U-SIT And Think News Letter - 61

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:

. The mini-lecture in this newsletter addresses the goal of structured problem solving methodologies. They are not algorithmic procedures for generating solutions, as in mathematics. They are paths to follow with one's eyes wide open. They show us how to plant seeds along these paths that can spark new concepts.

3. Mini USIT Lecture – 61
5. Heuristics for Solving Technical Problems

A Point of View

Creative thinkers often stand out in a group, problem-solving exercise. They have a trait that becomes evident in early stages of the exercise as the group struggles to clarify a problem situation. As the exercise unfolds, all members of the group are exposed to the same information. All share in the questions and discussion that gradually brings the group to a common understanding of the problem to be solved. Of course, backgrounds, experience, and ages of the group members are different but the creative thinkers among them will exhibit one common, distinguishing trait. They express different or unexpected insights.

A common feature in the definition of a creative thinker is the ability to draw new insight from the same information available to others. I'll call this a new *point-of-view* and then discuss how it comes about.

Structured problem-solving methodologies tend to have a lot of structure and a lot of methods. Their goal is to help a problem solver discover a new point-of-view of a problem. To understand how they can work let's begin by asking, what is a point-of-view?

My left-brain-literalist orientation started me thinking about the meanings of the two words, *point* and *view*. The first idea to come to mind was how we are trained in hunting animals to not stare at a potential location and examine its detail. Rather, a more effective procedure is to move one's head slowly while noting any motion in one's peripheral vision. When motion is noted, then look

straight ahead at it for detail. The reason is that our peripheral vision is more sensitive to motion while our central vision recognizes detail.

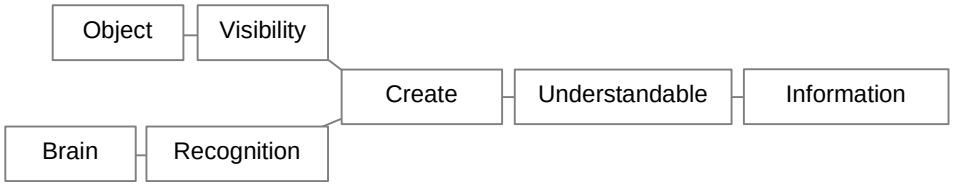
However, my problem-solving experience interrupted that train of thought to recognize that maybe some creative thinking would be useful here. That brought to mind the heuristic *to generify*. The value of generification in creative thinking is to subdue left-hemisphere logic in order to encourage right-hemisphere intuition and leaps of insight.

But how should point of view be generified? That's an unanswered question; it's now my problem to be solved. I'll begin by identifying objects, attributes, and an unwanted effect.

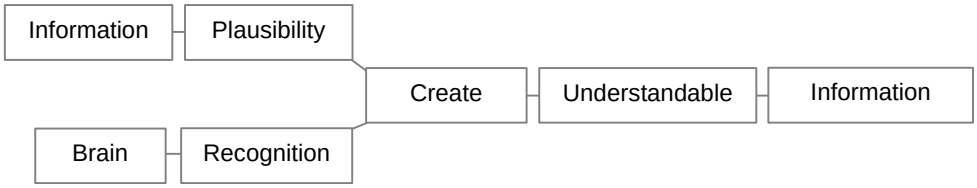
For discussion purposes, the unwanted effect can be expressed as "point-of-view is not generic".

Point-of-view suggests two things: something being seen and a mental reaction to it – a view, an interpretation of what is seen. The mental interpretation is an information object. The "something being seen" could refer to a physical object or an activity that the eyes physically see – "I see the dog chasing the ball." It could also refer to a mental concept that the brain metaphorically sees – "I see the point you are trying to make." Let's construct and compare OAF diagrams for these two cases to see if any enlightenment occurs.

In the first case, a physical object has the attribute of its visibility interacting with the attribute recognition (recall) of the brain to create understandable information.



In the second case, a purely mental exercise is at play in which the plausibility of information as an idea is tested for sensibility.



In both of these the brain plays similar interpretive roles. The two differ in the nature of what is being recognized. On noting this distinction a generification came to mind. Namely, that the conscious brain gets the information it tries to understand from the five senses and from the subconscious.

The conscious gets ideas from the subconscious throughout the problem-solving process. These ideas may need reshaping, trimming, and assembly before becoming a viable solution. We do that consciously.

By analogy, we have discovered that generification of point-of-view can be interpreted in terms of six paths of mental cognition – six metaphors. One new idea came from this, that the subconscious, as well

as the senses, is an information path to the conscious. Is there more RH creativity to be found from *point-of-view*?

It seems evident that so far I have favored LH logical thinking in this discussion. Generification has not engaged much RH thinking. The way to solve this problem is to remove the words that cue the LH and in their place use words that cue the RH. This calls for metaphors, words not immediately acted on by LH. RH deals in metaphors. Yes, words are metaphors and simple rewording of metaphors can be an effective thought seed.

In the case at hand, only two words were being considered, point and view. As a phrase, point-of-view, is a metaphor. This was seen when two interpretations were found for it.

Can more metaphors be found for point-of-view? Try these:

> "I have the feeling that …"; "It tastes a little like …"; "It smells of …"; "It sounds to me like …"; "I can see a …"; "This idea comes to mind …".

These show some insight and a lot of logical association with the discussion above – finding an expression for each of the six pathways to cognition.

We can also find different wordings for point-of-view that convey its intended use in problem solving:

> "insight"; "perspective"; "new focus"; "mental vision"; "new interpretation"; "fresh outlook"; "fresh eyes"; and "pathway to cognition", among others.

The latter caused me to wonder what is a pathway to cognition? Can this lead to any new ideas?

There are many pathways to cognition. Of interest here are those that lead to discoveries of solution concepts. A simplification of this process is that an idea surfaces to the conscious and there is tested for rational and logic in resolving an unwanted effect. It is not known how the subconscious does this. Another simplification is that the subconscious can be sparked into action by metaphors, which require interpretation.

The structure and methods of structured problem solving take us down paths of cognition as metaphors spark new ideas.

Point-of-view is a pathway to cognition.

6. Feedback

.

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/
	Korean	Yong-Taek Park	www.ktriza.com/www/usit/register_form.htm
"**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_59	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.

U-SIT And Think News Letter - 62

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:

. I ran across criticism of a source I favor for discussion of LH- and RH-thinking traits and their relevance in learning to draw. Since I have discussed this subject in these newsletters, I felt that I should acknowledge the criticism and revisit my discussions to see if apologies to you my readers are needed. I'll let you decide.

3. Mini USIT Lecture – 62
5. Heuristics for Solving Technical Problems

A Point of View on LH- RH-Lateralization

It has come to my attention that a source I favor for information on LH- and RH-thinking has come under criticism. Then I discovered that some of the criticism has been criticized. This has forced me to revisit my discussions on LH- and RH-lateralization and determine what changes should be made, if any.

The basis of these criticisms has to do with one's interpretation of the degree of separation implied in left-brain versus right-brain thinking, or left-hemisphere versus right-hemisphere differences (lateralization). A problem can arise when these terms are used as labels for classifying people as left-brained or right-brained. They may be misleading.

This is not a criticism of handedness labels, although handedness is subject to similar variations. Most people are right handed, some are ambidextrous, and some are left handed.

Let's examine the evidence. As we do, watch for tendencies to interpret things as black and white versus having shades of grey.

Neuroscience research early recognized that damage to the left-hemisphere of a brain *typically* affected a person's use of language. Paul Broca (1861) studied an extreme case of a patient who had a large cyst in the left hemisphere of his brain. He spoke only one word, his name, Tan. Studies of brain-damaged individuals by other scientists added to the evidence for language being associated with the left hemisphere. The singular importance of language as a brain function led to the label, left-brain *dominant*.

The Nobel Prize winning research of Roger W. Sperry and colleagues (1960's) opened the era of split-brain research. In severe cases of epilepsy it was discovered that severing parts of the corpus callosum could eliminate seizures. Subsequent studies of these commisurotomy (split-brain) patients revealed that their brain hemispheres performed independently – they had two brains. Both performed reasoning, remembering, communication, and problem solving, but with differences. Differences occurred in some degree of preference of one hemisphere or the other for various types of thinking (lateralization).

The right hemisphere was shown to be conscious, have a sense of self, of time, of the future, of humor, and could communicate with left hemisphere through emotional pathways in the limbic system (below the cerebral cortex).

Left-hemisphere specialization includes speech, reading, writing, syntactic and semantic analysis, symbolic relationships including logic and higher-order mathematical reasoning, as well as processing sequential order and keeping time (to music).

Right-hemisphere specialization includes non-linguistic processes involving visual and spatial judgment, higher-order geometry involving manipulations of three-dimensional images, solving visual puzzles, reading faces, drawing maps, following complex musical rhythms, discriminating chords, and singing.

Left Hemisphere	Right Hemisphere
Language skills	Copying of designs
Skilled movement	Discrimination of shapes
Analytical time-sequence processing	Understanding geometric properties
Symbolic relationships	Reading faces
Higher-order mathematics	Music
Keeping time	Understanding metaphors
	Holistic processing
	Expressing & expressing emotions

The table lists some of the specialties noted. Although sometimes the lateralization differences were small they were statistically significant.

Thus, differences in brain-hemisphere thinking were recognized in split-brain people. However, in those with their brains intact, both hemispheres were found to work in harmony as a single brain. The resulting model is that the whole-brain simultaneously processes the same sensor information in both hemispheres. The outcome is influenced by the traits of each hemisphere.

