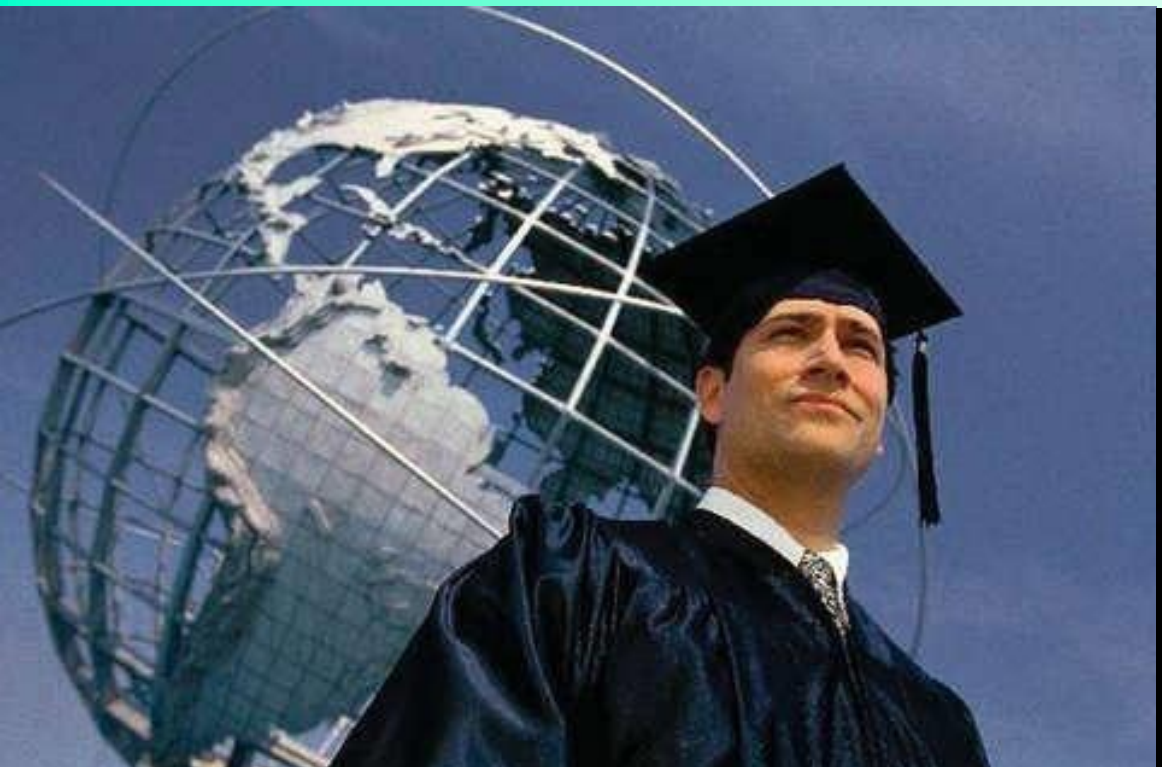
Кафедра ЮНЕСКО
«Новые материалы
и технологии»

А. В. Козлов,
Т. В. Погребная
О. В. Сидоркина

ФОРМИРОВАНИЕ ИНЖЕНЕРНОГО МЫШЛЕНИЯ В МИРОВОМ ОБРАЗОВАНИИ: СОДЕРЖАНИЕ И ТЕХНОЛОГИИ



«… мы должны развивать и подготовку инженеров качественно новых и взаимодополняющих типов, … это инженеров-исследователей и разработчиков – так называемый инженерно-технологический спецназ, я бы сказал, современный, владеющий технологиями мирового уровня, … , инженеров-исследователей, способных решать, казалось бы, нерешаемые задачи и обеспечивать инновационные прорывы в высокотехнологичных отраслях …».

А.И. Рудской – ректор СПбГПУ На заседании Совета при Президенте России по науке и образованию 23 июня 2014 г.

Инженерное мышление

2-й уровень: инновационное
Проектирование принципиально новых конструкций «Инженерный спецназ»

1-й уровень: типовое
Проектирование конструкций, аналогичных существующим

Инженерное мышление

2-й уровень: инновационное *Проектирование принципиально новых конструкций «инженерный спецназ»*

Методы целенаправленного поиска *«Интеллектуальный неолит»*

Методы нецеленаправленного поиска *«Интеллектуальный мезолит»*

«Охота за головами» *«Интеллектуальный палеолит»*

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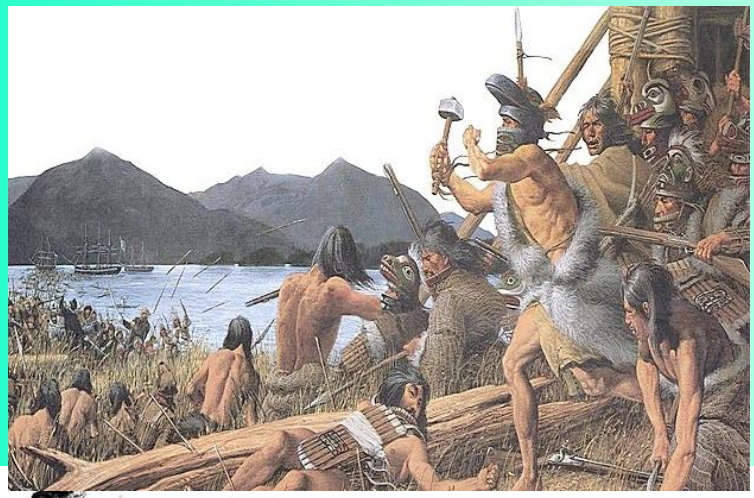
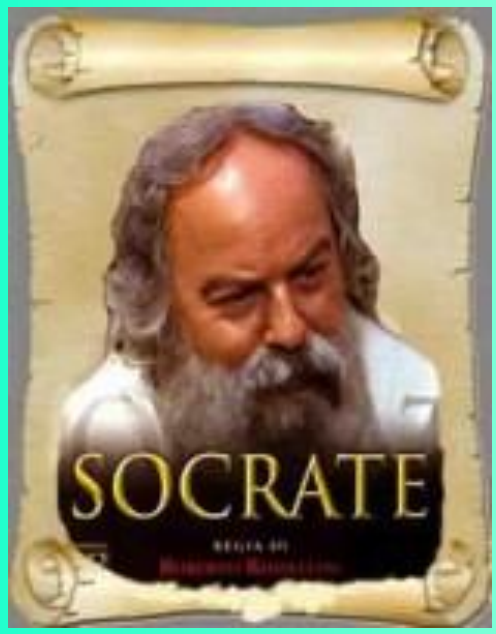


