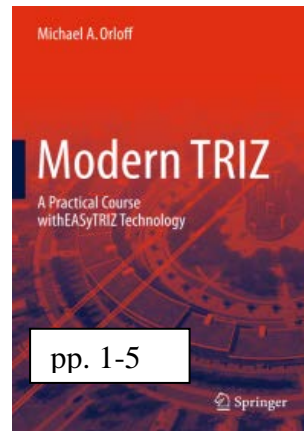# Principles of TRIZ

> While I was thinking through the milestones of my theory and its development, I was overcome with doubts… normal human doubts: if this is so important, why is it that over the course of many centuries so many clever people have failed to notice that, and have not done it without you? What, do you think you know better?[5]
>
> *Genrikh Altshuller*

1 Introduction

1.1 On Creative Discipline and Standardization of Knowledge

1.1.1 Learn or Re-learn?

Many books have been written about TRIZ[*]. Accordingly, after a cursory glance at the cover the reader might assume that the idea of the book is not new, and that it is yet another repetition of something "about TRIZ". Especially with a heading like *EASyTRIZ*! Definitely a "popular book" for "dummies". Yeah.

In reality, it is very different from anything you may have encountered before. This is not just another "*imitation cum repetition*". And I hope that the reader will soon appreciate this fact.

This book has used a technology of modeling, training and problem solving, called *EASyTRIZ*, but it is not the same as "easy reading" or "easy doing". The title of the book is merely a reflection of the fact that this book cannot be made any easier. Any attempt to do that might result in oversimplification, loss of quality and, possibly, acquisition of wrong knowledge and skills.

And it is *much more difficult to re-learn* than it is to learn to do something right from the start! Accordingly, learning TRIZ today is still basically re-learning – even for schoolchildren, let alone grownups.

It is necessary to restructure *poorly organized* – in the words of Genrikh Altshuller, TRIZ founder – previous thinking experience.

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[5] According to G. S. Altshuller, I. M. Vyortkin (1994) *How to Become a Genius. Life Strategy of a Creative Personality*. – Minsk: Belarus (in Russ.)

[*] as of the beginning of 2010

Such restructuring requires personal commitment and significant time, and even with those present, it sometimes remains incomplete. Because people have a tendency to return to their previous inefficient, hopelessly ineffective, but familiar experience of… *weak thinking.*

This book is for optimists, for people with a purpose. Studying this book, like any professional work, requires adequate labor, time and effort inputs to ensure that new skills are integrated into your personal experience.

1.1.2 About Modern TRIZ

First let me tell you what objectives I sought to attain writing this book, and what – *I hope and believe!* – may prove to be important and valuable for the reader.

So, let us first ask ourselves, what is it that we expect from TRIZ – or, rather, from **Modern TRIZ**?

Why is it that this technology designed to help find creative solutions to complex problems is becoming more and more attractive to practitioners and theoreticians, professors and managers, engineers and creative art psychologists? Why is it that TRIZ – with varying degrees of success – continues to expand its global footprint?

What needs to be done to help TRIZ enroll more supporters, both among developers and among users? What must happen for this theory to gain the recognition it deserves? And last but not least, here is a direct question that I keep asking myself (and expect to be asked by the reader): what is *most important* for TRIZ today?

Indeed, this is a very good starting point for any new book about TRIZ.

> My answer is as following: the most important for modern TRIZ is to ensure a mass-scale professional education in key, primary, fundamental models of theory.
>
> Therefore this book is designed to be used for education (including self-education) in these models as the point of origin, and the key element, of the Modern TRIZ universe.

Why do we need Modern TRIZ and what should it be like?

Extensive TRIZ teaching and application experience has shaped the convictions that the author needs in order to answer these questions. For many years, the soundness of these convictions has been confirmed by practice.

In addition to that, practice encourages further development of previous ideas. But even a brief answer will have to be broken down into several bullet points to reflect both the areas where TRIZ can be gainfully employed to perform practical tasks, and the prospects of its future development.

Well, here are the core objectives of our work:

a. Correct introductory education in key primary TRIZ models

The new TRIZ training technology must overcome the following known drawbacks:
- lack of an efficient introductory TRIZ training methodology,
- lack of generally accepted definitions for basic TRIZ concepts,
- lack of efficient standard examples to illustrate primary concepts and models.

Results of the "old-way" training include the following:
- fuzzy understanding of the simplest models,
- lack of skills required to use the simplest models,
- unrealistic expectations from theory and practical tools (particularly the TRIZ software package),
- uncertainty, fear or inability to independently resolve practical problems.

