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**Training technique of TRIZ elements with the help of a toy –Webbles  
("Bob of toy")**

*Conference "ETRIA: TRIZ- Future 2002" (6-8 November, 2002, Strasbourg, France)*

**Introduction**

One of basic elements TRIZ are the laws of technical system evolution and Altshuller's Inventive Principles [1]. In the TRIZ-literature each Inventive Principle and the law is illustrated by examples from different areas of engineering. The training takes place on a verbal channel of perception, with a support of abstract thinking (the student should present a situation, stated to the teacher, and then "to see" in it model of a task, contradiction and way of its elimination with the help of Inventive Principle. Such technique is designed for a wide technical outlook and high level of abstract thinking of the students.

In this work the new technique of training is offered. Its differences are described:

1. A situation of success is specially created: by use as examples only patents for a toy.
2. Two channels of perception are used simultaneously: visual and verbal.
3. The training to Altshuller's Inventive Principle is developed on one "through" object - toy "Bob of toy" (MKI A 63H 15/06).
4. Dividing of a lesson into stages of passive, semi-active, active mastering of a material and feedback.
5. During training the students create own "inventions".
6. The feedback (self-rating of a level of the decision of the task) is applied as a research task: to find a place to the technical decision in fund of the known inventions (educational card file).

7. At a stage of an active mastering the listener sequentially will use the contents of a method for problem solving in close (toy), mean (subjects of a household activities) and distant (social systems) areas.

8. For training to the laws of technical system evolution the special table is used.

Let's consider more in detail some components of a technique:

### **1.0. Creation a situation of success**

It is the major psychological element of a technique. At each stage of the lesson the student should feel own successful progress, development of knowledge and skills, and at the end of the lesson he should have obviously seen positive result of his efforts (the anchor) [2]. We specially pick up for examples the patented toys, as patents have the large importance in eyes of the people. For a "object for transformer" the toys ideally approach: they are well acquainted with both children, and adult of any trades. The tasks for inventing toys create a favorable emotional atmosphere for mastering and fastening of receptions, considered at the lesson. And when during the decision of the educational tasks the student repeats or surpasses the patented decision, it at once gives a high independent rating of his decision and raises value of received skills.

### **2.0. Card file of examples**

The toys seem simple and accessible for understanding to the adults and children. It is possible to show many creative receptions by simple toys "Bob of toy". "Bob of toy" under different names is known in set of the countries, for example - "Nevaljaschka" or "Vanjka-Vstanjka" in Russia, "Webbles", "Bob of toy" or "Tilting doll" in America, "Poussah" or "Culbuteur" in France, "Daruma" in Japan. The card file of educational examples from the patents of Russia, USA, France, Germany on "Bob of toy" is assembled. The card file contains a scheme of the inventions. For each lesson the distributing material as a series of separate sheets is prepared, each of which gives out to the student after performance of the previous task [3].

### **3.0. Stages of a lesson**

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3.1. At a passive stage the teacher explains, how the creative method is applied on toys, the students study the schemes of toys on a distributing material.

3.2. At a semi-active stage the students decide a task: how further to apply the same method for toys (from a distributing material), thus they can take the help of the teacher. The first inventions of the students occur already at this stage. They draw the schemes and ideas of the toys, thought up by them, on separate cards. Each student has his own color of cards with his ideas. With each a lesson the fund of own "inventions" of the student grows. Very frequently the study of the subsequent material allows them to improve the decision found before. It creates for the students feeling of success and high motivation to study.

3.3. At a stage of feedback all decisions, offered by the students, are considered by group. During the decision of a research task they find the inventions, which coincide with the decisions, offered by them, or it is worse than theirs. Thus at this stage we solve simultaneously two tasks: we expand a fund of the decisions, known by the student (thus frequently student improves also them), and we learn him to estimate his idea objectively. Frequently decisions of the students surpass in originality the patents from an educational card file. But the economic situation in Belarus does not allow to invest the patent on the invention. We understand, that "invention" of the student is not identical to the patent for the invention, therefore we use the term the "invention" as applied their ideas "in inverted commas".

3.4. At a stage of active mastering the student consistently uses the investigated creative method for the decision of a task "how to apply this reception" in close (toys), mean (subjects of a household activities) and distant (social systems) areas. At this stage we pay attention of the students to the purposes, which are put before by the inventor. Analyzing 1388 toys from our computer base of the inventions in USSR, we have allocated some directions of purposes of the inventor. Some of them pay attention only to improvement of characteristics of the object. Others create games and toys only for entertainment of the man. Third improve process of game, changing its structure and technical equipment. But there are authors, for

which purpose of the invention are - development, training and education of the person in game. And also - development by the person the role structure of social, mutual relation between the people, help in adaptation in a society to the people with various physiological features. Our task - to give understanding that the new intellectual resource - TRIZ - the student can consciously use for production the purposes of a various level of influence on a society. The students create a card file of own ideas in various areas of life. Use of Altshuller's Inventive Principles in social area allows the students to analyze and to solve own personality problems.