Технологии поиска талантов

- Headhunting, Executive Search (технологии прямого выхода на таланты)
- Networking (технология расширения контактов с целью выхода на кандидатов)
- Social Recruitment (технология поиска кандидатов в социальных сетях)

ИНТЕЛЛЕКТУАЛЬНЫЙ МЕЗОЛИТ



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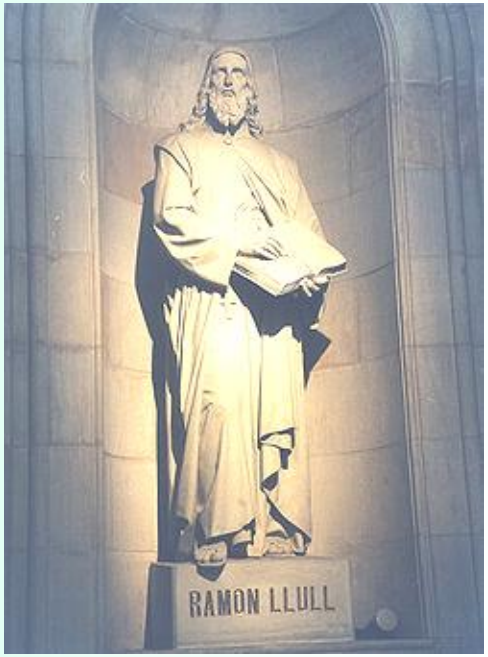

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XX век

Метод фокальных объектов (Э. Кунце, Германия, 1926, усовершенствован Ч. Вайтингом, США, 1953),

«Мозговой штурм» (А. Осборн, США, 30-е гг.),

Морфологический анализ (Ф. Цвикки, Швейцария, 30-е гг. XX в. – развитие идеи «кругов Луллия»),

Синектика (У. Гордон, США, 50-е гг. XX в.)

ИНТЕЛЛЕКТУАЛЬНЫЙ МЕЗОЛИТ

Фабрики мысли. The Richard Florida Creativity Group. Метод «Делфи»

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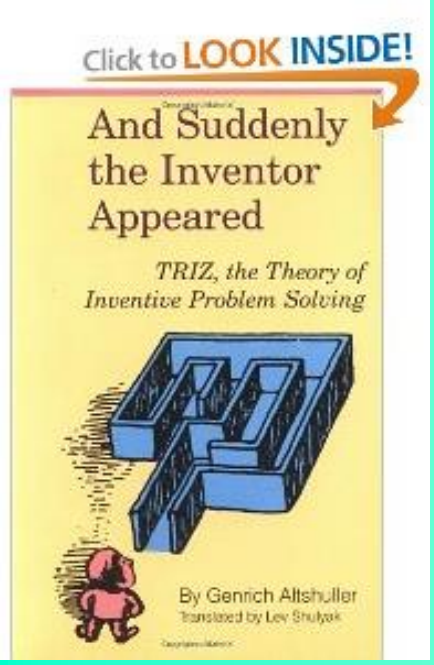
Фабрики мысли. The RAND Corporation. Метод «Делфи»

Теория решения изобретательских задач (ТРИЗ)

Генрих Саулович Альтшуллер - автор ТРИЗ 1926 - 1998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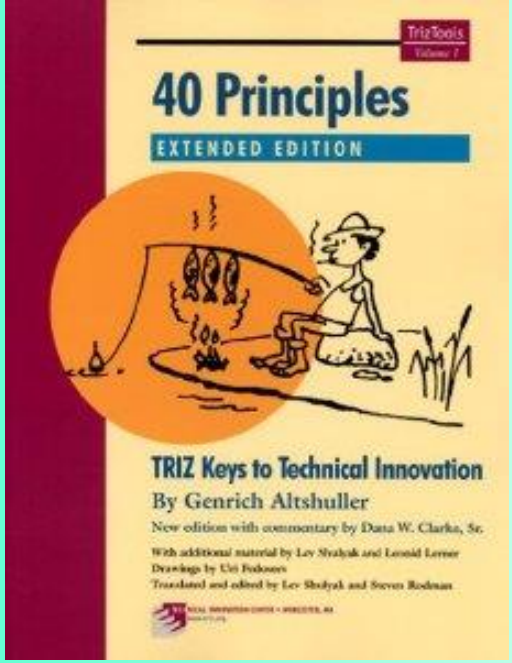
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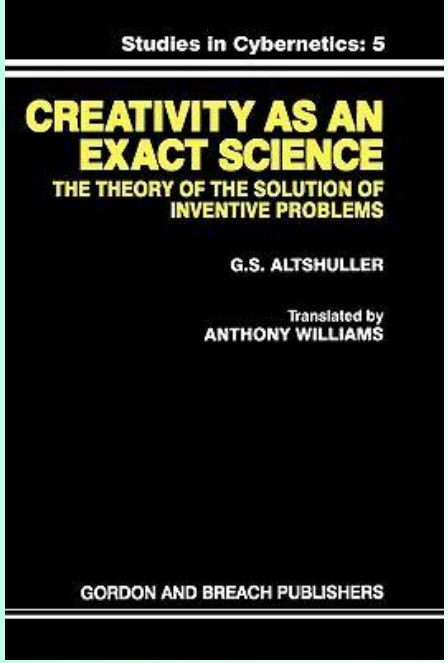
Studies in Cybernetics: 5
CREATIVITY AS AN EXACT SCIENCE
THE THEORY OF THE SOLUTION OF INVENTIVE PROBLEMS
G.S. ALTSHULLER
Translated by
ANTHONY WILLIAMS
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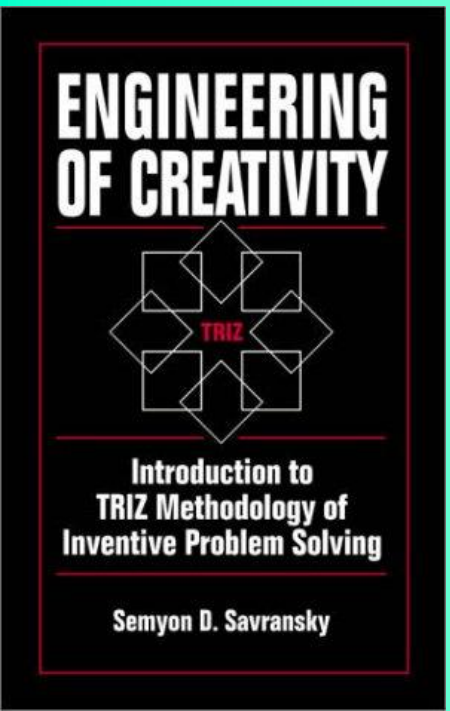
Yuri Salamatov
TRIZ:
The Right Solution at the Right Time
second edition
A Guide To Innovative Problem Solving
© Institute of Innovative Design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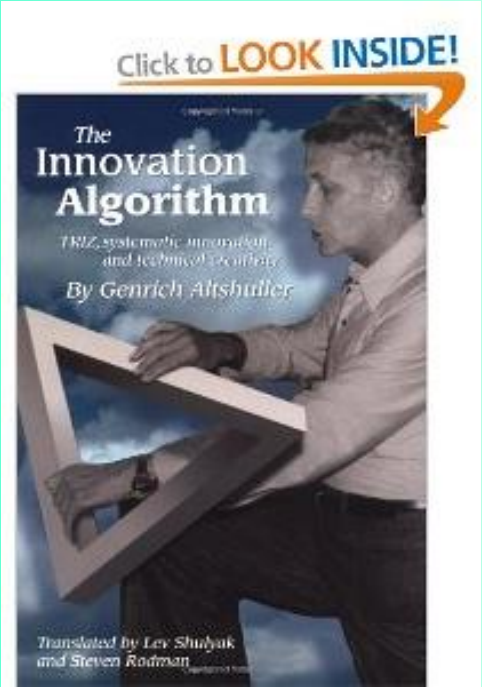
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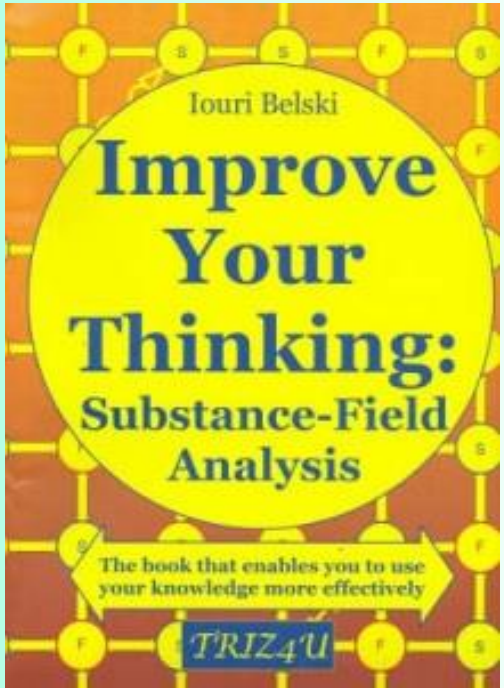
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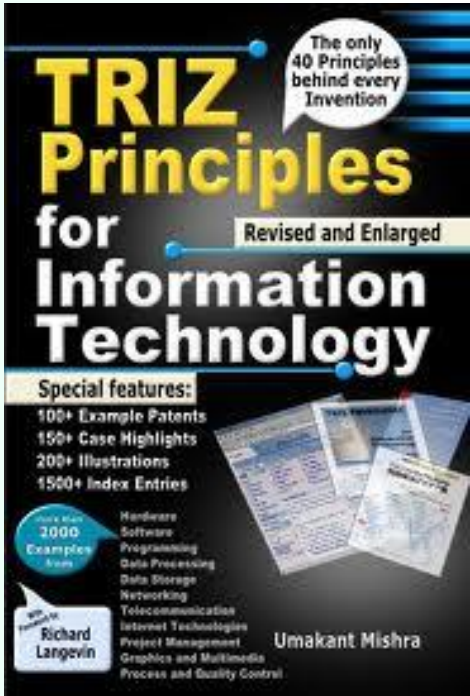
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Inside Innovation at Intel

