology of dripping and spark new concepts in the process.

Our problem is a drip falling from a bag. So we can begin here to understand the phenomenology of dripping. Weight of a drip and its contact area with bag are key factors. The greater the weight and the smaller the contact area the greater is the probability of breaking free and dripping. Breaking free affects the location of drip (from attached to bag to falling).



This becomes our first pair of active attributes to examine for new concepts. Nothing comes to my mind at this point so let's pursue root causes. Both attributes are starting points for plausible root cause branching. I'll examine contact area since surface tension was already suspected as a potential attribute of drip formation.

For example, I'll pair porosity with surface tension as plausible interacting attributes that support the unwanted effect *to form drip* affecting the output attribute contact area. **Question**; How does a drip form? Porosity allows the tea access to the outer surface of the bag and its surface tension, along the air-tea-bag interface, enables it to form into a drip ready to fall. So the affected attribute is contact



area. On the surface of the bag tea becomes shaped into a drip.
That is my plausible rational.

An idea comes to mind. While submerged, no drips form at teabag pores. Instead, liquid flows freely through bag pores. While suspended in air, liquid trying to flow through a pore tends to cling to bag material as a result of surface tension. As liquid, under the influence of gravity continues to flow, a drop grows at a pore until its weight exceeds the retarding force of surface tension and a drip occurs.

Concept: Increase the surface tension of tea bags to reduce tendency of tea to form into drips when a bag is lifted from a cup.

What about a contrarian view?

Concept: Reduce surface tension of bag so that tea drains rapidly from bag as it is removed from a cup. Increasing porosity of bag will also cause more rapid draining.

Does this apparent contradiction, both increase and decrease surface tension, suggest a violation of scientific fact? No, it implies the existence of an optimum range of values for surface tension in this particular application. Some investigation and modeling may be needed.

This demonstrates how plausible root-cause branching via active or causal attributes deepens understanding and presents search paths for new concepts. It also suggests how ideas for research come about.

I'm sure other concepts occurred to you. Please explore plausible root-causes branching and see what ideas you derive. For this problem there are other points of contact and more attributes to consider (after getting all the ideas you can from the first branch considered above).

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6. Feedback

Rich Kucera has recently started a Yahoo USIT group. See what you think of the idea.
The URL is …

http://groups.yahoo.com/group/heuristic/

Rich has made a number of nice comments about USIT in private correspondence. With his permission I'm sharing the following:

"For me, USIT is not just for inventive problems – I would try to use USIT all the time just for the way it teaches you how to define a problem. Another reason I would try to keep it in mind is that USIT seems to be an excellent platform to support curiosity about other technical/scientific disciplines not in your own field of expertise.

Another thing I like about it is it gives clear points at which outside consultants can be called in to ask focused questions on feasibility, and post-USIT engineering. Also gives mgmt an opportunity to be involved in conceptual part of problem. The problem definition phase of USIT is far in advance of anything I've seen (the possible exception is the Structural Thinking of Robert Fritz, but with "effect" language in Problem Definition and the Particle Method USIT currently integrates and goes beyond the "current reality/results wanted" language Fritz's method)."

7. Papers and essays

The following materials can be read by clicking on their titles. Links are also available on the USIT website (www.u-sit.net/Publications)

1. "Injecting Creative Thinking Into Product Flow"
2. "Problem Statement"
3. "Metaphorical Observations"

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 Technical 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.