#### **4.0. Training to the laws of technical system evolution**

After acquaintance of a line of Inventive Principles we pass to the following grade level TRIZ - study of the laws of technical system evolution. For this purpose the table of the size 841x594 mm is developed, on which the stages, laws and lines of development of systems are put in the certain order. The training to the laws technical system evolution will be carried out by an educational card file of toys and by own "inventions" of the students created at study of Altshuller's Inventive Principles.

4.1. At a passive stage the teacher explains the essence of the laws of development and processes occurring at different stages of technical system evolution. By the table he shows stages and lines of development of systems. Explains principles, on which it is possible to attribute the technical decision to the certain stage of technical system evolution. Tells about an opportunity of forecasting of the further evolution of system.

4.2. On a semi-active stage the students fill on the table "different floors" of stages of evolution of system by cards with the inventions, known for them, - from an educational card file "Bob of toy" and colour "inventions" (that it was possible at once to determine the author). There is an active discussion, the students argue - where exactly it is necessary to attribute this or that invention. The teacher corrects a course of discussion, giving the additional information for reflections on an investigated subject. As arguments it is authorized to use only formulations of

the laws of evolution, thus there is an active mastering of the laws, understanding of their interrelation.

4.3. As the task for "feedback" the students define: to what stages, laws and lines of development their own "inventions" concern it is well visible on color cards.

4.4. The active stage "begins itself". On the table, filled with cards, "white stains" are visible at once. Taken possession by initial skills TRIZ the students are set by a question: "and what prevents us to fill and this "white stain"?". So the mechanism of creative search is started again.

Use of the evident table, cards of the inventions and group discussion allows to fix a material about the basic concepts TRIZ - contradiction, Altshuller's Inventive Principles, laws of technical system evolution, forecasting of development.

### 5.0. Use

The technique is based on a personal inventive experience of the author [4-7] and approved on rates in public institute of technical creativity with the engineers and in institute of improvement of professional skill of the teachers - with the teachers of physics. The program of a rate of training, technique of realization of the lessons and distributing material on each the lesson is developed. The author works above the book "Nevaljaschka conducts Teach to invent, or Game-self for creative thinking".

To make the method more apprehensible and popular, the interactive game «Teach the Doll Bowling» is being developed. The structure and contents of game is developed, the prototype is made. It demonstrates the basic idea and some game opportunities, enables to operate behavior of a toy of "sample". Besides Nelly Kozyreva, who is the author of this method and the main ideologist of the project, the team of developers includes Elena Novitskaya, designer, organizer of the project and the author of the game structure and doll appearances; Nikolay Shpakovsky, TRIZ consultant and project organizer; Andrey Mitsov, programmer, doll-animator and author of the main game concept - «teaching through teaching» (co-author of Tatyana Mitsova) .

## SUMMARY

The offered technique is designed for the teachers of TRIZ. It will be useful to the teachers of technical creativity for the realization at the lesson at college, Liceum. At use of the technique in a technical University it is expedient to give the tasks at an active stage on perfection of the specialized technical systems investigated by the students. The computer game allows to organize correspondence or independent training of TRIZ, including the Internet.

## References

1. Altshuller, G., (1979) 'Creativity As an Exact Science. Theory of Inventive Problems Solving', Sovetskoye Radio; Moscow, USSR.
2. O'Connor, J., Seymour, J., (1998) "Introducing Neuro-Linguistic Programming", Versia; Cheljabinsk, Russia. ISBN 593162001X
3. Kozyreva, N., (2001) A technique of training to methods of solving the contradictions on an example of the licenced toys "Vanka-vstanka". 2001 Scientific - practical conference "Creativity in a name of worthy life ", July 11-12, Velikiy Novgorod, Russia.
4. The patent of Russia for the invention 2037324 "Designers".
5. The patent USSR on the invention 1819394 "Toys".
6. The patent of Russia for the invention 2111785 "Board games".
7. The patent of Russia for useful model 10102 " The Game in cards ".
8. Kozyreva, N., Novitskaya, E., (2002) 'Methods of Teaching TRIZ-Principles By a Through Example' TRIZ Journal online, [<http://www.triz-journal.com>], Issue August 2002.

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TRIZ-user. Engineer and psychologist, inventor TRIZ-games.

**TRIZ experience:** 7 years experience TRIZ-education in Belarus. Duration of training from 22 to 80 hours.

Former students: engineers, pre-school teachers, teachers of physics.

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