posted by **Esther Baldwin (□□□)** on **March 05, 2008**

Innovation is an increasingly popular word, you see it everywhere. If you look back in time it has gone from the occasional appearance in articles and magazines five years ago to the current situation where every company from cookies to cameras has innovation in their mission statements, vision and product ads.

Innovation as a discipline – some may think that is an oxymoron. But you can use a process to achieve innovation. Talking to Amir Roggel in the Technology Manufacturing Group about **TRIZ** – I have no doubt that there are processes that result in innovation. The use of **TRIZ** in our manufacturing environment is tracking millions of dollars saved.

Recent Comments

"Thanks for writing this article Scott. Clear, concise and very informative. I've purchased the Intel..."

idf2008 innovation **Intel** **intel** Intel Atom **Intel** CES intel developer **MID** **mobile** mobility Nehalem technology

Инновация как дисциплина – некоторые могут думать, что это - несочетаемо. Но Вы можете использовать алгоритм, чтобы достичь инновации. Говоря с Амиром Роггелем в Technology Manufacturing Group о ТРИЗ – я не сомневаюсь, что есть процессы, дающие результат в инновациях. Использование ТРИЗ в наших условиях производства дает миллионы сэкономленных долларов.

Компания Samsung Electronics приглашает на работу специалистов в области теории решения изобретательских задач (ТРИЗ)

(24 сентября 2004)

Мировой лидер в области IT технологий - компания Samsung Electronics **приглашает на работу специалистов в области теории решения изобретательских задач (ТРИЗ).**

Направления работы:

1. Решение стратегических и тактических задач.
2. Разработка новых концепций для товаров и услуг.
3. Оказание систематической поддержки на различных этапах процесса инновационного развития.
4. Ускорение инновационного процесса с помощью систематического анализа ситуации, решения неординарных задач и создания принципиально новых подходов.

Требуемые знания:

1. Понимание методологии системной инновации.
2. Практические навыки использования методов системной инновации.
3. Умение превращать нововведение в плановую деятельность.

MULTINATIONAL CORPORATIONS APPLYING TRIZ:

Boeing,

Bosch-Siemens,

Procter&Gamble,

Detroit Diesel,

Eastman Kodak,

Energizer,

Ford,

Gillette,

Intel,

ITT Industries,

LG Electronics Inc.,

Samsung,

Motorola,

Philips Semiconductors,

Phillips Petroleum,

Nokia,

Texas Instruments,

Western Digital Corporation,

Xerox

TWO GENERATIONS OF "THINK TANKS"

First Generation

RAND Corporation	The Richard Florida Creativity Group	The Heritage Foundation	The Adam Smith Institute
ANSER Institute	The Royal Institute of International Affairs	The Brookings Institution	National Institute for research Advancement

Methods: "Trials and Errors", Research of Operations, System Analysis, extrapolation of tendencies, Morphological Analysis, Delphi, etc.

