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**General Methodology of
 Creative Problem Solving & Task Achieving (CrePS):
 Reorganizing Various Application Cases and
 Their Methods in the 'Six-Box Scheme'**

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Introduction:

Solving problems (or undesirables) creatively and Achieving tasks (or desirables) creatively have been tried, practiced, and carried out successfully for the humans to establish the culture for millions of years in every area (e.g., society, business, technology, science, etc.) in every era and in every region of the world.

However, the processes and methods which produced successful results were widely diverse and not well recognized and recorded.

We should collect and integrate such successful methods and form a general and yet effective methodology, named

'the General Methodology for Creative Problem-Solving/ Task-Achieving'. (CrePS)

For this purpose, we need some basic framework (i.e., paradigm)

-- We can use **'Six-Box Scheme'**.

Various methods for creative problem solving & task achieving

Approaches	Examples in conventional methods	Examples in TRIZ/USIT	Skip
Basics in Science & Technology	Principles, theories & models in each discipline; knowledge bases	Knowledge bases of physical effects	
Learning from cases	Analogical thinking, Collections of hints, Equivalent transformation thinking	Active use of patent databases	
Analyzing problems/ tasks	Mind mapping, KJ method (Affinity method), Quality function deployment (QFD), QC tools, Root cause analysis, Value engineering (VE), Functional analysis	Problem definition, Root cause analysis, Function & attribute analysis, Formulating contradictions, Substance-field modeling	
Supporting idea generation	Brain storming, Brain writing, SCAMPER	40 Inventive Principles, 76 inventive standards, Contradiction matrix, USIT operators	
Taking care of environment and mental aspects	Brain storming, Facilitation methods, Cyneetics, NM method, 'The 3rd alternatives'	Size-Time-Cost (STC) operators, Smart little people (SLP) modeling, Particles method	
Realizing the ideas	Design methods in each discipline, Pugh's method, CAD/CAE, Taguchi method	Technical knowledge bases	
Foreseeing the future	Using various statistics, Delphi method, Scenario writing	9 Windows method, Trends of technical evolution, S-curve analysis, DE (Directed evolution)	
Towards a general methodology	Four -box scheme of abstraction, analogical thinking, ET thinking	Four-box scheme, ARIZ, Six-box scheme of USIT	

Reflection of the present situations on TRIZ has guided us to a new target at a higher level **Beyond TRIZ**

(May 2012, Toru Nakagawa)

a new target at a higher level.

To establish a general methodology of creative problem-solving / task-achieving,

to spread it widely, and

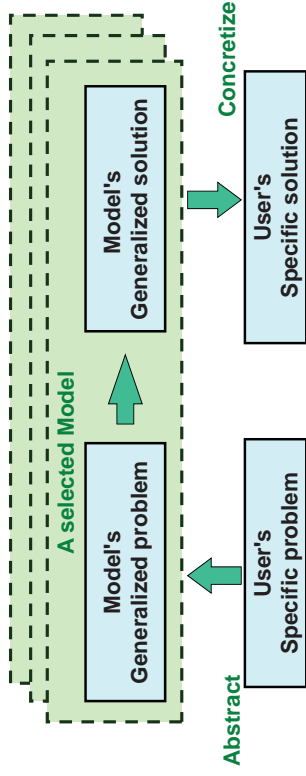
to apply it

to problem-solving and task-achieving jobs in various domains in the whole country (and the world).

The methodology is named as **'CrePS'** (April 2013, Toru Nakagawa)

Conventional basic scheme for Creative Problem Solving (Four-Box Scheme of abstraction)

Science & Technologies (Many models, specialized in areas)
Many models in the Knowledge Base



