U-SIT And Think News Letter - 28

Updates and Commentary

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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:

- Mini-lecture #28 digresses from the ongoing discussion of the drinking vessel using the CAF table and addresses query #3 from Professor Nakagawa.

1. USIT – How to Invent: the USIT textbook.	$44.50
2. USIT – an Overview	FREE

3. Mini USIT Lecture – 28

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

Continuation of **How to Invent** …

4. Classroom Commentary

Professor Nakagawa's Query #3

> *"Could you also make an overall view of this case study, to show what kind of consideration is essential in USIT. In a sense every lecture of yours shows such essential consideration. But since there are nearly 20 lectures already, please make us confirm the essence of your USIT procedure."*

This is a timely query. On reading it I suddenly had the feeling that I naively started off on a problem-solving excursion without letting my passengers know where we were headed. For that I am sorry. I will stop here and try to rectify the situation.

Two similar problems
So far I have addressed two example problems. The first dealt with the messy ink, the second is addressing inventions for a drinking vessel. The first I refer to as a "fix-it" problem. The second I refer to as a problem of "invention". Note that I put "invention" within quote marks.

In the current problem, finding drinking-vessel inventions, the team was charged to produce new

"inventions". Whereas the former problem, "fix-it", only incremental improvements are needed and expected.

The reason I called attention to "invention" within quote marks is that we should consider inventions as results obtained by filtering solution concepts for every problem we solve. Management wants "inventions", problem solvers want "inventions", stockholders want "inventions", everyone wants "inventions", but what are they? Do you know what an invention is? Inventions probably start out as ordinary solution concepts until they are recognized as unusual, not obvious, curious, clever, simple, cheap, profitable, "competitive edge", and on and on. Solution concepts become "inventions" by passing certain ad hoc filters. Ad hoc filters are filters that change in time. What is inventive today may not be inventive next month.

I have had many solution concepts that I instantly recognized as inventive. However, for the most part, save a dozen or so patents, they were short-lived as inventions.

With "invention" relegated to the end game of USIT, we are free to resolve any and all problems in the form of solution concepts. However, "fix-it"-type and "invention"-type problems are common designations used in problem-solving assignments. This distinction can be a stymie to USIT students – they seem not to know how to start. Hence, for illustration, I have elected to call attention to fix-it-type problem solving and then to invention-type problem solving to show their similarities. As a result of these similarities we have no need to change the USIT process. We simply convert "invention" into an "unwanted effect" and solve it. "Fix-it" has an implied unwanted effect.

Strategy

Most of the time when we begin to solve a problem, any kind of problem, we formulate in our minds some kind of strategy for progressing from the problem to the solution. There are exceptions. On occasion I have faced mathematics or physics problems for which I had no idea how to begin. No plan of attack was evident. When this happens I usually play around with pencil and paper jottings of the numbers involved, or sketches of the objects, or portions of text, whatever are the obvious elements of the problem. At first it is merely mental play having no rational objective. At some point an idea eventually comes to mind that recognizes a key need in the problem, a potential route to collect other components, and a goal. My first clue often arises as I begin to cull useless information. This is usually the needed break in foggy thinking that gets the job going. This "getting the job going" is not problem solving. It is problem definition.

My problem-solving experience has taught me that the most important part of getting the job going is problem definition.

In USIT the flow chart is a standard (to-be-memorized) strategy for problem solving. It is brief, simple, and made up of powerful metaphors that are intentionally ambiguous to be broadly provocative. Having the "standard" strategy in the form of a flow chart accelerates our progress through a potentially foggy start up. Once we have defined the problem clearly, and have expressed it in the language of USIT (objects, attributes, and functions) the flow chart becomes functional and so does our mental procedure.

At the highest level the flow chart leads us through three strategic stages: define > analyze > solve. Each of these consists of heuristic tools. The strategy of USIT, as we progress through the flow chart, is to isolate a single unwanted effect, express it with appropriate ambiguity, pry into the depths of its

root causes, open new perspectives, and spark unusual recall. The strategy is accomplished by using the heuristic tools.

I have also learned from my problem-solving experience that flow charts guide logical, linear, thinking, but illogical, scattered thinking may spark solution concepts. The former is manipulated fully at the conscious lever. The latter occurs in the subconscious without the benefit (a questionable word) of logical manipulation. It is this idea that justifies the emphasis on ambiguity in objects names, for example, in order to allow the subconscious to make unusual (illogical) object-object associations.

The most important conclusion I draw from this observation is that encouraging the subconscious to work is more important than belaboring a flow chart. And the consequence of this statement is that I often follow a fresh, unexpected idea right to the solution stage, which diverts me from the flow chart to which I eventually return.

This kind of flexibility requires, or produces, valuable iterations between the three stages of problem solving. Each stage improves with iteration.

However, having said all of the above have I answered Professor Nakagawa's query – "What is the essence of your procedure?" I'll pause here to review the earlier lectures.

So what is my strategy in the messy ink problem? Here's a synopsis.

NL_01

- begin by **constructing a well-defined problem**.
  - reduce the problem situation to a single, unwanted effect.

NL_02

  - minimize objects

NL_03, 04

  - identify plausible root causes
  - examine points of contact between the objects
  - identify and remove filters

NL_05, 06

  - record solution concepts as they occur

NL_07

- begin **problem analysis**
  - construct a closed-world diagram of how the errant design was intended to work (no unwanted effect here)

NL_08, 09, 10

  - construct a qualitative-change graph associating the unwanted effect with causal attributes of specific objects

NL_11 thru 18

  - apply **solution techniques**

NL_19

- Clarification of causes and effects (also published in the TRIZ Journal)

*** At this point, I think it would be instructive to ask you to construct an up-to-date synopsis of the lectures on inventions for a drinking vessel.

8. Other Interests

1. Regarding inquiries about ordering the book, "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. USIT newsletter readership is growing weekly. Multiple readers are registering from many companies. Thanks for spreading the word.

3. A temporary newsletter auto-mailing snafu caused some multiple mailings. I think I have corrected this problem.

4. The USIT newsletter is being translated into Japanese and Spanish. Now I learn that a Korean translation is in the making.

5. My new book on heuristics is in the final review stage. I'll keep you posted on publication timing.

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

To be creative, U-SIT and think.