Modern brain-hemisphere research uses imaging techniques such as PET (positron emission tomography) and the newer fMRI (functional magnetic resonance imaging) to locate centers of thinking activity in whole-brains while performing thinking tasks.

The criticism of left-brain and right-brain labels for lateralization of thinking traits is the possible inference of a barrier separating these activities. Such labels do not emphasize, or even recognize, that both hemispheres do both kinds of thinking. One may do one type better than the other one does, but together they outperform either one.

In my reading of the literature I have inferred differences but have never inferred stark distinction between the two brain hemispheres. I have, however, used LH and RH labels freely to imply a difference. This realization has me concerned that my readers may have been misled. If so, I apologize.

All be they small, the lateralization differences exist. This may help to understand the small differences among individual technologists in a problem-solving group. With similar years of experience, and training (but not equal), some show innovative thinking while their colleagues do not.

What is more important than labels, to our development of models for innovative thinking in problem solving, is the recognition of the modes of thinking we have. Of these, the two of most significance are logic and metaphor (which have been identified as LH and RH traits, respectively). It doesn't matter so much which hemisphere *prefers* (is stronger in, uses better) which trait, or if both use them. Two things matter: that they are natural thinking modes and that they have the innate natures of being contradictory. Being contradictory suggests that it should be easy to favor one trait over the other. Hence, an effort may be required to enable both traits to participate in innovative thinking – especially for logical-thinking technologists.

Dr. Betty Edwards, in her book "The New Drawing on the Right Side of the Brain", Jeremy P. Tarcher / Putman, New York, NY 1999, (my favorite source) uses LH and RH differences to explain how some people fail to learn to draw while others have little difficulty. This happens early in life. When trying to sketch an object, and the results are not good, one becomes discouraged. She points out that part of the problem lies in LH logical criticism. She argues that one needs tools with which to subdue LH criticism and encourage RH spatial thinking. She gives an excellent example exercise of drawing left and right profiles of a human head to form a "Face/Vase".

In this exercise you copy one profile onto a sheet of paper while naming each part of the head being sketched: forehead, brow, nose, upper lip, lower lip, etc. Then draw horizontal lines on the top and bottom of the sketch representing the top and bottom of a vase viewed in profile. The vase is to be completed by coping the just sketched profile in reverse (left-to-right mirror image). Before sketching the second side, trace again (on top of) the original profile while carefully naming each part of the face. This brings LH verbalization in to play. Having retraced the first side, now draw the other side to complete a vertically, left-to-right symmetrical vase.

A typical experience of someone drawing the mirror image is to suddenly be stopped and confused, as a line seems to want to turn in the wrong direction. She explains this conflict on the need to exercise RH-spatial awareness to complete the drawing but being criticized by LH-verbal interaction.

She offers a neat solution to this conflict by having you copy a rather complex line drawing. In order to shift your thinking to RH-mode without LH-conflict, she has you turn the drawing upside down to discourage any tendency to name parts. I found this exercise very enlightening. This is a good example of problem solving from a new viewpoint.

The description you have just read is not that of Dr. Edwards. It is my interpretation of her concepts. I have no reason to criticize her discussion, either of her ideas about how to draw or her explanations of LH and RH thinking. She makes no claim of being a neuroscientist. She has researched both subjects (art and brain lateralization) and makes convincing arguments of how to use the latter to the benefit of the former. Her goal is to extract or develop a model of thinking relevant to successful drawing based on thinking traits. I find her discussion of lateralization to be consistent with what I have read in psychology literature. Her presentation of the subject does not infer the stark division of LH and RH activities that some claim. The drawing examples she gives demonstrate real value to be gained from her model of LH and RH conflicts and how to resolve them.

Since I tend to think of art, writing, and engineering as different examples of mental problem solving activities, I look for similarities that underlie their problem solving experiences. Dr. Edwards' work has

convinced me that structured problem solving, as used in USIT and other methodologies, can gain from her work. Until cognitive psychologists have the details of problem solving worked out it behooves us to develop and test simple models to find effective aids. This has motivated my interest in examining how logical and metaphorical thinking can be accommodated in USIT. It is convenient for this purpose to think of lateralization of LH-logical reasoning and RH-metaphorical thinking as an effective basis for a model of problem solving challenges or opportunities. However, it is not intended that these terms be used as hard and fast labels. Nor is it intended to distort neuroscience understanding.

Upside-down copying in art has me looking for analogs in USIT for finding new points of view for innovative problem solving in technology.

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/
	Korean	Yong-Taek Park	www.ktriza.com/www/usit/register_form.htm
"**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_61	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.

U-SIT And Think News Letter - 63

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:

. With the mini-lecture in this newsletter I'm introducing the topic of the struggle we have between intuition and logic while adhering to the structure of structured problem solving. To demonstrate this effect I begin with the heuristic of working backwards. It is a well known heuristic in mathematics and we have all used it at least in solving some puzzles. It is one of the main heuristics of USIT.

3. Mini USIT Lecture – 63
5. Heuristics for Solving Technical Problems

The Intuition-Logic Struggle

Working backwards

We learn in the USIT textbook the importance of a well-defined problem and how to produce one from a wealth of problem-situation information. This is the topic of an early USIT lecture that is easily glossed over by students eager to get on with finding solutions. After all, "We've heard it before!" Yes, you have. Starting with a well-defined problem is a ploy of most structured problem-solving methodologies. But too often it is not recognized as a solution-finding step. How does that work?

How does defining a problem solve it? That's not quite what I mean. The point I want to make is that in the thought process of developing a well-defined USIT problem new insights are discovered. Each new insight instantly prompts the subconscious for intuitive solutions. We can't help that. In fact, we want to encourage it.

Intuitive solutions are often wrong, even so they provide excellent starting points for modification and polishing to make an unacceptable concept into an acceptable one. Of course you don't know a concept is wrong until you have consciously tested it. Then issues are discovered which seed again the subconscious. Intuitive solutions from our subconscious prime our conscious into rational thinking.

Recall that one of the solution techniques of USIT is to start with a known solution. This technique came about as an extension of the mathematics heuristic of working a problem backwards, from a solution to the initial problem. It is embodied in the particles method of ASIT and USIT, and the

little people of TRIZ. Another USIT heuristic, an extension of working backwards, is to look at intuitive solution concepts as tentative solutions to be modified for possible use.

Reality versus logic

In a moment we're going to do an exercise together to demonstrate a subconscious conflict of reality and logic. I could tell you this at the end of the exercise and then have you go back and review how it happened. However, it occurred to me that it might prove more effective to give you a clue of what to watch for as we proceed. Since it is a subconscious phenomenon, I don't think forewarning will affect the results.

The logic of USIT suggests first establishing an unwanted effect. Follow this with its analysis. Then look for solution concepts. The reality is that upon recognizing an unwanted effect one's mind immediately offers intuitive solutions. It is reminiscent of the axiom, "Put a problem on the table and everyone present will instantly try to solve it".

Intuitive solution concepts

To illustrate how quickly intuitive concepts come to mind I'll suggest a problem situation and slowly walk us through it. As you read, stop immediately (before you see my ideas) to write down solution concepts as they come to your mind, any intuitive ideas. These should include related problems and known products that come to mind. Of course you and I will have some of the same ideas and some different ones. There is more to be discovered in this exercise, but I'll save that until we have some ideas to work with.

{Pause here to get a pencil and paper. Heuristic: Learn by doing.}

The {Pause here: …} inserts that follow show where I paused to ponder a moment.

A simple way to find a problem to discuss is to pick an obvious artifact ,any manmade object, and wonder how it might be improved. This could involve modifying an existing feature (incremental improvement) or adding a new one (invention). I'm typing this lecture using a computer keyboard. This could be a useful artifact. Let's give it a try.

I asked myself if a keyboard could be improved? That led me to look at it to see which keys I use and don't use.

{Pause here: Have you written any ideas yet? If not, give yourself another 30 seconds while you stare at your keyboard.}

I noted immediately that I rarely use the numeric keypad, 20% of the length of my keyboard.

{Pause here: Any intuitive activity yet?}

Then I noted that I rarely use the F-keys, 40% of the width of my keyboard.

{Pause here: Now how many ideas have you gotten?}

Without pausing to verbalize an unwanted effect, several intuitive concepts came to my mind:

1. Make the numeric keypad thin and slide it in and out from under the main board when working on projects that need it.
2. Make the thin keypad a touch-sensitive pad.
3. Make the F-key row retractable also, to be brought out for projects that use them.
4. Replace the F-key row with a single-line display screen showing the line being typed. This would ease the distraction and avoid loss of time when stopping to find the cursor

on a large screen.
5. Make a folding keyboard to hide unneeded sections.
6. Design a split, rotatable keyboard (a known product).

Now that those ideas are out of my head I can move on.

{Pause here: Did you think of these ideas and/or others? Did these cause you to think of others? List any ideas that reading mine caused you to think of – ideas spawn ideas. Did some of your ideas spawn others?}

7. Have the numeric keypad and/or the F-keys appear in a corner of the main screen when needed. Display and operate them using the mouse.

Pause here: (I'm momentarily out of ideas.) Was your intuition productive up to this point? How many ideas did you have? Did it occur to you that any particular ones might be worth developing further?

Our goal in this exercise is to select a problem situation and develop it into a well-defined problem. The above pauses and moments of pondering were to clear our minds of intuitive ideas without filtering them.

An unwanted effect that is nagging in the back of my mind is the computer keyboard takes up too much desk space. I'll continue with that idea. You will get more out of this exercise if you choose your own unwanted effect to work on as you read.