Second Generation

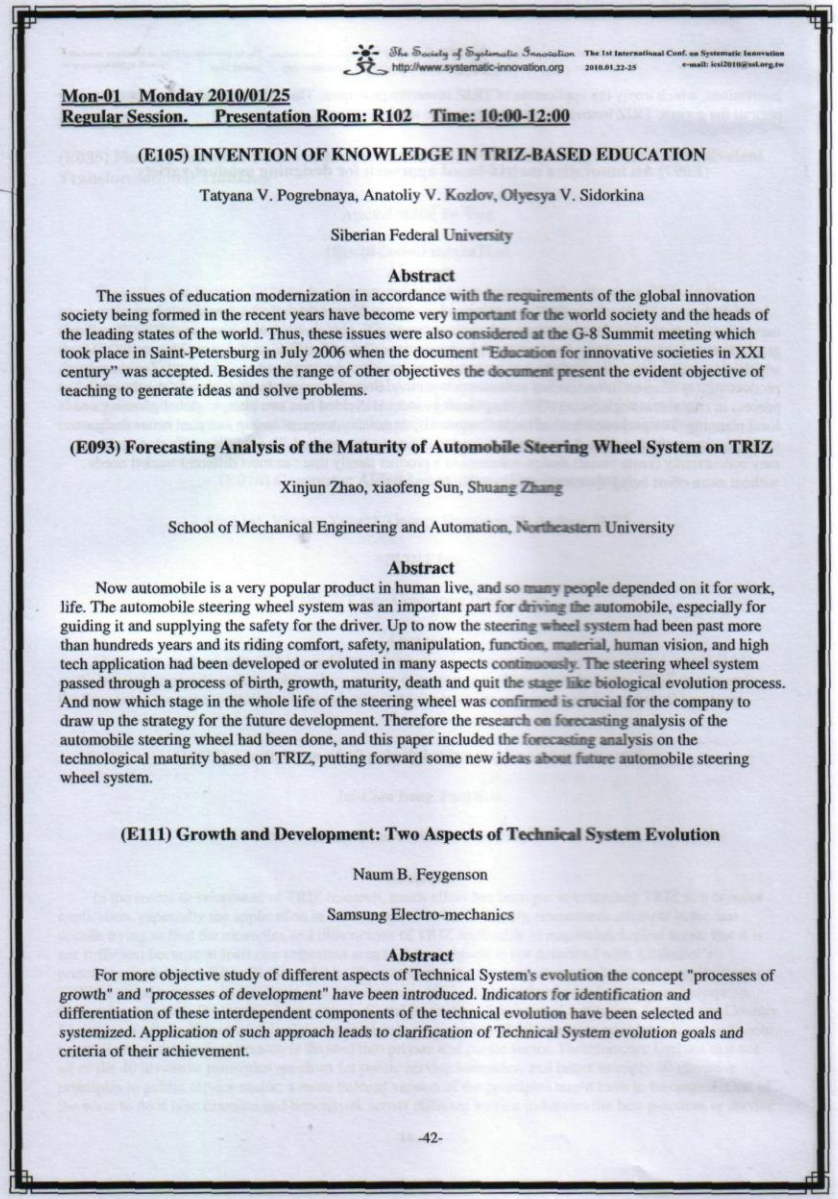
GEN 3 Partner	Invention Machine Corporation	Ideation International Inc.	Applied Innovation Alliance
C2C-Solutions	National Institute of Applied Science	Inventioneering Company	Systematic Inventive Thinking Center

Method: TRIZ

challenged him to use examples in the software and IT services area, which is the focus of much of Bangalore's business.

I gave the keynote speech on the topic of the global innovation revolution and the role of TRIZ in the revolution. The participants asked a wide range of useful questions, giving me the opportunity to talk about TRIZ with Six Sigma and Lean, and TRIZ for school children, among other topics.

ТРИЗ-саммит в г. Бангалоре («Силиконовая долина» Индии)



The Society of Systematic Innovation http://www.systematic-innovation.org The 1st International Conf. on Systematic Innovation 2010.01.22-25 e-mail: icsi2010@ssi.org.tw

Mon-01 Monday 2010/01/25
Regular Session. Presentation Room: R102 Time: 10:00-12:00

(E105) INVENTION OF KNOWLEDGE IN TRIZ-BASED EDUCATION

Tatyana V. Pogrebnaya, Anatoliy V. Kozlov, Olyesya V. Sidorkina

Siberian Federal University

Abstract

The issues of education modernization in accordance with the requirements of the global innovation society being formed in the recent years have become very important for the world society and the heads of the leading states of the world. Thus, these issues were also considered at the G-8 Summit meeting which took place in Saint-Petersburg in July 2006 when the document "Education for innovative societies in XXI century" was accepted. Besides the range of other objectives the document present the evident objective of teaching to generate ideas and solve problems.

(E093) Forecasting Analysis of the Maturity of Automobile Steering Wheel System on TRIZ

Xinjun Zhao, xiaofeng Sun, Shuang Zhang

School of Mechanical Engineering and Automation, Northeastern University

Abstract

Now automobile is a very popular product in human live, and so many people depended on it for work, life. The automobile steering wheel system was an important part for driving the automobile, especially for guiding it and supplying the safety for the driver. Up to now the steering wheel system had been past more than hundreds years and its riding comfort, safety, manipulation, function, material, human vision, and high tech application had been developed or evoluted in many aspects continuously. The steering wheel system passed through a process of birth, growth, maturity, death and quit the stage like biological evolution process. And now which stage in the whole life of the steering wheel was confirmed is crucial for the company to draw up the strategy for the future development. Therefore the research on forecasting analysis of the automobile steering wheel had been done, and this paper included the forecasting analysis on the technological maturity based on TRIZ, putting forward some new ideas about future automobile steering wheel system.

(E111) Growth and Development: Two Aspects of Technical System Evolution

Naum B. Feygenson

Samsung Electro-mechanics

Abstract

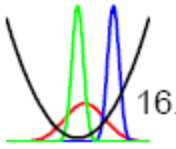
For more objective study of different aspects of Technical System's evolution the concept "processes of *growth*" and "*processes of development*" have been introduced. Indicators for identification and differentiation of these interdependent components of the technical evolution have been selected and systemized. Application of such approach leads to clarification of Technical System evolution goals and criteria of their achievement.