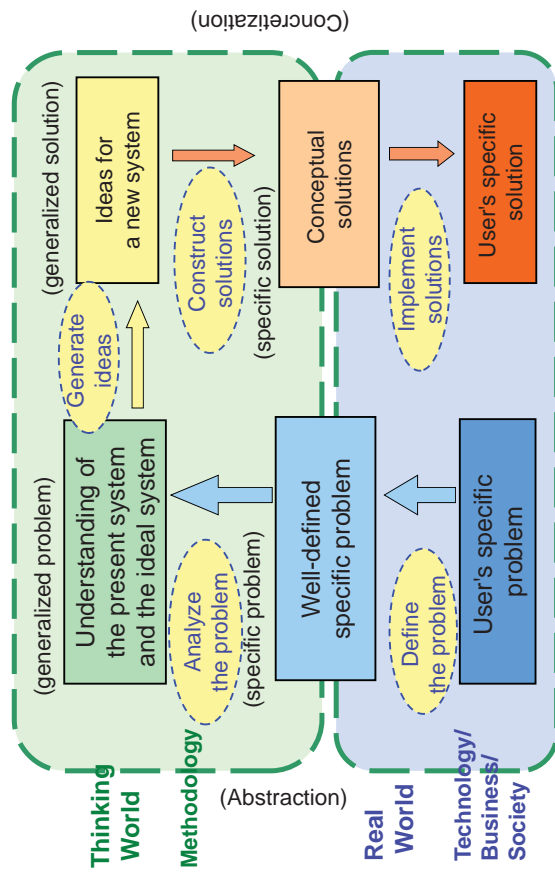
Pitfalls: The contents of the boxes depend on the fields, models, and problems and cannot be explained any further in general terms.
Problem is mapped onto a model, and the general solution is shown just as hints to be concretized in analogical thinking.

*** TRIZ made multiple models applicable across areas

'Six-Box Scheme' (the Paradigm of CrePS)

- 'Real World' and 'Thinking World' are separated, for clarifying their roles.
- Recognition of the problem situations (Box 1) must be done in the 'real World' (or in the business activities)
- Problems and tasks to be addressed (Box 2) is defined in the Real World and is handed to the Thinking World.
- (In Box 3) The present system is understood with standard analysis methods in the aspects of space, time, components, attributes, and functions, and the ideal system is also understood in its image.
- Ideas for a new system (Box 4), exceeding the stage of hints, are often obtained quite smoothly from the understandings in Box 3, without explicit use of various techniques for assisting the idea generation.
- Conceptual solutions (Box 5) need to be constructed around the core ideas, by using basic capability in the relevant (technological) fields.
- Actual solutions (Box 6) need to be implemented by the business activities in the Real World.

New Paradigm of Creative Problem Solving (Six-Box Scheme of CrePS)



The current status of research on CrePS/TRIZ/USIT:

'General Methodology for Creative Problem-Solving/Task-Achieving' (CrePS)

CrePS is feasible by using the 'Six-Box Scheme' as the basic paradigm.

Different methods (including TRIZ) can be reorganized into CrePS.

USIT is a concise process for applying the Six-Box Scheme of CrePS.

On-going research activities for developing CrePS:

- To make course materials of CrePS case studies.
We should just use case studies already published.
- To understand different methods (including TRIZ) and to describe them in the framework of CrePS.
- To relate CrePS to various activities in the 'Real world'.
- To categorize various purposes of CrePS application, and to recommend concise CrePS processes for each category.
- To proliferate the vision of CrePS.

(1) To make Course Materials of CrePS Case Studies

Published TRIZ/USIT case studies are to be described in the Six-Box Scheme.

Theme	Description
1	How to fix the string found shorter than the needle
2	How to prevent the staples from being crushed for binding more papers
3	How to reduce the necessary water for toilets.
4	Picture hanging kit problem: how to prevent from tilting
5	How to increase the foam ratio in forming a porous sheet from gas-solved molten polymer

A Simple Case Study of USIT

Skip

T. Shimoda and T. Nakagawa (2006)

Everyday-life Case Study in USIT:

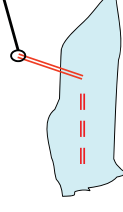
How to fix a string shorter than the needle at the end of sewing

Define the Problem: [Box-1 ==> Box-2]

(a) **Undesirable effect:** The string is shorter than the needle and prohibit applying the standard way of making a knot.

(b) **Task statement:** Devise methods for fixing the string left shorter than the needle.

(c) **Sketch:**



(d) **Plausible root causes:**

The standard way of making a knot is applicable only when the string left is longer than the needle.

(e) **Minimum set of relevant objects:**

Cloths, string (already sewn), string (left), the needle



Problem Analysis (1): Understanding the present system

Skip

[Box-2 ==> Box-3]

(1) **Functional analysis:** What is the function of the Needle?

A base for making a loop of the string;

A guide for passing the end of the string through the loop

(2) **Attribute analysis:** Properties taken for granted form the Constraints:

The string does not expand = Its length does not change.