Points of contact offer phenomenological insight

Next we need to select objects that contain the unwanted effect. Two pairs of contacting objects came to mind: keyboard and desk, and keyboard and fingers. It's convenient to group fingers as a single object. I'll look first at the keyboard-and-desk pair of objects and then consider keyboard-and-fingers. The former will clarify the functions a keyboard has; the latter will clarify its operation.

Serious analysis of a pair of objects and an unwanted effect begins at their point of contact. The phenomenology we invoke, to rationalize proposed causes and their effects, provides new insights.

Phenomenology

The frame defines the footprint of my keyboard. Within the frame are individual key assemblies. The keys are arranged into several function groups; a QWERTY group with its own numbers, the F-keys, a numeric keypad group, arrow keys, Insert and Delete and 4 page-selection keys, 3 screen manipulation keys, and an isolated Esc key.

{Pause: Any intuitive activity here?}

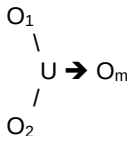
8. Replace F-keys with voice activation.
9. Replace screen manipulation keys with voice activation.
10. Replace the F-row of keys with a built-in touch-sensitive cylinder of keys. Rotate the cylinder to a row of F-keys or a row of screen manipulation keys, or arrow keys, as desired. Maintain cylinder position with angularly arranged detents.
11. Replace the top row of number keys with the key cylinder (10) and let the F-row be the default position of the cylinder.

Other objects to consider are fingers that make contact with keys.

Intuition model

It appears that subconsciously I'm using a simplified OAF model in finding intuitive

concepts – no attributes are involved. This demonstrates that intuition is seeded quickly with only objects and effects. By adding attributes to our thought path we begin to subdue intuition and emphasize logic. Logic, in this instance, gives us pause to rationalize the addition of other key features in problem definition. Once this is done, intuition will again become active, as you will see.



----- This lecture topic will be continued. -----

The next lecture will begin with construction of a plausible root-causes diagram. You might find it interesting to do this on your own before the next newsletter comes out.

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/
	Korean	Yong-Taek Park	www.ktriza.com/www/usit/register_form.htm
"**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_62	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.

U-SIT And Think News Letter - 64

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:

. The discussion of intuition-logic struggle, begun in NL_63, is continued here. Please have your paper and pencil at hand and note your ideas as they occur.

. If you have not seen it yet, the "Second TRIZ Symposium in Japan" has been announced. For more information visit …

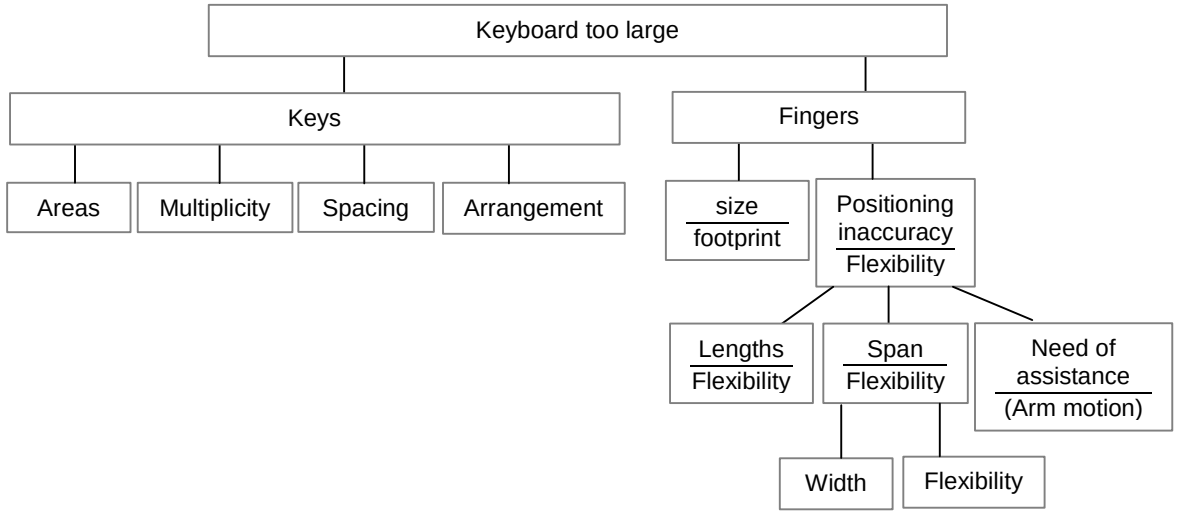
http://www.osaka-gu.ac.jp/php/nakagawa/TRIZ/eTRIZ/

3. Mini USIT Lecture – 64
5. Heuristics for Solving Technical Problems

Continuation of "The Intuition-Logic Struggle"

In the last lecture we saw intuitive ideas spring from the names of three objects and an unwanted effect. Now we'll add attributes to see what happens.

Plausible root-cause analyses for new perspectives
We can do a quick plausible, root-causes analysis at this point to see if any new ways of looking at the keyboard come to mind as we identify attributes. Choosing keys and fingers as two interacting objects was obvious, as were the causal attributes of keys shown in the diagram. The remainder of the diagram required more consideration.



After some thought, I chose finger size and positioning inaccuracy as the main causes of fingers producing the unwanted effect. Positioning inaccuracy involves three finger-attributes, longitudinal reach, angular span, and any need of assistance. Short fingers may need assistance from arm motion. Arm is inserted in parentheses to indicate that an additional object is being considered. Finger span is limited by interference of neighboring fingers as a result of their widths and finger-joint flexibility.

In the process of rationalizing the components of the diagram, thoughts came to mind about causation of flexibility. These included issues of undue stretching, fatigue, and general ease of motion. I also thought of the tactile contact with a key. However because I have little experience with these issues I moved on. They seem to be more appropriate for ergonomics experts. Note that these ideas provide entrees for sensible discussion with an expert.

{Pause: Any intuitive activity here?}

The exercise caused me to examine and analyze my hand and finger positions while typing. I noticed that I rest my forearms (not elbows) on the edges of my desk as I type. Their positions introduce natural arcs in the lateral motions of my hands as my hands move over the keyboard. This made me wonder if arranging the rows of keys in arcs would assist typing accuracy – an experimental idea for the ergonomic scientists (and a keyboard idea – that may be known [?]).

12. Arrange QWERTY-rows in arcs.

Positioning inaccuracy, being related to span flexibility, raised a question of whether all keys need to be of the same width? Why couldn't keys within the easy reach of one's default hand positions be narrower?

13. Vary sizes of keys according to ease or accuracy of locating them.

I notice that, to this point, 11 ideas were found before the plausible root-causes analysis and 2 afterwards.

In my experience, construction of the plausible root-causes diagram demands associated rationalization. This leads to trial-and-error testing of causes, trial selection of wordings, and rearrangements of boxes. It is the most thought provoking exercise of USIT. Here you discover the depth of your understanding and the level at which you should be able to find solution concepts.

However, in this particular example, I got more intuitive ideas before looking for plausible root causes than during the search. That didn't used to be the case when I was first developing the tool. This is why I encouraged you to pick your own unwanted effect to investigate. That way you could discover how construction of this diagram impacts your thinking process.

Problems solved using USIT

I'll digress a moment to attempt an explanation of my experience. I am occasionally asked for examples of problems solved using USIT. This question is somewhat troubling because it seems to ask what has USIT done? I have solved problems using calculus, but I can't tell you what calculus has done.

I have used USIT many times in the past years, always with success. Yet I can't claim that those problems were solved by USIT. USIT is a thinking methodology based on an assortment of heuristics. Problem-solving ideas come to mind while using these heuristics. However, heuristics are exercised at the conscious level. Solution concepts arrive to the conscious from the subconscious.

Solutions belong to their associated problem not to a methodology. In principle, they can be found by other methods. Using USIT is a way for the conscious to seed the subconscious. The subconscious does the problem solving. How? I don't know.

So why did I find more ideas intuitively before exercising the plausible, root-causes heuristic? It may be that years of experience using USIT has somehow engrained in my mind unwanted effects, contact between object pairs, and causal attributes in some subconscious but effective way. This would be doing USIT at the subconscious level. It may simply be that I'm old enough to have many years of experiences for my subconscious to search through. Cognitive psychologists probably have other ways of looking at this question.

Finally, note the logic, or its lacking, in the processing of the exercise so far. I started out using USIT on the keyboard problem. While searching an unwanted effect, intuitive improvements came to mind. By the time I got to plausible, root-causes analysis more concepts had been found than would be found using the analysis. Did USIT provide these ideas? I don't think so. Did my logical, conscious mulling of USIT do it? Again, I don't think so. Solutions came from my subconscious. Conscious testing of these intuitive ideas raised more questions for the subconscious to ponder. Did you have a similar experience?

Let's get back to the exercise.

Multiple unwanted effects

"Keyboard too large" is one possible unwanted effect. Can a computer keyboard have others? A keyboard's electrical cord is always a nuisance, but wireless communication solves that one. Visibility is a problem with laptop keyboards on night flights. It is also an occasional problem for desktop keyboards.

14. Illuminate keys.

A systematic method of searching unwanted effects is to focus on contact points of single pairs of objects. Let's have a look at a single finger contacting a single key.

{Pause: Any intuitive activity here?}

This brings to mind typos and their causes. I have in mind mechanical errors not mental ones. There are two mechanical errors that I experience while typing: accidentally striking two side-by-side keys simultaneously, and accidentally catching an upper row key when intending to strike the key below it.

Eye contact with key is another possible source of an unwanted effect. My typing is composed partly of unaccomplished touch-typing and partly the "biblical method" (Seek and ye shall find!). Seeking and finding requires eye-key visual contact. I have no touch-typing capability with number keys. I rarely use the numeric keypad, preferring instead to look at the upper row of number keys while typing. Thus I always position my keyboard toward my right-hand side to put the numeric keypad

out of the way and more easily access the QWERTY keys.