-42-

Международная конференция по системным инновациям в Синьчжу («Силиконовая долина Тайваня»)

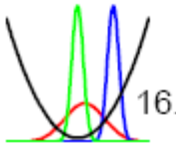
Theory of Inventive Problem Solving (TRIZ)

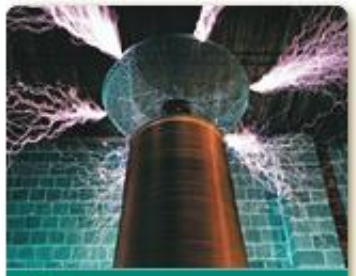
- Genrich Altshuller
  - Sought to identify patterns in the patent literature (1946)
  - "Creativity as an Exact Science" translated in 1988.
- The basic concept
  - Define problems as contradictions
  - Compare them to solutions of a similar form
  - Provide a large database of physical phenomena
  - Anticipate trends in technical evolution



TRIZ Software

- Ideation International (http://www.ideationtriz.com/)
- Invention Machine (http://www.invention-machine.com/)
  - Effects
  - Principles
  - Prediction





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What is TRIZ?
What we Deliver
TRIZ Problem Solving
The TRIZ tools and process
The Oxford Creativity Team
TRIZ workshops

Improvement of thinking and problem solving skills of engineering students as a result of a formal course on TRIZ thinking tools

Iouri Belski
Royal Melbourne Institute of Technology
Melbourne, Australia

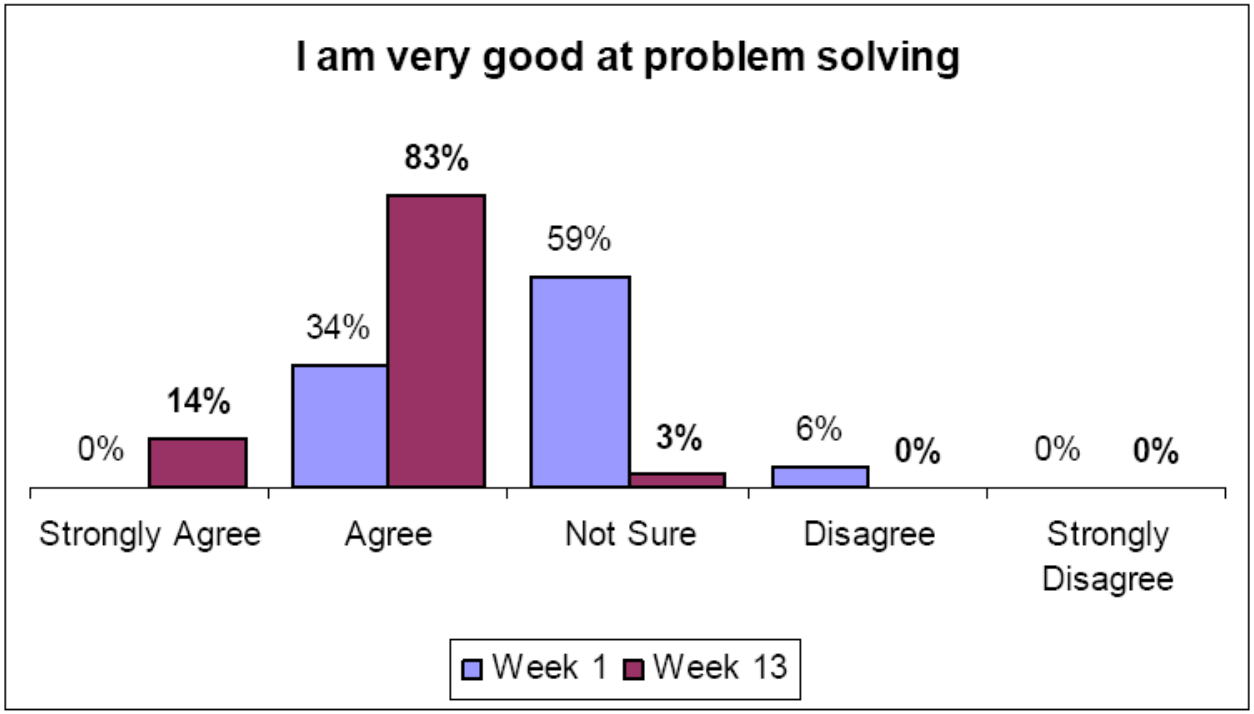

Figure 4. Change in the students' self-assessment in problem solving as a result of the course

Thinking Tools of TRIZ

TRIZ is the Russian acronym for Theory of Inventive Problem Solving. It is a well-established system of tools for problem solving, idea generation, failure analysis and prevention. TRIZ originated in Russia more than 50 years ago [18]. TRIZ thinking

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TRIZ-based Engineering Education for Sustainable Development

Lepeshev, A.A. ; Podlesnyi, S.A. ; Pogrebnaya, T.V. ; Kozlov, A.V. ; Sidorkina, O.V.
Interactive Collaborative Learning (ICL), 2013 International Conference on
Digital Object Identifier: 10.1109/ICL.2013.6644632
Publication Year: 2013 , Page(s): 489 - 493
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Invention of knowledge in TRIZ-based education

Pogrebnaya, T.V. ; Kozlov, A.V. ; Sidorkina, O.V.
Global Engineering Education Conference (EDUCON), 2013 IEEE
Digital Object Identifier: 10.1109/EduCon.2013.6530223
Publication Year: 2013 , Page(s): 959 - 964
IEEE CONFERENCE PUBLICATIONS
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Invention of knowledge in TRIZ-based education

Pogrebnaya, T.V. ; Kozlov, A.V. ; Sidorkina, O.V.
Interactive Collaborative Learning (ICL), 2013 International Conference on
Digital Object Identifier: 10.1109/ICL.2013.6644700
Publication Year: 2013 , Page(s): 757 - 764
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Development of creativity in engineering education using TRIZ

Lepeshev, A.A. ; Podlesnyi, S.A. ; Pogrebnaya, T.V. ; Kozlov, A.V. ; Sidorkina, O.V.
Interdisciplinary Engineering Design Education Conference (IEDEC), 2013 3rd
Digital Object Identifier: 10.1109/IEDEC.2013.6526750
Publication Year: 2013 , Page(s): 6 - 9
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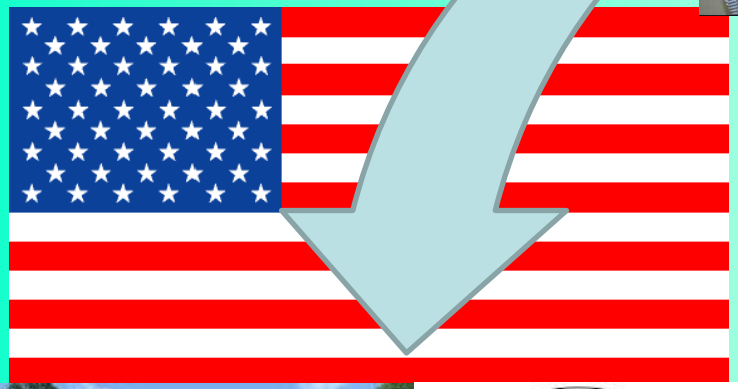

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The Application Mechanism of TRIZ in CDIO Mechanical Theory Teaching