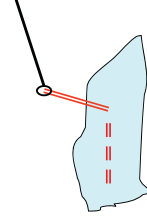
The needle is hard = No change in shape and length.

When any of these constraints is lifted, there appears a novel solution.

(3) **Analysis of time characteristics:** Processes of sewing:

Solutions at the final stage and solutions at any earlier stage.

(4) **Analysis of space characteristics:** A knot makes the string thick at the end. Watch out about the topology in making a knot and in the 'hole and string'.



Several known solutions:



A well-known technique. Difficult to make the loop of string in the space; need some practices



The hole of the needle has a slit, thus the string can be passed and removed without cutting the loop of the string. (a commercial product)

Problem Analysis (2) : Understanding the Ideal system

[Box-2 ==> Box-3]

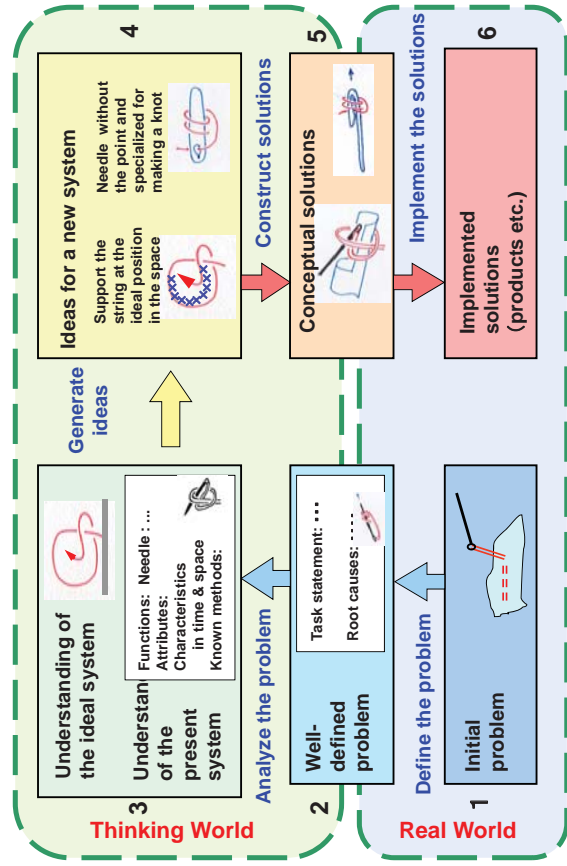
Ideal arrangement of a sting in space for making a knot



It should be nice if we could hold the string in this arrangement in the space.

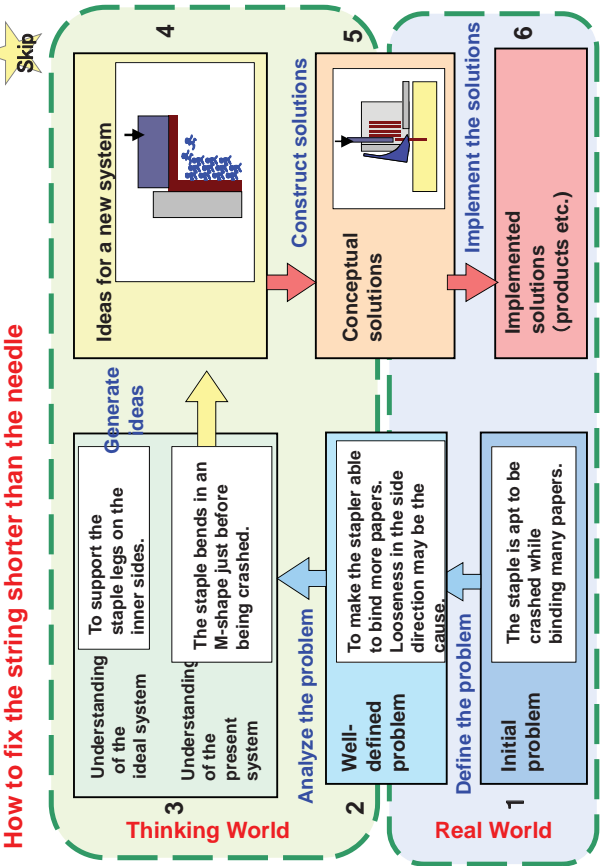
**Case study in the Six-Box Scheme:
How to fix the string shorter than the needle**