No other unwanted effects come to mind at the moment; so let's analyze the simultaneous two-key-strikes effect. I'm distinguishing simultaneous two-key-strikes from a double-strike of a single key.

********** To be continued **********

This is a convenient break point. It'll give you a chance to try your thinking process in modifying the plausible root causes diagram for the unwanted effect of striking two keys.

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/
	Korean	Yong-Taek Park	www.ktriza.com/www/usit/register_form.htm
"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_62	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.

U-SIT And Think News Letter - 65

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:

. The discussion of intuition-logic struggle, begun in NL_63, is continued here. Please have your paper and pencil at hand and note your ideas as they occur.

. If you have not seen it yet, the "Second TRIZ Symposium in Japan" has been announced. For more information visit …

http://www.osaka-gu.ac.jp/php/nakagawa/TRIZ/eTRIZ/

3. Mini USIT Lecture – 65
5. Heuristics for Solving Technical Problems

Continuation of "The Intuition-Logic Struggle"

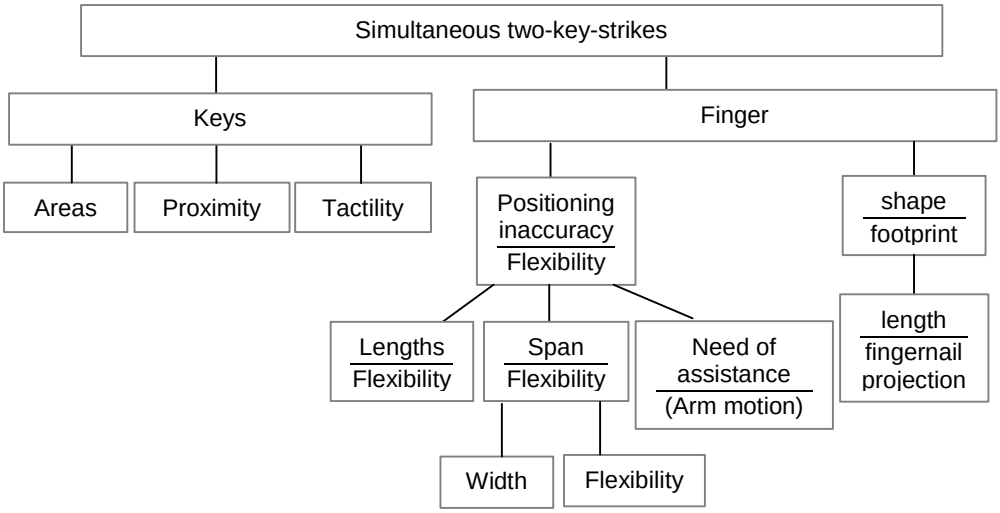
Since the last mini-lecture (NL64) you have had a chance to try your hand at developing a new perspective within the plausible root-causes diagram for the unwanted effect of simultaneous two-key strikes. I trust that this has been an informative exercise for you. I'll begin this lecture showing you my attempt. We understand that this is not an exercise in deciding right from wrong. It is an exercise in discovery by seeding individual minds. Consequently, we should expect interesting differences, all of which are usefull – the motivation for organizing "fresh-eyes" teams in industry.

Analysis of simultaneous two-key strikes
My attempt at plausible root cause analysis of simultaneous two-key strikes is shown in the figure on the next page.

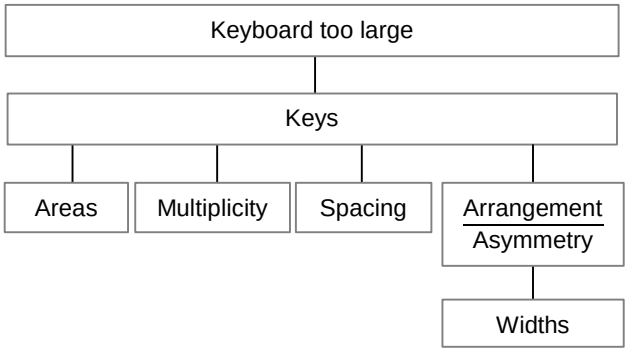
This analysis brought to light the plausible cause of two, vertical-key strikes being a result of fingernail extension of a finger's footprint.

15. Decrease the chance of catching an upper key with a fingernail by increasing the trapezoidal slope of a key (reduce its top area).
16. Decrease the chance of catching an upper key with a fingernail by embossing a small, raised landing pad atop a key.

These ideas caused me to reflect on key shape, which recalled the original OAF diagram. On examining the diagram again I thought to look at key arrangement. The Keys-section of the diagram is repeated here (second figure on the next page).



Modification of the keys-section of the OAF diagram for the keyboard too large unwanted effect.



Keys arrangement caused me to notice that ten keys in the QWERTY section are wider than the letter keys. Why? That question caused me to note that if they were all the same size and two redundant keys in the bottom row were eliminated, a smaller footprint trapezoidal shape would result. Could it be that the wider keys, and redundant keys were added to fill out a rectangular shape?

17. Eliminate redundant keys and give the outside columns of keys widths that produce a smaller area trapezoidal footprint.

As I typed “outside columns” it caused me to look at the keyboard and note the frame again. The frame has an exposed boarder all the way around its perimeter. Why? My fingers don’t make contact with it. It serves no purpose that I can see, other than display the manufacturer’s logo.

18. Reduce keyboard-frame size to the footprint (perimeter) of the bordering rows and columns of keys.

My keyboard, if reduced to a borderless QWERTY section, would be only 61% of its present width. I like that idea. Probably, I could then find a number of things I have lost on my desk. [☹ ➔ ☺]

Reality of problem solving
The reality of structured problem solving is that intuition and logic play complimentary roles. We outline our effort and rationalize our ideas using logic. This entails graphic and verbal metaphors. Elements of these metaphors seed our subconscious, which is eager to pursue every thought provoking seed for intuitive fruit.

In the keyboard exercise, I got eleven intuitive solution concepts before exercising the logical plausible root-causes tool. Once the tool was brought into use, I got an additional 7 ideas. Did the tool do this? I doubt it, as explained earlier.

Developing the plausible root-causes diagram was an intense exercise. It involved searching for a phenomenological basis of rational for each idea tested. For example, "position accuracy" was tested (in my mind) in several different wordings before being settled upon. Each test wording seeded the subconscious and raised further considerations for rationalization. Intuition offered test wordings. Logic made the final selection.

Logical problem-solving strategy with intuitive execution
On reviewing (logically) the keyboard problem exercise it appears that subtle intuitive strategies were at play. Once the artifact was selected for improvement, the computer keyboard, it intuitively became a single object with only two interactions: fingers-keyboard and keyboard-desk. I never even thought of keyboard-computer interaction, until writing this paragraph.

It never occurred to me either to consider object minimization, to which I am usually very sensitive. Also, I was well into the problem before thinking that the selected unwanted effect might be a convolution of others.

A major component of USIT's logical strategy is searching and analyzing two-object points of contact. It is assumed that there is a reason for every contact of two objects, i.e., to support one or more intended functions. We don't need to know *a priori* the reasoning of the designer for a given contact. On the contrary, we use this approach to spark our imagination along lines of logical relevance of a contact to enable us to apply our own understanding of the implied phenomenology. In this way, we encourage our subconscious (or hope to) to stay on track, so to speak. We identify the functions at a point of contact in images and words. These are the metaphorical seeds for our subconscious. We then delve deeper into our own understanding by polishing our interpretation through OAF diagramming.

Points of contact are themselves metaphors. For example, two flat surfaces in contact are treated as a point of contact. This may not be a good mathematical representation but it is an effective metaphor for sparking creative thinking. All we need to identify is what possible functions can exist at the interface of two surfaces in contact. Then select seemingly relevant ones. If you wish to think of the interface as an infinite set of points, okay; but you often find that each of these points performs the same function. Simplification encourages elimination of this redundancy and consideration of a single point as representative of the others.

Object → Function ← Object
As noted before, the unwanted effect of the keyboard being too large led naturally to two, two-object points-of-contact for consideration. Just out of curiosity, to see if we learn anything, let's consider the keys themselves. If they are taken as the problem situation, what unwanted effects could be invoked? (Yes, the question itself is a problem to be solved.)

----- This lecture topic will be continued. -----

This is a convinent place to pause. Can you think of other points of contact for analysis of the keyboard being too large?

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/
	Korean	Yong-Taek Park	www.ktriza.com/www/usit/register_form.htm
"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_62	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.

U-SIT And Think News Letter - 66

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:

. The discussion of intuition-logic struggle, begun in NL_63, is continued here. This is an ongoing exercise in sparking intuitive creativity. While reading keep listing your ideas as they come to mind.

. My ideas are numbered sequentially in these mini-lectures beginning with NL_63.

. Back issues of the USIT and Think Newsletter are available on request.

3. Mini USIT Lecture – 66
5. Heuristics for Solving Technical Problems

Continuation of "The Intuition-Logic Struggle"

(From **NL_65**) Can you think of other points of contact for analysis of the keyboard being too large?

NL_66
Intuitive insights from function identification
The obvious way to answer this question is to begin identifying functions of the keys. These come to mind:

- Present information to the user
- Transduce position information into electrical information
- Detect position change
- Provide logical access to their information (speed typing via a rote pattern)
- Provide convenient access to their information (visual cues)

When I typed "present information" (a seed) it brought to mind (recall of experience) the overlays for keyboards (intuitive result of seeding). Overlays are often used to aid one's learning of the features of a software system (logical expansion on intuition). Recall of overlays was an immediate suggestion that much more information could be made available on a keyboard than the QWERTY section provides (a new line of intuitive thought). This could be worded into an unwanted effect as, for example, too low information density. That is, given the size of a keyboard, it seems that potential information space goes unused. (I hope Madison Avenue ad writers don't get wind of this!)