Pathetic inefficiency of the "old" TRIZ teaching methods erects insurmountable barriers in the way of practical application of new knowledge and skills by most students as soon as they finish "traditional" workshops and seminars. The absence of sustainable skills required for error-free independent operation hamstrings them, dilutes their initial enthusiasm, and deprives them of the possibility to efficiently apply basic TRIZ knowledge in real-life situations.

b. Standardized mass-scale education as an adequate reaction to new challenges created by global economic integration

Today not only large concerns have branches on different continents and in different countries. Small and medium-sized enterprises, universities, independent researchers and developers successfully form associations focused on research, design, production, marketing, education, consulting and other tasks.

Particularly complex problems are tackled by multinational Think Tank Teams.

Efficient operation of such Think Tank Teams is predicated on availability of a common problem-modeling language and a standard set of tools to generate ideas that can be understood by all team members.

Such language and such toolset can be created only on the basis of efficient structuring and standardization of TRIZ models. Conversely, failure to standardize TRIZ concepts and tools represents a major obstacle in the way of global dissemination of TRIZ, and hampers implementation of TRIZ programs in universities and other educational institutions. Meanwhile, students – those of them who are not infected with negative problem resolution stereotypes – might become the most appreciative and fruitful TRIZ users fully armed to implement innovative methods in their post-graduation work environments.

c. Accumulation of innovative experience by firms, associations and universities

Several years ago, the author undertook an analysis of innovations implemented at a major German enterprise over a period of almost 50 years. The findings were later verified by three reliable independent sources. The analysis convincingly demonstrated the following:

- efficient practical solutions are not analyzed to extract *objective models and methods which were employed to develop those solutions*, and which could be used to train young specialists!

- innovative experiences are recorded and codified only in the form of general engineering descriptions and technical specifications, and are *not presented as formalized creative models* similar to reusable TRIZ models which make it possible to avoid waste of time and effort on solving essentially identical problems!

- *failure to implement a workable paradigm for amassing and structuring innovative and inventive experiences* excludes the possibility of preservation and accumulation of invaluable intellectual capital; moreover, it amounts to wasteful and neglectful misuse of a legacy that may be irretrievably lost – for the company, for the young generation, for the society – when those who created that legacy retire or resign.

This state of affairs is global and typical. It is also lamentable and incomprehensible.

Without understanding this phenomenon, without creating a new technology for ongoing accumulation of knowledge and skills, how can we talk about the aims, objectives and functions of quality management, project management or personnel management? About innovative thinking culture and innovation management, about inheriting intellectual capital and ensuring corporate continuity? Continuity… in what?

This outrageous extravagance is valued at dozens of millions of dollars at any large enterprise. It is difficult to make a reliable estimate of the losses sustained by the industry as a whole, but we can safely assume that those losses may be as high as dozens – or even hundreds – of billions of dollars.

d. Exchange of experience among thousands of innovators and availability of ongoing "lifelong" self-training to all interested specialists based on deliverables produced by such exchange

Archaic TRIZ "transfer-of-learning" and teaching methods have the following drawbacks:

- poorly structured examples leading to unclear interpretations and inconsistent training applications which depend almost entirely on personal experiences accumulated by individual trainers,
- lack of objective criteria to evaluate model efficiency,
- grievously limited training in practical resolution of real-life problems.

All these drawbacks can be eradicated by creating centralized databanks containing information on standardized TRIZ models which have been successfully used to resolve real-life problems. Instead of being arbitrary collections of haphazardly selected examples, such databanks represent highly efficient "machines" assuring reproduction and productive transfer of TRIZ learning. They can be built on the basis of the following simple principle: the more participants a databank has, the higher its efficiency! The databank of TRIZ knowledge created by Modern TRIZ Academy (the Modern TRIZ Pool, or its company-specific implementations) will ensure efficient transfer of knowledge and skills among all members,

enabling them to engage in ongoing self-improvement through daily training and review of periodically published digests.

e. Development of Modern TRIZ

Standardization of TRIZ models and accumulation of numerous examples of efficient solutions result in the attainment of a "critical mass" which generates new opportunities for Modern TRIZ improvement.

The Modern TRIZ Pool is rapidly becoming a treasure-trove of collective intelligence, while its empirical uses open up breath-taking applied research vistas.

Other important features of Modern TRIZ education include Internet availability of TRIZ knowledge and organization of mass-scale TRIZ basics remote training. It is this standardized education that is being developed by the Modern TRIZ Academy.