T. Shimoda and T. Nakagawa (2006)

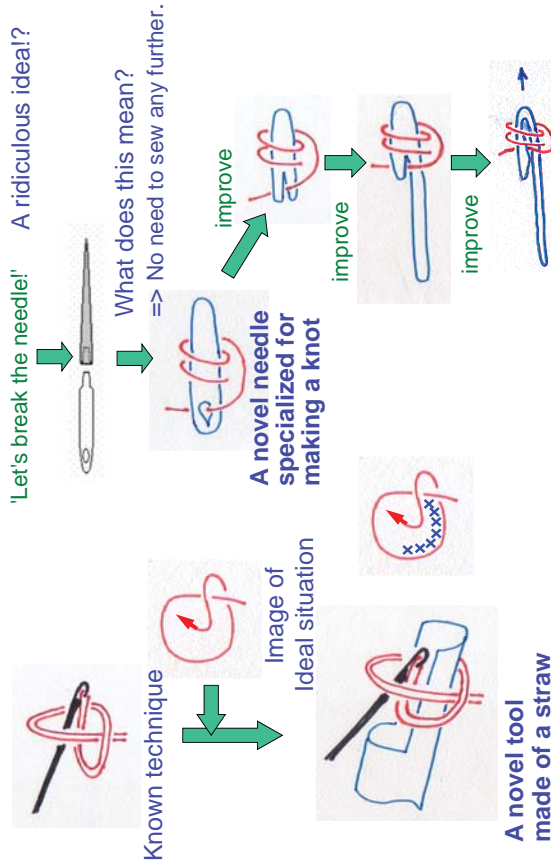


**Case study in the Six-Box Scheme:
How to fix the string shorter than the needle**

T. Nakagawa & K. Kamiya (2004)

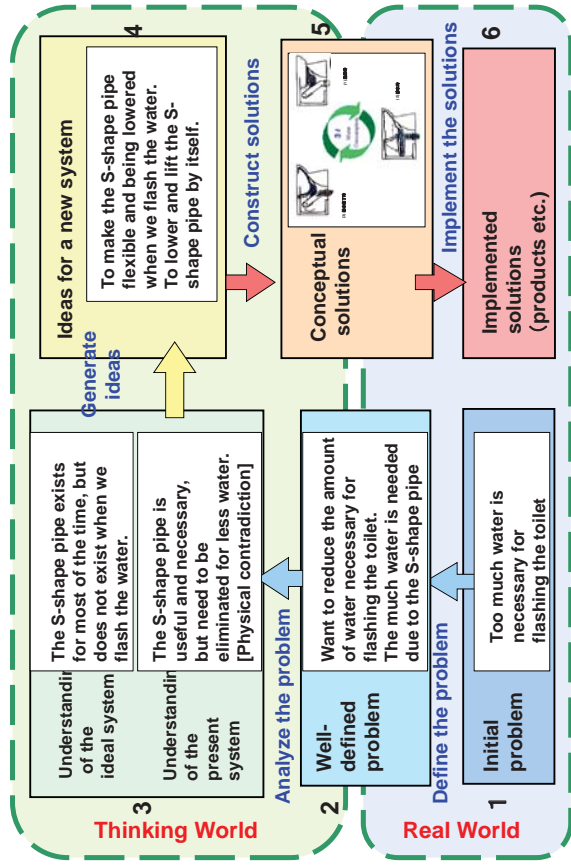


Solution Generation: Generate Ideas and Construct Solution
[Box-3 ==> Box-4] [Box-4 ==> Box-5]



Case study in the Six-Box Scheme: Water-saving toilets

KyeongWon Lee et al. (2003)



(2) To understand different methods (including TRIZ) and to describe them in the framework of CrePS.