Unwanted effect: "Keyboard information density is too low." Writing this statement started a flow

of ideas.

Let me get my intuitive ideas out of the way:

19. Inlay key tops with miniature digital screens for displaying information – such as keyboard overlays for specific software.
20. Make screens visible according to ambient light conditions.
21. Offer software developers access for showing information on miniature key-screens (a new product opportunity).
22. Use mouse pointing to select monitor icons for activating software-specific information displays.
23. Enable automatic illumination of key sequences for software training – such as learning a software package, performing computer diagnostics, computer hardware and software installation, etc.
24. To reduce typos, lock keys from accidental striking that are not needed in a particular software package.
25. Electromechanically retract unneeded keys.
26. In periods of no finger-key contact, mechanically raise the F and J keys to enable quick QWERTY hand positioning for touch typists.
27. Put detectable vibrations in keys for tactile identification by blind typists and touch-typing students.

Now that those are recorded let's begin USIT logic to seed more intuitive inspiration.

Intuitive insights from object identification

I'll begin with object identification and selection. Keys are obviously relevant objects. However, information is the more important. In the above list two forms of information objects were mentioned, visible and tactile. Audible information could be useful but taste and smell are not likely candidates (or are they?).

Visible information can be in the form of single color illumination, varied colors, varied intensities, and various patterns of multiplexed illumination, intensity, and color.

28. Encode key information in forms of multiplexed illumination, intensity, and color.
29. Encode key information in forms of multiplexed sound intensity and frequency.
30. Encode key information in forms of multiplexed vibration intensity and frequency.

An important contact with information is a key and the information it displays. This immediately provides a point of focus. Digital screens imbedded in key tops have been mentioned.

31. LED patterns could be embedded in a key top to enable multi-functions for keys under software control.
32. Keys could have foggy windows with etched messages to be illuminated when

needed.

33. Keys could have distinguishing grooves or bumps for tactile information.

Another important object that contacts information is the user. This makes me think of kinds of information the user might find useful on a keyboard.

34. A running tally of total word count when using word processors.
35. A running tally of file size when using image-processing software.
36. The directory path of the file being edited.
37. A memory-usage gauge.

Another point of contact already alluded to is sensor stimulation: by visual, tactile, and audible stimulation. This list could include thermal stimulation from hot or cold keys.

38. Encode keys using temperature modulation.

The idea of rote key pattern, mentioned above, brings to mind a subset of keys that are mechanically elevated while playing games.

39. An elevated pattern of keys for game software.

Intuitive leaps to creativity

"Leaps" come in various sizes. And size has various metrics. My big intuitive leap may be a piddling step in your mind. There is one distinguishing characteristic of any leap of intuition, namely, that it is not obvious. That is the implication of leap. Logic, by contrast, flows in incremental steps of accepted rational. These steps can be so small as to render their reading very dry. A good example is a mathematical proof.

The complimentary interaction of logic and intuition as we solve problems is composed mostly of small leaps of intuition. Ambiguity of a metaphor eludes logic and seeds the subconscious to proffer a not so obvious idea, for which the conscious immediately fills in the logical connections.

When I typed, "Keyboard information density is too low" (above #19), it immediately seeded the not so obvious idea, "#19 Inlay key tops with miniature digital screens for displaying information – such as keyboard overlays for specific software". Looking back, maybe "information density" connected subconsciously to recorded experience with computer screens full of information. A month or so ago, I had given a lecture on digital photography in which I discussed the information density of a computer screen. As I typed the first part of the sentence logic seems to have stepped in and offered simple expansion of the idea "such as keyboard overlays for specific software".

In ordinary conversation a speaker's words may somehow metaphorically inspire a response from a listener that seems to be a way off track. Somewhere there is a logical connection within the listener's mind that is not obvious to others present. I can hear it now: "Why did you say that? It isn't logical!" When the responder takes a moment to logically clarify the response it suddenly makes sense. Intuitive leaps have different sizes in different minds.

The kinds of intuitive leaps that are considered to be innovative or creative are those not obvious to one's peers – people of similar training and background. This is a measure used by the US Patent Office. It requires a "non-obvious step" as a requisite for a patent.

The big leaps of non-obviousness come from minds packed with relevant information and long periods of analyzing, trial-and-error seeding, testing, modifying, and persisting, interspersed with resting and digressing. Periods of rest and digression allow the subconscious to organize recent memory and play with unusual associations that logic of the conscious would not allow. Insatiable curiosity can carry anyone there.

Heuristic: Foster intuitive leaps to discover creativity.

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/
	Korean	Yong-Taek Park	www.ktriza.com/www/usit/register_form.htm
"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_63	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.

U-SIT And Think News Letter - 67

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.

Keys

PD = Problem definition

H = Heuristics

T = Theory

M = Metaphors

This is a test of keying mini-lecture content – a suggestion by Australian reader Shahid Ahmed, to whom I'm grateful for the suggestion. What do you think?

Dear Readers:

. In this issue of the USIT and Think News Letter I digress to share with you comments by John Dunbar on the computer keyboard project. His comments are insightful, educational, and demonstrate how ideas spark ideas. If you are not familiar with the RSS Internet feeds he mentions, check out this URL: www.palinet.org/**rss**/toti/tsstutorial.htm

. HELP I'm searching for problem solving methodologies that advocate no filtering of ideas (or delay of judgment). Know any? References please.

Mini USIT Lecture – 67
Heuristics for Solving Technical Problems

Comments on "The Intuition-Logic Struggle"

[H] Five heuristics
Five effective heuristics for creating new viewpoints and sparking creative thinking:

1. Simplify
2. Minimize objects to two.
3. Analyze a single point of contact.
4. Critique criticism
5. Ideas lead to ideas

[PD] Problem start-up
The current problem on computer-keyboard design, begun in NL_63 as the struggle between intuition and logic, emphasized heuristics (2) and (3) and succeeded in producing leaps of intuition. (See Feedback below.) I hope you had the same experience as you listed ideas that came to your mind while reading the mini-lectures.

[T] How can this work? How can eliminating objects still produce broad ranging solution concepts including system-type ideas? My interpretation of this phenomenon is that the initial process of

- amassing problem-situation information,
- identifying and selecting a single unwanted effect,
- reducing information by organizing and selecting relevant material,
- minimizing objects to two, and
- analyzing a single point of contact,

is an intense procedure of rationalization and memorization. We are making a transition from the problem situation to a single problem based on our wealth of experience, training, and determination to simplify. In this process we immediately increase our memorized database of

experience and overview of the problem situation. This is the raw material the subconscious ponders while the conscious performs logical procedural steps of analysis to understand a problem.

[M] Throughout the ensuing logical treatment of the problem the subconscious is actively solving the problem with a different protocol, one that allows seemingly illogical association of objects, whimsical features, and broad interpretations of metaphors in the problem statement. The result is the subconscious constantly interrupting the conscious with intuitive leaps of insight not logically evident to the conscious. The subconscious is not logically bound to two objects and a single point of contact, but (by now) the conscious is. As the conscious is rationally analyzing the minimal situation, it is experimenting with words and images. These are metaphors for subconscious inspiration.

Feedback

Ed,

I was reading U-SIT - 66 when I considered item 20 regarding inlay key tops (to have miniature digital screens) when out jumps the internal "constructive critic" that whispered "won't work, there's too much pounding (stress, vibration) on the key tops. There will be LED failure." I quickly recognized the internal critic and realized that this was not the time to critique new ideas. So I dismissed the objection and read on a few more of your points.

But then I recalled an image of inlay key tops with their flashing lights and at the same time recalled my internal critic's objection. From there I immediately thought of using the wasted space that you earlier talked about in the same newsletter. I then imagined turning the keyboard casing tops into one (or several) miniature digital screens. This would eliminate the pounding issue. When I later read your items 34 - 37 of specific things that could be put on the keyboard screens, I thought my idea was somewhat confirmed and then lept to another idea of moving the Windows System and Taskbar items down to the keyboard. There's lots of fighting over screen real estate (particularly along the bar that runs across the bottom of Microsoft's operating system). Much of this could be minimized. From this, another idea appeared: why not use RSS feeds from the internet to drive keyboard advertisements or data feeds (stock prices, etc). Then I thought this also might be a solution to internet popups, as browsers could send pop-ups to the keyboards.

So, all of this led to a question: Can suppressing critical thoughts during brainstorming actually lead to more, or better, ideas. I ask this question because the essence of these ideas relied on getting around the stress factor that I perceived early in the intuitive brainstorming process. Should the critic be encouraged early in the process and milked for new ideas before any formal processes are started?

Keep up the great work. I didn't think your keyboard project would end up so interesting.

John Dunbar

John,

Your very perceptive introspection regarding reactions to computer keyboard ideas is most interesting. I would like to react to your comments and then get your permission to publish both in a future USIT and Think Newsletter.

"Constructive critic"
When the "constructive critic jumped out and whispered won't work", I thought, I know John Dunbar although we have never met. He shows the markings of a highly trained, practiced, sophisticated engineer or scientist. I recognize these markings as tattoos of membership in an elite club. Our motto is, "Don't believe anything you hear or read until you have critiqued its plausibility with respect to your own knowledge." I'm in the same choir and sing the same song. This is a valued trait that enables us to unravel semi-truths to nurture and grow our understanding of the world. My practice is a hindrance to my creative thinking that I constantly battle – more on this later.

