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TRIZ already 35 years in the Czech Republic

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Abstract

TRIZ methodology was popularized in the Czech Republic in technical journals since 1980.
Then it has been lectured at several technical universities since 1996 (Brno, Prague, Liberec, Pilsen, Ostrava, Zilina, Kosice).
Since 2000 original publications from more Russian authors have been translated into Czech, and later some of their publications from English.
Into companies TRIZ enters in the form of motivational three hour lectures and subsequent short-term 2+1 day courses during last ten years.
Anyway, to follow-up the educational course of TRIZ by practical applications in intention of repeated analyze and solving a concrete innovation task go well in companies only in combination of several factors.
Despite to the many positive references of more than 2260 listeners, mostly from companies and partially from technical universities, TRIZ methodology has not yet become a common studied theme neither in universities nor in corporate development departments.
In this paper the authors summarize the experience of teaching and implementation TRIZ at technical universities and findings from teaching and applications in companies in the Czech Republic and Slovakia for the last 35 years.

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1. Introduction

Content and form - evergreen question what and how to do. It is not difficult, but time consuming to come to the opinion that both the systematic approach to the problem solving, and the stimulated and developed human creativity are constantly useful and applicable in technical education as well as in innovative practice.

There's no doubt that engineering graduates provided with the methodology of systematical and creative thinking would adapt more easily and rapidly to the variable demands of the very dynamic reality in practice.

Sometimes, the engineers have an allergic reaction already just to the words: methodology, analysis, synthesis, etc. Of course, there are no universal short instructions how to connect the system approach and solving creativity in the engineering qualifying profile. But there is a well-elaborated and instrumental TRIZ - relatively transdisciplinary, analytic - synthetic methodology which can be studied and mastered, which supports both system approach and creativity needed for inventive solving process.

It was already Leonardo da Vinci (1452-1519) who had something to say to the question how to educate and simulate creative man. In his legacy to his students he declared four rules how to stimulate the brain to creative actions:

- Study science of art (to get object knowledge – to know WHAT),
- Study art of science (to adopt methods - to know HOW),
- Develop all your senses (to keep creativity – to think HOW DIFFERENTLY),
- Keep in your mind system approach (because all is connected with all - to think HOW BETTER).

2. TRIZ is good because non-trivial

Mastering of non-trivial methodology (if compared with some others) requires serious study, solved examples, and time for real applications. That is nothing new; the reality puts always obstacles to all valuables. Only unvalued can be

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obtained immediately. The same is valid for education and for schools. The methodology TRIZ leads the solvers from vague problem situation to the problem description, through comprehensive analysis of the problem object and to the formulation of various innovative tasks and to the formulation of typical inventive tasks to be solved (contradictions, models of conflicts, function) an then offers several recommendations (inventive principles, separations, trends, scientific effects,…) how to obtain concepts of solving variants for implementation [1, 2, 3, 4]. That is why several enthusiasts [Dostál, Bušov and Jirman] attempt to introduce TRIZ into the technical education both in universities and innovative companies in the Czech Republic and Slovakia, since 1980.

The conference we understand as an opportunity to make short recapitulation and to find direction for continuation of TRIZ implementation in Czech Republic.

2.1. What have we done for popularization of TRIZ

Since 1980 we (Dostál, Bušov, Jirman) have published 85 popularizing articles not only in technical journals.

Since 1993 we have realized 6 teaching seminars with Russian lectors (Kucheryavyj, Skuratovich, Severinec, Lubomirskij, Devoino, Gasanov, Kokin, Khomenko, Souchkov and Belski) and several consultations (Khomenko, Gasanov, Kokin, Devojno and Belski).

Since 1993 we have published 63 contributions at national conferences.

Since 1993 we have presented TRIZ and its SW support Invention Machine at 7 international and 7 national exhibitions organized in the Czech Republic.

Since 1995 we have published 65 contributions at international conferences.

2.2. TRIZ is lectured at several technical universities

The TRIZ full semester seminar was introduced as an optional course for magister study in Technical universities Brno (1996) and Liberec (1991).

The TRIZ topic can be found as a partial theme in frame other courses in 7 universities in the Czech Republic and Slovakia (Pilsen, Prague, Ostrava, Brno, Zilina, Bratislava, Zvolen, Kosice).

Since 1993 we have gained 6 institutional supported grants and have participated in 4 another grants more or less supporting implementation of TRIZ into education and innovative practice.

2.3. Several publications have been translated

Since 1996, 7 books were translated (authors: G.S. Altshuller, I. Devoino, J. Salamatov, I. Belski, A. Guin).

Since 1997, 30 subsidiary papers for students and engineers (authors: Gasanov, Ivanov, Bystrickij, Vajnerman, Goldovskij, Souchkov) were translated, respectively worked out (Dostál, Andrejsek, Beneš, Bušov, Jirman, Valášek, Skařupa).

2.4. TRIZ is lectured and applied in companies

Since 1997 we have cooperated in 65 innovative projects in the role of consultants supporting innovative teams in companies where TRIZ was more or less used. They were for example the following companies: SKODA, BOSCH, SIEMENS, PRECIOSA, Honeywell, Visteon, HVCC, VITKOVICE, LINET, BORCAD, FOREX, ELITEX, KOVOSVIT, BRANO, ELMARCO, Continental, etc.

Besides given overview of activities we have done other efforts to popularize TRIZ in the Czech Republic. Despite a lot of popularizing work the TRIZ methodology remains little known both in education and in the innovative practice. Probably because this methodology is not trivial.

3. To establish TRIZ in companies is not easy

We frequently offer TRIZ for companies. Initially in the form of 3-hour informational and motivational lectures. Then are usually organized short-term, mostly 2+1 day courses during last ten years. The first day of the three-day course is devoted to intensive explanation and demonstration of basic analytical instruments, modelling of problem situations and formulation of numerous innovative tasks. The second day is devoted to explanation and demonstration of solving instruments from ARIZ, again through numerous cases. During the third day, after interval of one or two weeks, several teams of engineers present several partially elaborated innovative tasks solved on base of knowledge obtained during first two days and the lector is in the role of a couch moderating the discussion on each presentation. Since 1997 to 2015 more than 2260 engineers were introduced with TRIZ. Opinions of critically thinking not only technicians are mostly positive as show in Fig.1.

If we compare Figs 2, 3, 4 and 5 then we can see that the more time and deeper explanation of basics TRIZ, the more positive the responses from listeners. The same fact is proved by our experience [5, 6, 7, 8].

The response of the engineers in companies after a 3 hour informative-motivational lecture is positive, but the opinions show the greatest variance, perhaps because participants are not only engineers, but also HR professionals, marketers, businessmen (Fig. 2).

Positive opinions may have engineers already after two days very intensive training seminar in which the company requires education even more including conceptual solutions of innovative tasks. But only two days is not enough to meet the demands of companies that often want more than is possible. Such two days are extremely challenging for the teacher as well as for practicing engineers and therefore this variant we do not want repeat because the results are not usually so good, as were in the two mentioned companies (Fig. 3 and Fig.4).

The most positive opinions are those of the engineers after 2 days of educational seminars plus one day subsequent application of TRIZ in solving their innovation tasks with the support of the coach (Fig.5).

Important for education in the universities and the future of TRIZ is the fact that the vast majority of practical engineers