** Many and various methods are actually known in literature: Some handbook describes, say '300 techniques'.

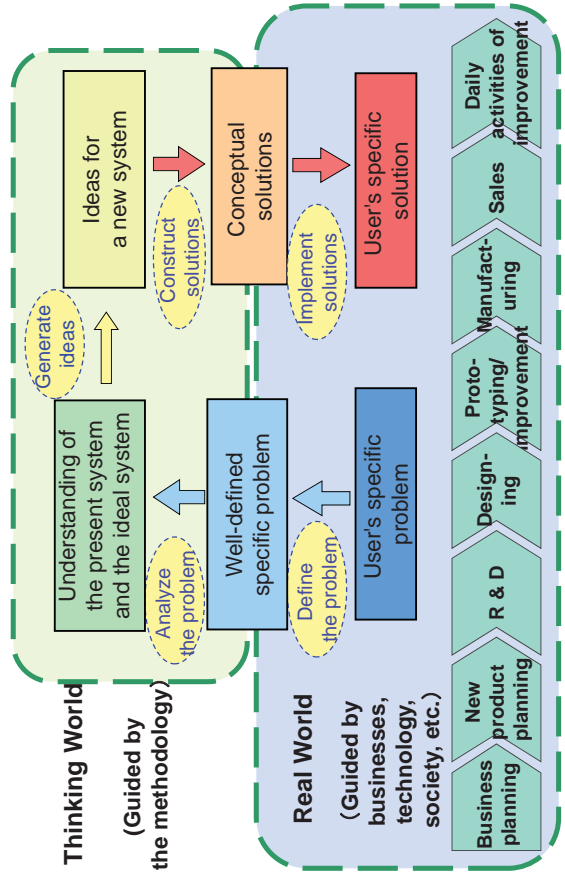
It is useless to list their names or component names in our scheme.

** We should describe the individual methods with respect to: their purpose, stages of usage, input and used (e.g. stored in the knowledge basis) information, generated and output information, etc.

==> (Trial) Documents in 'TRIZ Home Page in Japan'

** We need to establish some general frameworks which can characterize and position such methods in such different aspects

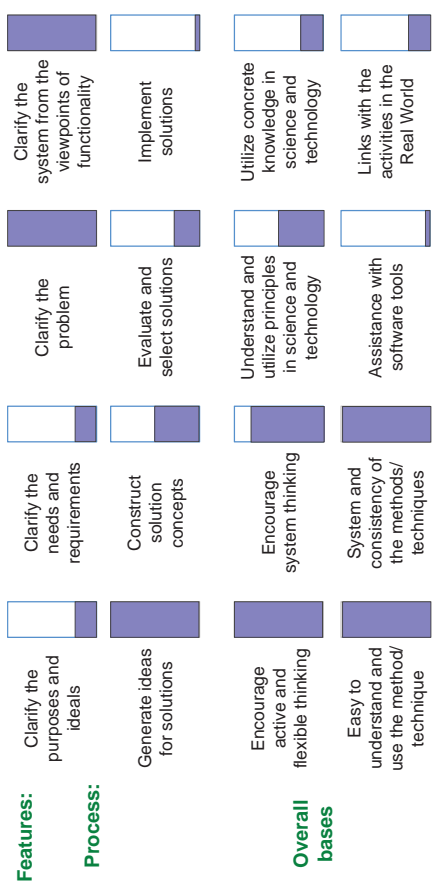
**(3) To relate CrePS to various activities in the 'Real world'.
Position of CrePS and its Six-Box Scheme**



Method: USIT (Unified Structured Inventive Thinking)

Ref: Ed Sickafus "USIT" (1997); Toru Nakagawa, in "TRIZ Home Page in Japan" (1999-2014)

Outline: Started with a trigger of TRIZ and SIT, established as a compact and consistent full process for problem solving. Has the features of Defining the problem, Analyzing the present system in terms of functions and attributes, Making images of ideal system, and idea generation. Later in Japan, A system of operators for idea generation and the paradigm of Six-Box Scheme were derived. Currently regarded as a simple and consistent process for practicing the CrePS methodology.



(3) To relate CrePS to various activities in the 'Real world'.

There are a wide range of activities, say for an industry, e.g., Business planning, New product planning, Research and development, Designing, Prototyping and improvement, Manufacturing, Marketing, Daily activities of improvement, etc.

Every stage of activities in the Real World has to solve problems and achieve tasks, and hence has opportunities and necessities of applying the general methodology CrePS.

(Note: TRIZ /CrePS should not try to 'contain' or 'cover' the Real World.)

(4) To categorize various purposes of CrePS application, and to recommend concise CrePS processes for each category.

USIT is such a process for 'general purpose'.

Necessary to categorize a number of specific purposes and to build concise processes.

(5) To proliferate the vision of CrePS.