Authors: Fan, Jiang; Chunliang, Zhang; Yijun, Wang; Zhenzhang, Liu

Source: Advanced Science Letters, Volume 12, Number 1, June 2012, pp. 367-371(5)

Publisher: American Scientific Publishers

< previous article | view table of contents | next article >

Abstract:

This study introduces the TRIZ theory to CDIO teaching process and established the teaching optimization mechanism in CDIO engineering education based on the TRIZ theory. That mathematical description of evolution tools, conflict analysis tools, scientific effects database tools, applied in the CDIO is established. The pseudo VC++ codes are given, and the solution flow is provided. This model provides a theoretical tool for the TRIZ theory applied in optimization of CDIO teaching. Meanwhile, three aspects of problem-solving examples in CDIO teaching are investigated, such as the knowledge point optimization of mechanical principles, optimization of the teaching process, students using TRIZ tools to solve problems in the project. The knowledge-point and the sequence of mechanical principles for CDIO teaching, the sequence of teaching organization, and the conflicts solving process for students and the product evolution analysis process are given. The given analysis examples suggests the TRIZ theory plays an active role in CDIO teaching and has the potential for application.

Articles that cite this article?

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DOI: http://dx.doi.org/10.1166/asl.2012.2817

Publication date: 15 Июнь 2012 г.

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«Эксперт» №48(589) / 24 декабря 2007

Убить противоречие [35]