"Too much pounding (stress, vibration) on key tops."
This is an insightful criticism that can detour one's continuation of reading or inspire further creative thinking (e.g., by critiquing the criticism). When I saw the words, pounding, stress, and vibration, I thought, aha, a chance for developing new materials – a creative motivation for materials scientists.

In teaching creative problem solving we commonly disallow filtering of ideas (criticisms). It's an ideal that I've never succeeded in mastering. So I have a requirement to criticism: I try to practice the idea of never criticizing an idea that I can't improve or extract a new idea from – ideas lead to ideas.

"Turning the keyboard casing tops into one (or several) miniature digital screens"
A great idea to be followed with more interesting leaps of intuition.

"Moving the Windows System and Taskbar items down to the keyboard"
I really like this one. I'll be first in line to buy one.

"RSS feeds from the internet"
This is another excellent idea and a good demonstration of how ideas lead to ideas.

"Can suppressing critical thoughts during brainstorming lead to more, or better, ideas?"
The more I practice problem solving the more I move away from the dictum of "no filtering allowed in creative thinking". As I indicated in the beginning of this response, critical thinking is what we are trained to do. To squelch it is unnatural. So let's deal with it as an asset in creative thinking. However, it is worth teaching to awaken students to our bent for criticism and how it can detour us from creative thinking.

The value of critical thinking in USIT is demonstrated every time we construct a plausible root causes diagram – it is built from rational thinking of phenomenology. To deal with it, make every criticism constructive with creative follow-on ideas of improvements. Thus, criticism at any time during problem solving can produce more solution concepts.

On the question of better solution concepts I do invoke the dictum of no filtering. To answer the question of *better* you must have in mind filters by which you can judge among solution concepts. I see no value in filtering concepts during creative problem solving – ideas lead to ideas. Such judging has its proper role in selecting ideas to pursue into engineering.

"Should the critic be encouraged?"
The critic is an innate presence in our professional psyche as trained technologists. Encouraging

his/her input is not an issue, but getting the most out of that input is. Milk it for all you can.

Thanks for you comment on the keyboard project being interesting. I did not know how the project would turn out and didn't worry about it. I try to attack problems in real time (so to speak) during USIT classes and in writing the mini-lectures. I don't want to know in advance how they will come out. I am fascinated with how we can seed our subconscious and find intuitive leaps of insight. Each new idea is a marvel as a problem progresses. Your feedback is very valuable to me and to others. Seeing how different minds cultivate the same metaphors in a problem definition is fascinating and educational.

Thanks too, for allowing publication of this communication. Ed

Papers and essays

The following materials can be accessed 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"

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/
	Korean	Yong-Taek Park	www.ktriza.com/www/usit/register_form.htm
"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_64	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.

U-SIT And Think News Letter - 68

Subject Keys

PD = Problem definition

H = Heuristics

T = Theory

M = Metaphors

A = Analysis

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:

. This issue of the U-SIT and Think News Letter has no mini-lecture. Instead, I'm using it to give you an overdue update on why the long gap of no newsletters.

. A brief report on The 2nd TRIZ Symposium in Japan 2006 is included.

. An interesting article in Popular Science magazine is referenced.

UPDATE

"All's well!"

Thank you for the nice letters subtly inquiring about my possible demise. I am pleased to report that all is well here. The recent hiatus is nearly over, but not quite. I'm reworking the web site in order to announce a new book that compliments and extends USIT. At the moment, I'm calling it Heuristic Innovation. More on this in the next news letter.

"ESP" Computer Keys (extrasensory perception)

An article in the December issue of Popular Science magazine caught my attention – as you may appreciate. The article, "Animated Keyboard", on pp. 104-105, states, "Program the keys on this customizable controller for your computer to take on different functions based on the application you're working on." Apparently, they are now selling this product.

My immediate interest follows from having written, among others, idea #19 in the USIT and Think News Letter (April 24, 2006) that states, "Inlay key tops with miniature digital screens for displaying information – such as keyboard overlays for specific software." (In NLs 61 – 66 some 39 ideas for keyboard inventions were discussed.) I wonder how long it took them to come up with their idea and whether they used any thinking methodology to do it? No such details were discussed in the article.

The 2nd TRIZ Symposium in Japan, 2006*

(* These notes incorporate comments extracted from the Preface for the Proceedings written by the Program Chairman, Professor Toru Nakagawa, and from his report on the meeting.)

I had the pleasure of being one of two keynote speakers at the 2nd TRIZ Symposium held in Osaka, Japan, August 31 to September 2, 2006. The symposium was attended by 157 technologists with 18 from China (Hong Kong), Germany, India, Japan, Korea, Russia, Taiwan, UK, and the US. Among the 34 presentations made, 11 were given by overseas attendees. Of interest for this newsletter are the number of papers presented (6 of 34) that had direct relevance to USIT and demonstrate its rapid growth in Japan. More detailed comments will be found at http://www.osaka-gu.ac.jp/php/nakagawa/TRIZ/eTRIZ/.

The USIT oriented papers include the following:

1) "Practices Applying TRIZ/USIT in Konica Minolta Business Technologies, Inc.", by Tateki Oka and Shigeru Sawada, both from Konica Minolta Business Technologies, Inc.

2) "A trial of 'Phenomenon-Attribute-Analysis (PAA)' application for the USIT textbook problem, 'Picture Hanging Kit Problem': a new device for the USIT Process", by Hideaki Kosha, Fuji Photo Film Co., Ltd.

3) "A Simple Theory Underlying Structured Problem-Solving Methodologies – ASIT, TRIZ, USIT (and others)", by Ed Sickafus, Ntelleck, LLC, Grosse Ile, MI, USA.

   (This paper is available as a 92 KB .pdf file; Click here)

4) "A New Paradigm of Creative Problem Solving (3) Usage and Significance of the Six-Box Scheme in USIT", by Toru Nakagawa, Osaka Gakuin Univeristy.

5) "Introducing USIT in Matsushita Electric Works", by Kouji Tsuji and Jiro Hashizume, Matsushita Electrical Works, Ltd., Japan.

6) "TRIZ Home Page for Students by Students" – Understanding TRIZ/USIT by Solving Everday-Life Problems, by Masayuki Hida, Tsubasa Shimoda, Naoya Hayashi, Mizuo Omori, and Toru Nakagawa, Osaka Gakuin University, Japan.

It was heartening to me to see the rapid acceptance and adoption of USIT in the Japanese technical community. The Japanese industrial and academic efforts, and the symposium embracing USIT, are largely a result of the interest and motivation of Professor Toru Nakagawa.

With Professor Nakagawa's permission I'll quote a paragraph from his report that fit perfectly the message I was trying to deliver in my paper. (Yes, ego also influenced this selection.)

> "-- Ed Sickafus' papers always have much deep insights. Sometimes we do not nderstand them at first and try to refuse them. (Emphasizing the limitation in the structured way of thinking may be such a case.) And then, eventually we would find them true. In Japan, there has been a traditional way of mastering anything: "First study and enter the Form, and finally leave the Form". The 'Structure' in Sickafus'

paper is the Form in the Japanese saying. Beginners have to learn the Structure first, because it is the means of communication from masters (or teachers) to beginners (or students). When they have learned and practiced it sufficiently they would come to the stage of using or applying it more freely without <*being*> bounded by the Structure."

This topic is much of the gist of Heuristic Innovation.

In my experience organizing international meetings for the American Vacuum Society I never confronted the difficulties this symposium presented to its organizers. Imagine dealing with 1/3 of the papers being presented by foreigners, an audience made up of attendees from 9 countries, and two official languages for the symposium! The “Collaborative Board of TRIZ Promoters and Users in Japan”, the symposium organizers, are to be commended for deciding not to have simultaneous translation of the papers – a doubling of the time alloted to speakers, or halving of information presented if standard time were not alloted. They did use two projection screens, one each for the two languages (Japanese and English). This was not a perfect solution, as the board surmised, but its difficulties were eased with printed versions of the slides in Japanese or English being presented to each attendee at registration.

One of the highlights for me was meeting Japanese and Korean technologists who are on teams in their companies that use USIT. Another was encountering three generations of teacher-student pairs using USIT. And another was witnessing the interest and excitement of students in a poster session discussing a USIT paper. Although I couldn’t understand a word of their conversation, their animation and facial expressions conveyed a lot.

The poster sessions, always a difficult thing to make work, seemed to go very well in this symposium. They were held in a not too large room with hors d’oeuvres and refreshments on tables in the center and posters mounted around the walls. This arrangement encouraged individual investigation of the posters followed by small group discussions. With food readily available, there was no need to quickly take in the posters and then leave to find food.

In all, it was an effective meeting as demonstrated by audience approval – they voted to have number 3 next year, probably in Tokyo.

+ - + - + - + - + - + - + - + - + - + - + - + - + - + - + - + -

I wish you a pleasant celebration of the season and transition to the new year.

Papers and essays

The following materials can be accessed 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"
4. "A Simple Theory Underlying Structured Problem Solving Methodologies – ASIT, TRIZ, USIT (and others)", abstract and slides presented at The 2nd TRIZ Symposium in Japan 2006 held in Osaka, Japan, August 31 – September 2, 2006.

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/
	Korean	Yong-Taek Park	www.ktriza.com/www/usit/register_form.htm
"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_64	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.

U-SIT And Think News Letter - 69

Subject Keys

PD = Problem definition

H = Heuristics

T = Theory

M = Metaphors

A = Analysis

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:

. Finally, the new web site is completed – please visit http://www.u-sit.net/

. This means that the new book, "**Heuristic Innovation"**, is also completed and is described in the new web site along with its table of contents.

