U-SIT And Think News Letter - 05

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 first and major phase of problem solving is problem definition. The USIT approach to this phase is near completion in the Mini-Lectures. It should be completed in Mini Lecture - 06. The next phase is problem analysis.

1. USIT – How to Invent: the USIT textbook.

- Detailed examples of the application of USIT are available in this textbook, as well as partially worked examples that instructors can use for classes to complete.

2. USIT – an Overview

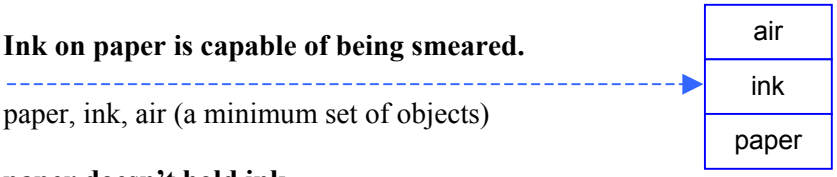
3. Mini Lecture – 05

Completion of A Well-Defined Problem

Continuation of the publisher's problem – "Ink on newsprint is messy. Fix it!"

Recap: Mini-Lecture_04 completed the plausible root-causes analysis. We have assembled the necessary components of a USIT well-defined problem:

Single, Unwanted Effect: **Ink on paper is capable of being smeared.**
Graphic Description:



Objects (generic names): paper, ink, air (a minimum set of objects)
Plausible Root Causes

by paper: **paper doesn't hold ink**
- root causes: smoothness, absorption, bonding, wettability – surface tension, chemical activity, physical bond, water content, density, hydrophobic, transfer speed, packing pressure, permeability (12 possible root causes)

by ink: **ink doesn't bond to paper**
- root causes: surface tension, chemical affinity, physical bond, viscosity, temperature, vapor pressure, saturation (7)

- root causes: **ink doesn't bond to itself**
wetness, drying rate, vapor pressure, temperature, hygroscopic, viscosity, friable (7)

by air: **air doesn't dry ink**
- root causes: humidity, speed, temperature (3)

That's the Recap, now for the Rethink: Where are we going and what are we trying to do? Now that's a dumb question to ask a class of intelligent problem solvers; so I apologize. No insult was intended. What I really mean to do here is to stop the lecture a moment and point out that we are engaged in a rather idealistic process and need to take it into account.

Forming a well-defined problem is a critical beginning step – I don't mean to denigrate what we've just done. The process, as was presented here, is the way I do it. (And, in this case, took notes as I went along and gave them to you as honestly as I could.) What has not been noted, which makes my lecture so far somewhat disingenuous, is that our brains are actually solving this problem, and any other problem, as we proceed through its structured analysis. Hence, if I continue this lecture to the formal stage of applying solution techniques, I am indeed being disingenuous. That is because you and I have already have found solutions. To continue without accounting these would make it appear that I'm trying to give credit for earlier found solutions to the method's specific problem-solving techniques – techniques that haven't even been introduced yet.

What our subconscious is doing, while we consciously construct a well-defined problem, is to attempt solutions intuitively – i.e., to brainstorm ideas. Well, almost: brainstorming differs somewhat from intuitively finding solutions. Intuition involves automatic, subconscious recall, while brainstorming is a concerted conscious process (with subconscious recall). We're probably doing both privately, given the long time between lectures. In any case, we already have thought of solutions by this point in the process. Therefore, to be honest, I recommend that you and I list the solution concepts we have already thought of, both previously known solutions and new ideas we have generated. That's your assignment before the next mini lecture.

What will happen after we list our solutions is that we will be more focused on finding new ideas. We will not be wondering if this process will find the solutions we already know or be unconsciously trying to force it to find those solutions. But, won't this reduce the number of ideas we get out of the process, you ask? Maybe, I can't say. Look at it this way. Brainstorming works. Take advantage of it to grab the low hanging fruit, and then turn to structured problem solving to reach the out-of-the-way stuff. Make it an efficient process, by noting every solution concept as soon as it is found.

What it will also do is show you in a convincing manner just what you can accomplish yourself with the formal process. And one more thing: each solution idea your write down becomes the more clearly established in your mind. It will now be recalled to be improved upon or to aid improvement of other ideas in the remainder of the exercise.

These comments may lead you to suspect that I have a pet peeve that is bugging me. I do! Too many times, while teaching structured problem solving in Ford Motor Company, I found students trying to "trap" the process. That is, instead of participating in learning and discovering how to jar the subconscious into creating ideas, they sat back and waited to see the outcome. Consequently, they got little learning and Ford Motor Company got cheated out of its investment in their intended training. As a manager, this was not a very satisfying observation.

4. Classroom Commentary

Some people comment, "give me a root cause and I will give you a solution". This is probable always true. But my perspective is that there are "root causes" (plural) for every problem rather than "root cause" (singular). Every root cause has potential for a solution concept – if not from one mind, perhaps from others.

5. Problem-Solving Tricks and Related Miscellany

6. Feedback

7. Q&A

8. Other Interests **17,152 Solutions found for Archimedes' Stomachion,** New York Times 14 December 2003 Greek mathematician, physicist, inventor, Archimedes (287? to 212 BC), apparently proposed a combinatorial problem of creating as many arrangements of 14 triangles and quadrilaterals as possible that produce a square. The problem is known as the Stomachion (pronounced sto-MOCK-yon).

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

To be creative, U-SIT and think.