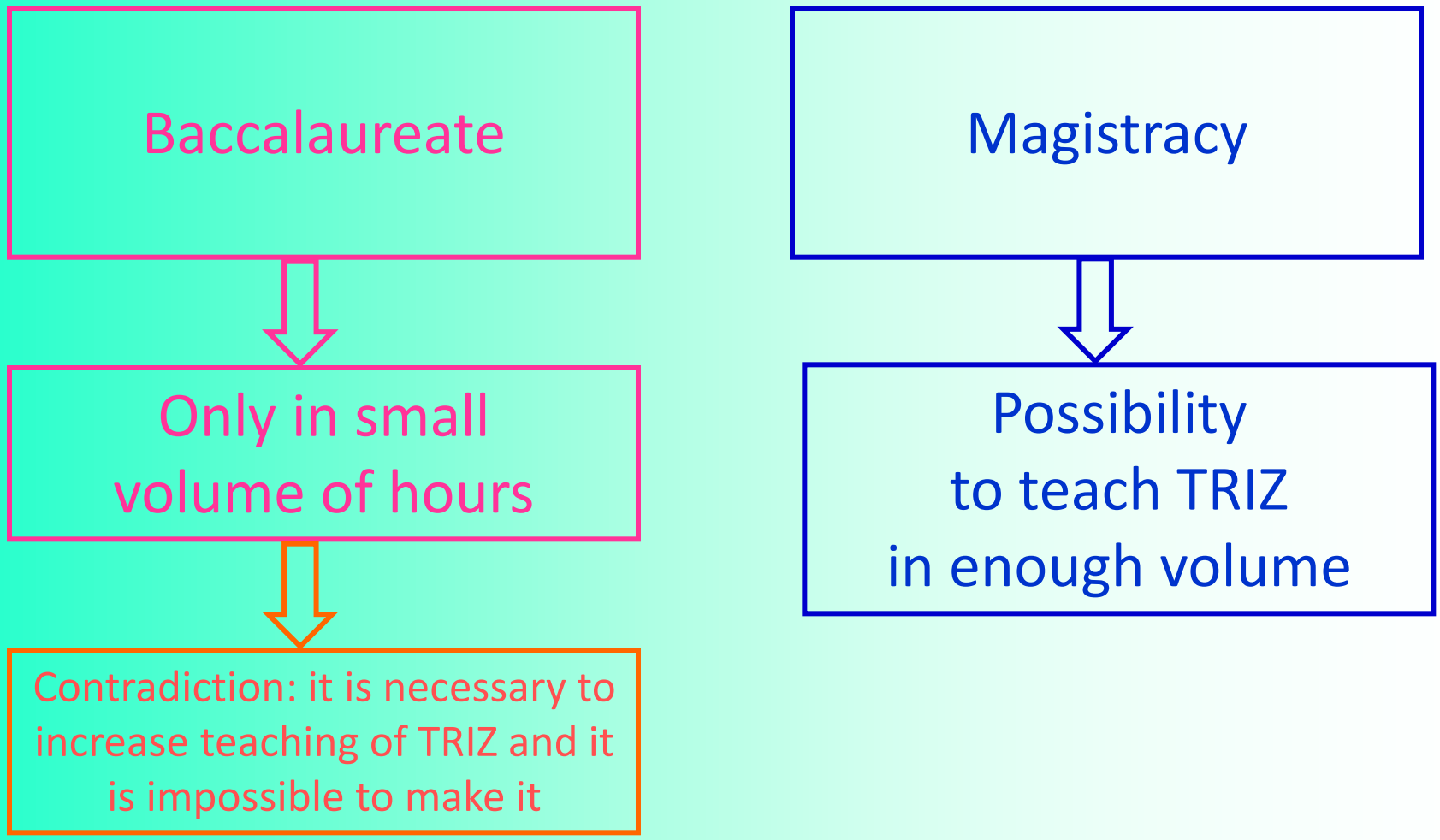
Ольга Рубан

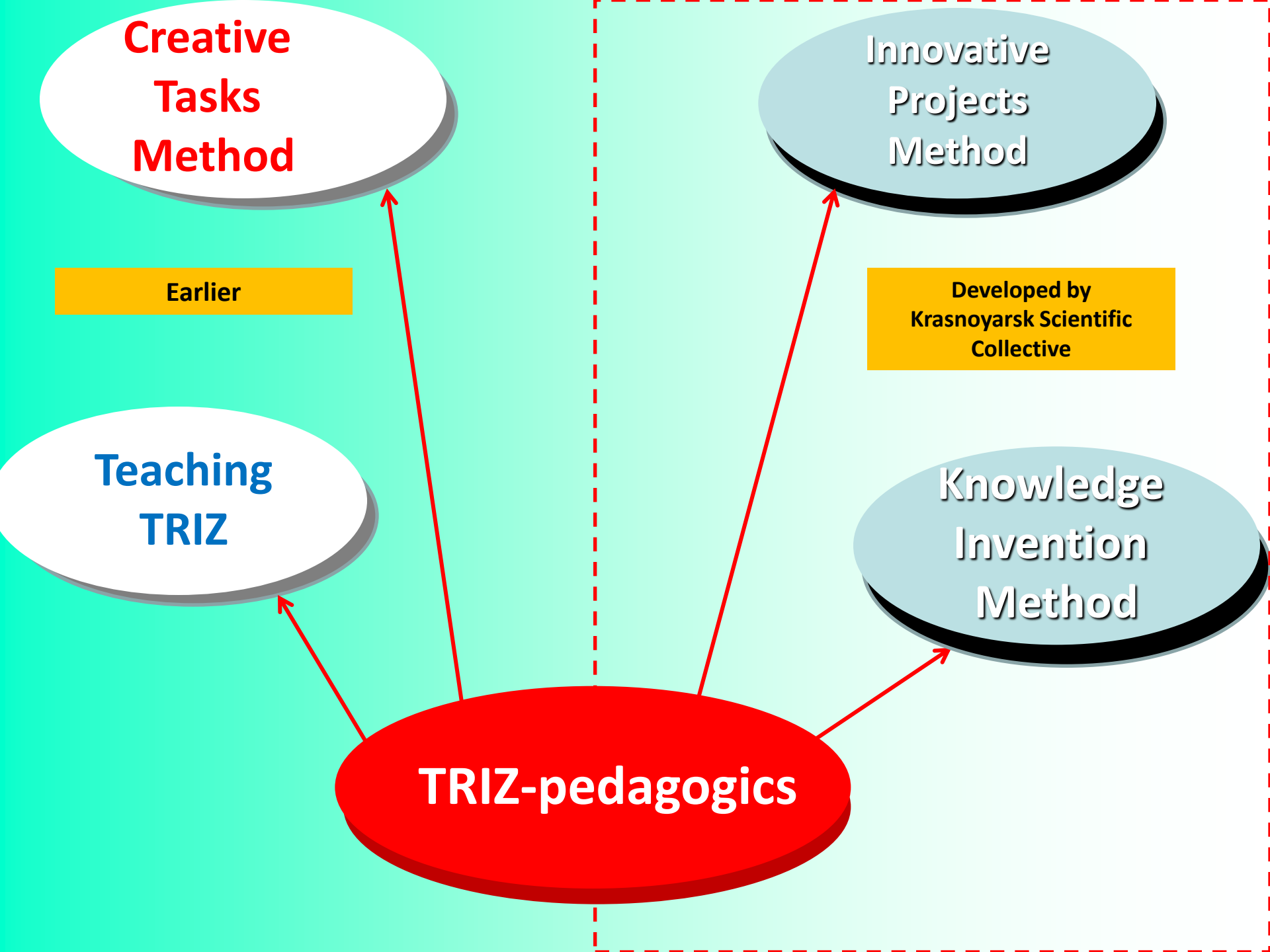
Советский энтузиаст-одиночка Генрих Альтшуллер придумал теорию решения изобретательских задач. Сегодня его ученики по всему миру превратили концепцию мэтра в успешный консалтинговый бизнес, приносящий многомиллионные доходы

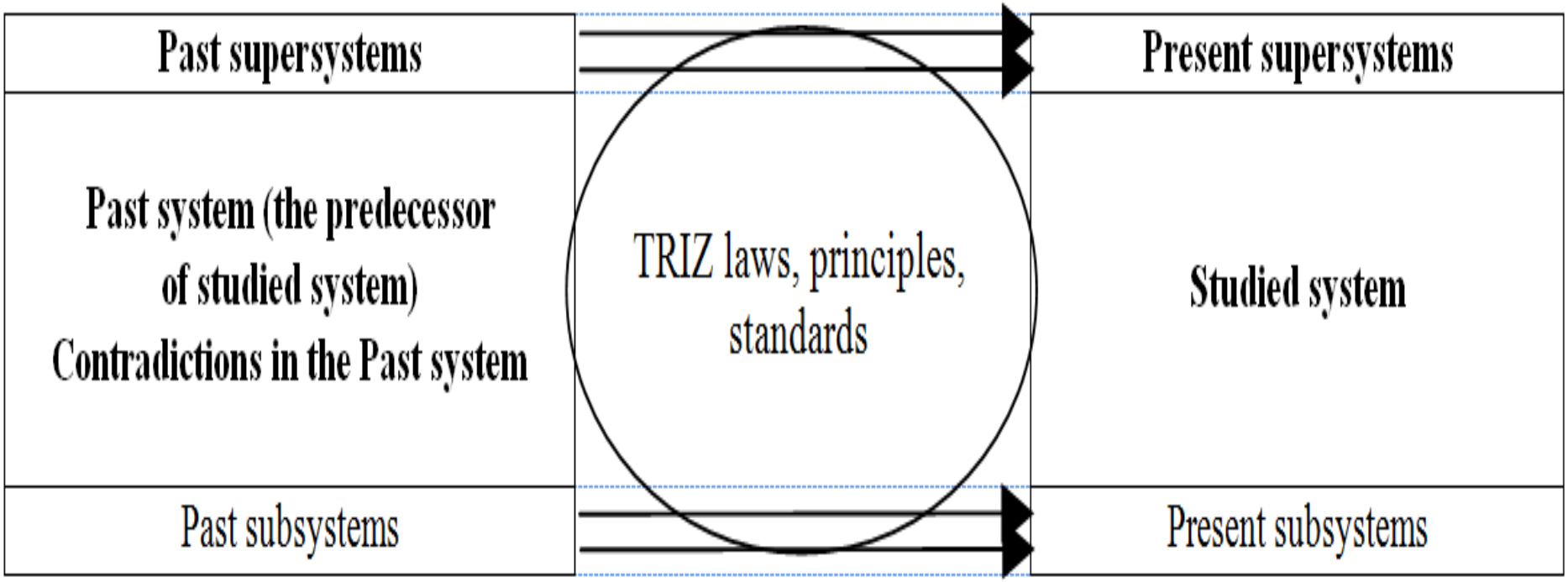
Иллюстрация: Константин Батынков

Идеальная техническая система — это система, вес, объем и площадь которой стремятся

Long-term practice shows that it is important to begin studying of TRIZ with as more as possible younger age.