. At the site a vote is being taken to measure potential interest in a second newsletter having mini-lectures devoted to heuristic innovation.

. While they last, the two textbooks are being offered for the price of one.

Mini USIT Lecture – 69
Heuristic Innovation
This lecture is devoted to introducing the What? and Why? of the new textbook

Heuristic Innovation and its Development

Heuristic innovation was developed from unified structured inventive thinking. The motivation for its development resulted from a bit of self-referential reasoning that went like this:

. USIT is a structured problem-solving methodology that claims to evoke innovative thinking by establishing new and unusual views of a problem.

. If this is true, then USIT could be used to find a new and unusual view of itself.

This seems like a reasonable approach to developing an advanced form of structured problem solving. But where does one start?

Innovative thinking from the new and unusual
Obviously, according to USIT, we must start with a well-defined problem, which must arise from an unwanted effect. The goal mentioned above of establishing *a new and unusual view* of USIT, doesn't exactly identify an unwanted effect. This is a common situation when starting a problem. It usually requires a bit of talking through the situation to begin to see unwanted-effect opportunities. I began by reviewing the status of USIT from an overview perspective. This entailed identifying its salient features and their purpose.

Simplify in order to find what lurks under superfluous detail
Perhaps the strongest feature of USIT is its use of the heuristic "simplify" to build a logical method of innovative thinking applied to problem solving. The early work of Dr. Horowitz and colleagues in developing ASIT had this goal as they worked to simplify TRIZ.

In essence, the first stage of simplification is to reduce a problem to three essential elements; objects, their attributes, and the functions they support (where functions are wanted or unwanted effects). Following that

simplification, all further developments, in the unified approach, are based on these elements.

As this discussion progresses, note the heavy use of logic in the organization and application of USIT. It is considered to be an appealing aspect of USIT – but, logic is more appealing to technologists than to artists, dreamers and others with active imaginations. This realization had some influence on the final unwanted effect that was adopted.

Logic, the bane of the dreamer

In some sense, the need of logic produces a contradiction of expectations when trying to evoke innovative thinking and adopting new perspectives. The technologist tends to evaluate the logic of a potential thought path before venturing down the path. The poet, by comparison, sees the newness of a path and leaps ahead to find what it offers without concern for its logic. The technologist hopes to avoid wasting time and facing potential embarrassment, while the poet hopes to at least find a nub of an idea that can be burnished into something provocative. Neither one can use a final concept devoid of the other's influence.

This line of reasoning confronted me with the obvious — USIT is too logical. Is this the unwanted effect I am looking for? Here, I decided to examine the degree of logic wrapped around USIT to protect it from misguided and unguarded thinking.

Tools and rules

At the heart of problem solving is problem definition – a very creative exercise. A well-defined problem becomes one that is defined so as to be amenable to the solution techniques to be applied. (Sounds like circular logic – it's well defined if it fits your methodology!) Once defined, the problem can be analyzed using USIT's plausible root-causes tool. Here the analyst engages in questioning his or her personal understanding of the technical logic tying together cause and effect. The underlying bond between a cause and its effect is one or more active attributes. Down this path one stretches personal logic and experience to its limits.

At the heart of a problem's solution is a concept, as opposed to an engineered, working prototype. USIT teaches technologists how to find the concept. It assumes that we need no further training in bringing it into existence. Our need is to be weaned from technically stilted practice to examine new ways of thinking.

Six problem-solving heuristics were chosen for USIT and given names that relate to their logical line of thinking: uniqueness, dimensionality, pluralization, distribution, transduction, and generification. Uniqueness focuses on the spatial and temporal characteristics of effects. Dimensionality focuses on the activation and deactivation of attributes. Pluralization examines multiplication and division of objects. Distribution rearranges objects (and functions). Transduction looks at the connectivity of the elemental components of a problem's definition. And generification uses known solution concepts as thought starters for finding new concepts. Together, these form a knit of basic elements capable of covering the scope of creative thinking. (But does it?)

Keep the best

Finally, the whole of USIT is brought together in a logical organization that provides a flow chart of actions to be taken on the way from problem definition to discovery of its solution concepts. Students and practitioners of USIT have expressed their satisfaction with this logical unification of structured problem solving. Surely it is worth fostering and preserving. It is. So how could there be too much logic at hand?

That is, this logic is worth fostering and preserving for the following reasons. The practice of problem simplification *a la* USIT, and its procedures of finding new insights, can be counter intuitive and not obvious. It may even be threatening to one's cherished ways of thinking. Thus, learning the methodology would be nearly hopeless without its interwoven logic. The same goes for teaching USIT, or any other technical subject, logic is the gateway to one's mental acceptance of new ideas. We learn, teach, and communicate technology using logic. The structure of USIT is logical.

Understanding and practice of USIT methodology has an interesting learning-curve that begins in an up-hill climb as terminology is learned and applied to real-world problems. Progress is slow. With memorization of terminology and experience in applying the methodology, progress improves and the hill begins to flatten. As

with learning of any technical subject, its familiarity begins to obviate need of flow charts and procedural details, the method becomes a subconscious way of thinking. Logic makes this possible. So logic has a fundamental role in learning and teaching. The procedural tools of USIT have done their pedagogic job once the method is ingrained in the subconscious. Now what?

As USIT takes root

Pondering the 'now what' question took an interesting turn when I began to read about results of studies in cognitive psychology regarding the brain's ability to solve problems. We each have two engines of cognition, our two brain hemispheres, which both engage in solving the same problem simultaneously. However, they bring different biases in their preferred protocols for dealing with a problem. One engine favors logic while the other favors intuition. Both produce solution concepts. At this point the light came on! USIT has pushed one hemisphere to new capabilities without offering equal opportunity to the other hemisphere.

Opportunities for the wording of unwanted effects began to surface; opportunities such as

- USIT is too logical
- USIT is too complex
- USIT is has too steep of a learning curve
- USIT does not foster intuitive thinking
- and others.

Before discussing these, I'll comment on why I was led to wonder if one could find a new and unusual view of USIT.

Within my first half year of practicing structured problem solving I began to notice that I was using a variety of short cuts rather than draw all of the diagrams the method teaches. Once noticed, it caused me to wonder if I was shortchanging the method and missing potential solution paths to investigate. Of course, there is no way to know what may or may not have been missed in one's thinking if one hasn't even had the thoughts. But, the matter of shortchanging the method can be examined. It was, and I concluded that this was an indication of subconscious adoption of a new way of thinking. In the ensuing years I began to wonder if USIT could be extended into an advanced stage and how?

Shortchanging intuition

The first three of the above mentioned unwanted effects are rather generic and a bit trite. They could be claimed of many methodologies; but the fostering of *intuitive* thinking as an extension of USIT struck me as a valuable and unique opportunity. So the unwanted effect selected was, "USIT emphasizes logic at the expense of intuitive thinking".

Plausible root causes became evident as lack of ways to stir intuitive thinking, on command, and means of recognizing response. The latter, recognizing response, has been handled in USIT and other methodologies by the admonition to restrain from criticizing ideas as they arise. The former, stirring intuitive thinking, was not emphasized, but was allowed. The power of metaphors was recognized and these were intentionally created through words for objects, attributes, and functions plus sketches of problem situations. But their functioning was not elaborated nor developed into effective tools. Most emphasis was placed on the power of language and images in communicating with the brain and stirring creative thinking.

Metaphors as seeds for subconscious thinking

Reading about studies in cognitive psychology made clear how one brain hemisphere tends to excel in language and thereby controls conscious, logical thinking. The other understands language but has different interests as it considers a problem. An important point, for me, was learning that both hemispheres understand metaphors. From this arose the idea that both hemispheres can be seeded simultaneously to sprout new ideas from the subconscious by using metaphors. They allow each hemisphere freedom to use them as they wish, with or without literal logic.

That raised the question of what are the ingredients of a seed? Dictionaries tend to give definitions of metaphors as centered on words. I generalized the idea to intentionally omit the vehicle for provoking thought (words), and emphasize instead its intent – to produce concepts that do not literally denote anything. That led to the idea that all sensory inputs to our two cognitive engines (denoting nothing in particular) are capable of making subconscious associations to our past experiences and from those to bring to the conscious new ideas (useful or not). The smell of a new car led to an after-market product of canned new-car odor.

We must have experience

For example, I recall an elementary school experience of listening to classical music and then drawing a picture of something that came to mind in the process. I still easily remember the sound of the bassoon and my image of a waddling duck. From further back, I easily remember the taste of grandma's corn bread with the image of the wood-burning stove warming the kitchen and the faint smell of hot bacon and the sound of crackling embers and the texture of the fresh bread. I've learned that any one of those sensory inputs can bring back that memory.

Solution concepts usually come to mind not as finished products but as simple associations from past experience that then spark conscious effort to make them relevant. But, we must have experience.

Heuristics

A strategy began to develop that would capture USIT's methodology for rapidly reducing a problem to its essence and discovering plausible cause and effect for its understanding. Once this becomes second nature in one's thinking, the strategy turns from consciously forcing logical structure to creating metaphorical seeds for sparking both hemispheres into action. These need not be logical. A crackling ember probably doesn't make you think of warm bread. But I would bet that it recalls some experience.

To put these ideas together, metaphors became the goal, and to be useful to both cognitive hemispheres they were seen as expressible in heuristics. For a new way of looking at heuristics, a graphic technique was used to define a problem. From this graphic metaphor, thinking paths to solution concepts were identified. These ideas are presented in heuristic innovation. Starting with graphics may quickly spark intuition while logic pauses to select associated words to ponder.