"TRIZ Home Page in Japan" --- Public Web site since Nov. 1998

Let's enjoy "Think & Try"! (for Children and Highschool students) Editor: Toru Nakagawa Last updated: Oct. 17, 2014
For solving problems creatively (for Students and the General public) Editor: Toru Nakagawa Last updated: Oct. 17, 2014
Methods of creative problem solving (for Engineers and Researchers novice to TRIZ) Editor: Toru Nakagawa Last updated: Oct. 17, 2014
Practices and methodologies of Creative problem solving (for Practitioners and Experts) Editor: Toru Nakagawa Last updated: Oct. 17, 2014



TRIZホームページ
責任編集：大阪学院大学 中川 徹
Last Updated: October 17, 2014
http://www.osaka-gu.ac.jp
http://naka-gawa/TRIZ

TRIZ Home Page in Japan
Editor: Toru Nakagawa
(Professor Emeritus, Osaka Gakuin Univ.)
Last Updated: October 17, 2014
http://www.osaka-gu.ac.jp
http://naka-gawa/TRIZ

This home page serves as an open forum of information exchange for better understanding and usage of Creative Problem Solving Methodologies, especially based in Japan. Readers' contributions are very welcome, including introductory articles, papers, case studies, news, questions, comments, etc.

Pages under this directory are the English versions. Click the hyper-linked keywords or the buttons. The buttons guide you to the Japanese pages. Most articles are posted in the two languages, but some are only in either of them.

Established on Nov. 1, 1998
099909 visits since Nov. 1, 2005

4 'Entrance Pages'

A Proposal of Global Network of Public Web Sites in TRIZ for Building A Global TRIZ Community

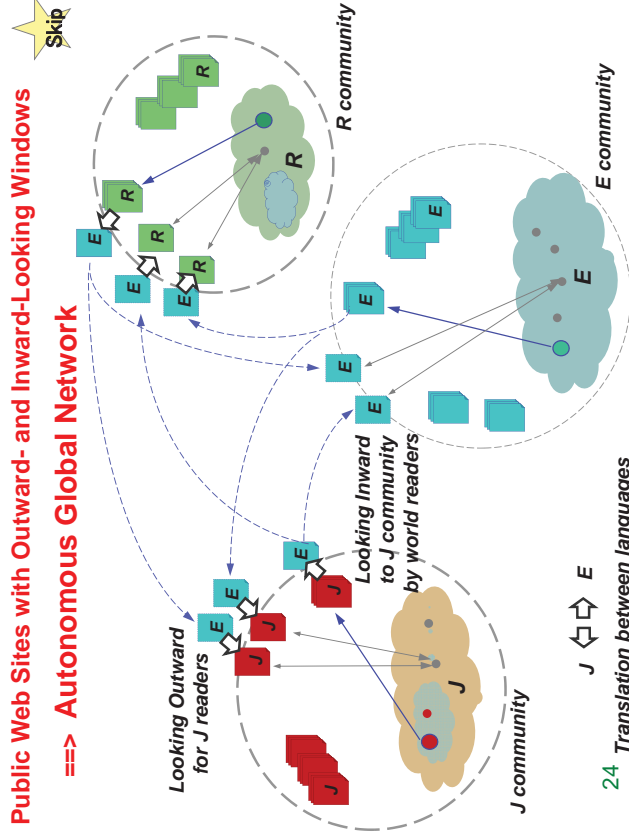
This has been proposed since 2008 on the basis of my building TRIZ Links in the World (2008) and the lessons learnt from my Web site "TRIZ Home Page in Japan".

1. Let's build many **Public Web Sites** (not private, not official) in different TRIZ communities,
2. and set both **Outward- and Inward-looking Windows** on them for overcoming the language/community barriers, (bi-directional translation and introduction)
3. and form an **Autonomous Global Network of them.** (Links will form recommendations, without official control)

Our vision: A Global TRIZ Community intermediated by many Public Web sites for different TRIZ communities.

Public Web Sites with Outward- and Inward-Looking Windows

==> **Autonomous Global Network**



24 Translation between languages

Concluding Remarks:

A higher level target for us TRIZ community should be:

a new target at a higher level.

To establish a general methodology of
creative problem-solving / task-achieving (CrePS)
to spread it widely, and
to apply it
to problem-solving and task-achieving jobs
in various domains
in the whole country (and the world).

**We can build CrePS on the basis of TRIZ / USIT
by using the Six-Box Scheme !**

I wish you to share the vision and collaborate together !



Thank you for your attention

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