Yet, I wondered if logic was still giving intuition short shrift? This again brought up the issue of not only stirring intuitive thinking but also recognizing its response.

Natural thinking, problem definition, and heuristic innovation

At first glance, this appears to be a wrong path. After all, the success of science and engineering is obviously its grounding in logic. Furthermore, it assiduously bolsters that logic with mathematics. The reason for this is that we early learn in science that our intuition can be wrong. Our use of mathematics aids in discovering and correcting such errors.

On second glance, it comes to mind that many inventions, creative ideas, and amazing insights had no obvious links to mathematics and or even to logic. Logic may have been needed to make a concept intelligible for further development and for communication. It comes to mind also that thinking itself is not logical, orderly, or predictable. We start our thought process and it quickly finds other matters to explore, some relevant and some not, as it constantly jumps about. It takes conscious effort to push an initial problem through the morass of thoughts in search of relevant ideas. But it works. This is natural thinking. Why not capitalize on it by marrying its success with the best features of USIT?

Now that we have adopted the structured methodology into our subconscious it acts to keep subconscious thinking not always on a direct path, but at least on circuitous routes that bring it back to the issue at hand. This reliability gives us an opening to explore the benefits of natural thinking; that is, thinking unencumbered by conscious rules. First, note two points: the beginning of problem solving is problem

definition, and in USIT the path of simplification takes us through many metaphors as we strive to improve a problem's definition. This is where the most innovative action is. Thus, in heuristic innovation there is one directive, define a problem iteratively. In each iteration, change words and sketches to invoke new and unusual metaphors, thus giving both hemispheres provocative seeds. The most effective metaphors are not known *a priori* to problem solution. Therefore, iteration plows the ground for multiple seeding.

Once concepts are found they now are available for polishing, restructuring, incorporating, or culling. Unified structured inventive thinking and heuristic innovation have done their jobs.

Ed Sickafus, March 2007

Papers and essays

The following materials can be accessed 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"

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/
	Korean	Yong-Taek Park	www.ktriza.com/www/usit/register_form.htm
"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_64	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.

U-SIT And Think News Letter - 70

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. **H**euristic **I**nnovation is an extension of **USIT**.

Subject Keys

PD = Problem definition
H = **Heuristics**
T = **Theory**
M = Metaphors
A = Analysis
BH = **Brain hemispheres**

Dear Readers:

. Last month's launch of the new web site, www.u-sit.net, had its problems. Apologies are extended to early book purchasers.

. "Two Brains are Better" begins a short series on using both cognitive hemispheres as tools for innovation.

Please work the simple, 30 second problem presented in the introduction before reading further in the discussion.

Mini USIT Lecture – 70

Two Brains Are Better

I'd like to begin this mini-lecture with a short, simple problem to be solved in 30 seconds. The results will be the subject of discussion to follow.

You'll need paper, pencil, and a watch with a second hand, or you can guess time expired in seconds. Give as many answers as you can and note the time interval between their occurrences. List your rationale for each answer and your assumptions. Write the numerical answer as it comes to mind. You can add your rational and assumptions later, after the 30 second period has lapsed.

Got your stuff together? The problem is on the line following the next paragraph.

Now look at your answers and mark them L, I, or LI, depending whether you think your answers were obtained with logical thinking (L), intuition (I), both (LI), or, if you have no idea, use a question mark (?). Also note any assumptions you made in reaching your answers. These may have been consciously made assumptions or, apparently, subconsciously made assumptions that you now deduce.

There are five birds on a wire. If you shoot one of them how many are left?

In "Two Brains Are Better" we will examine how both brain hemispheres are involved in problem solving, their contributions, and techniques for using them as tools for innovation.

One-sided introspection

Convincing ourselves that we can engage both of our brain hemispheres in problem solving is not difficult as a gedanken experiment (thought experiment) but may be difficult as a real-time

demonstration. In this mini-lecture we will perform real-time problem solving and associated introspection to find evidence of thinking by both hemispheres. However, at the outset we confront a two-faceted problem.

Fortunately, it is to our advantage that we readily understand conscious thinking, its use of language, and its preference for logic. Such understanding is the logical hemisphere at work. We, as problem solvers, are adept in exercising our logical hemispheres.

The intuitive hemisphere, on the other hand, understands language but does not communicate using language. It gives us no conscious access to it through words, spoken or written. That is one facet of our problem. Another facet is that introspective analysis of how we solved a problem will necessarily involve the logically-thinking hemisphere. Introspection occurs at the expense of no conscious response from the intuitive-thinking hemisphere. Remember these caveats as we proceed.

It came to mind

An amazing event in problem solving is the instant an idea surfaces to the conscious – like when the first number came to mind for the number of birds remaining after one was shot. We can not see it forming, we have no warning of its approach, when, of a sudden, there appears an idea. Sometimes it seems to make an attempt to surface and is noted as a fleeting glimpse of a possible idea. This is a common experience when trying to remember someone's name.

In the case of the bird problem, we are interested in the number and our rationale for the number. Rationale is a logical explanation. In this case, it is generated because the problem was presented as three problems: How many birds remain? What is your rationale? What assumptions did you make? Answering these questions evince our cognitive hemispheres at work.

Logic, intuition, or both?

Let's compare answers to the bird problem. Actually, you can compare; I have only mine to examine.

Five birds

Here are my answers:

There are five birds on a wire. If you shoot one how many are left?				
No	Rationale	Assumptions	Time (sec)	L, I, LI
1	4 flew away	Hearing birds flew away. Dead bird was unable to flee.	1	I
5	1 dead + 4 deaf	Deaf birds were not disturbed.	+2	I
5	5 decoys	No deaths or disturbance from fear	+5	L,I
0	Shot didn't kill any	5 flew away.	+15	L

(1) The answer one, with four birds fleeing, came to mind so quickly that I labeled it intuitive thinking.

(5) Deaf birds came to mind soon thereafter, again, intuitively. It may have resulted

from my past experience as an interpreter for the deaf – a subconscious association. It may also have resulted from subconscious application of the contrarian heuristic – the opposite of hearing is deafness.

(5) The answer five for decoys came rather quickly but may have been influenced by logic (it was not as spontaneous as the first two). Even the assumptions came to mind quickly for the decoys. This answer seems to have been seeded by the previous one with deaf birds. It may also have been influenced by the subconscious application of the heuristic to take things to extremes – from deafness to no ears.

(0) The last answer did not come quickly. I simply applied the heuristic of taking things to extremes. This entailed logical reasoning to start on a new thought path.

In the remaining time I became interested in the assumptions I made and thought of making. I lost track of time and my 30 seconds were up.

Most of the assumptions came to mind later and seemed to require concentration on logical analysis. I found myself looking for plausible reasons for the answers coming to mind.

While thinking of the rationale and assumptions I used, I wondered why am I assuming that the birds are alive? Later, past the allotted time, I thought of balloon birds with one bursting on being shot. That brought games to mind. In each case I had vague, mental images of birds on a wire. Until now, I never gave any thought to what they may have been shot with, or how far away they were, or whether it was daylight or night, or what kind of birds they were. I did imagine the shot one falling off of the wire and decided he was still "left", meaning, he hadn't flown away. My parting thought was a question to myself, wondering if one could write a rationale for each number, 0 through 5, as plausible answers?

At this point, I noticed how the problem was growing as new questions came to mind: from 5 birds on a wire to fear of noise, flight ability, decoys, balloons, games, weapon, ammunition, marksmanship, visibility, species, and probable fatality of a shot. Mental images formed with each new question. Where were these questions (problems) coming from? Was it from one or both cognitive hemispheres?

Problems ←→ Unanswered questions

I started to answer this question and stopped – a subconscious interruption. The idea came to mind that logic is suddenly in control both in posing and answering questions as I write. Was the interruption of thought caused by the intuitive hemisphere? Of course, I don't know, but an interesting aspect of questions became evident. Namely, that verbalized questions require logical thought to organize their features and then to render them grammatically. Intuitive inquisitiveness should not suffer such time consuming preparation. An intuitive question should be spontaneous. Perhaps it is.

For this discussion, intuitive inquisitiveness will be defined as spontaneous curiosity. Curiosity may be indicative of the intuitive hemisphere at work. Curiosity implies a question, but not necessarily a thought-out, logically-expressed question – it seems to originate from the subconscious.

Spontaneous curiosity causes us to take a second look when the first glimpse leaves uncertainty.

In this case, there is no time or need of plodding logic to phrase a question. The glimpse (question) and second look (answer) are over before logic is even called upon. Here we have a plausible example of our intuitive hemisphere posing and resolving a question.

Look again at the fifth paragraph back (in Arial font). Some of it was summerized, in the next paragraph following it: *"…as new questions came to mind: from 5 birds on a wire to fear of noise, flight ability, decoys, balloons, games, weapon, ammunition, marksmanship, visibility, species, and probable fatality of a shot."* I suggest that these are examples of spontaneous curiosity and support the deduction that they are the works of the intuitive hemisphere.

Furthermore, that the answer "1" and its rationale, "hearing birds flew away", were spontaneous, having no obvious dependence on logic, is an example of spontaneous intuition solving a problem independently of the logical hemisphere. The example of a glimpse and second look is also.

This small set of examples suggests that problem solving can be intuitive, logical, and both. It would be interesting to hear your results and comments on this demonstration.

---------- More analysis in the next mini-lecture ----------

Ed Sickafus, April 2007

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
2. See also "Heuristic Innovation", and register for multiple resources.

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/
	Korean	Yong-Taek Park	www.ktriza.com/www/usit/register_form.htm
"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_67	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.