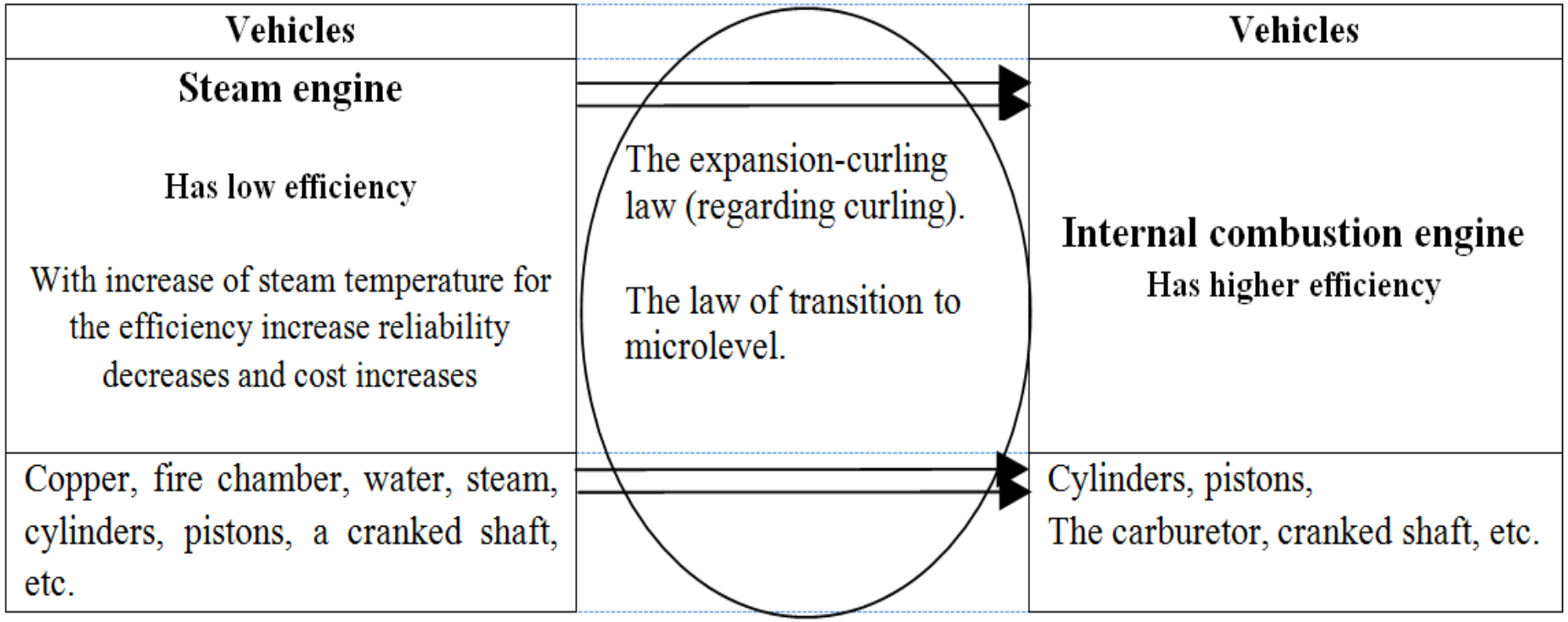

Creative Tasks Method
Innovative Projects Method
Earlier
Developed by Krasnoyarsk Scientific Collective
Teaching TRIZ
Knowledge Invention Method
TRIZ-pedagogics



The graphic scheme of the knowledge invention

Siberian Federal University

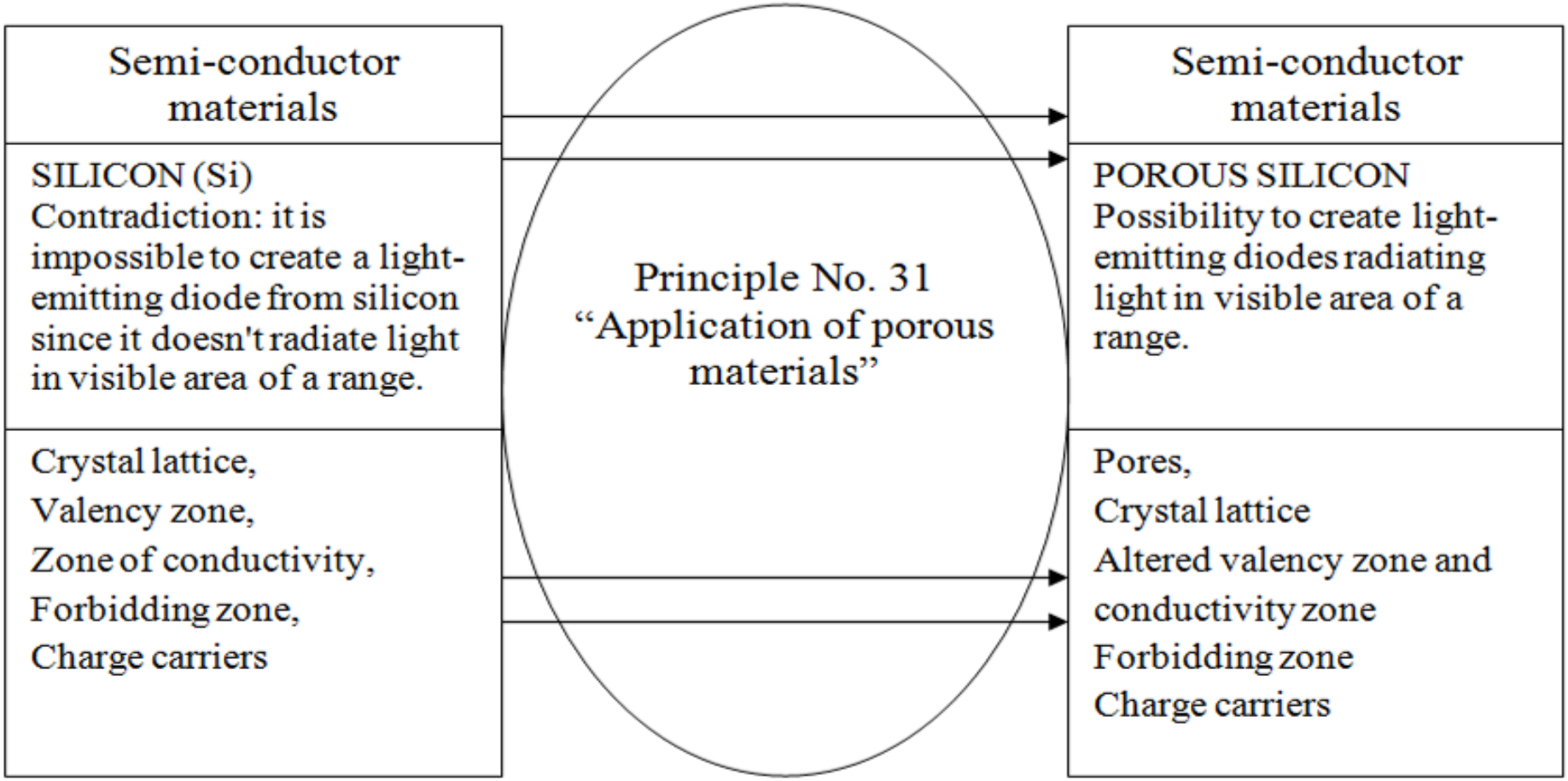
UNESCO Chair "New Materials and Technologies"



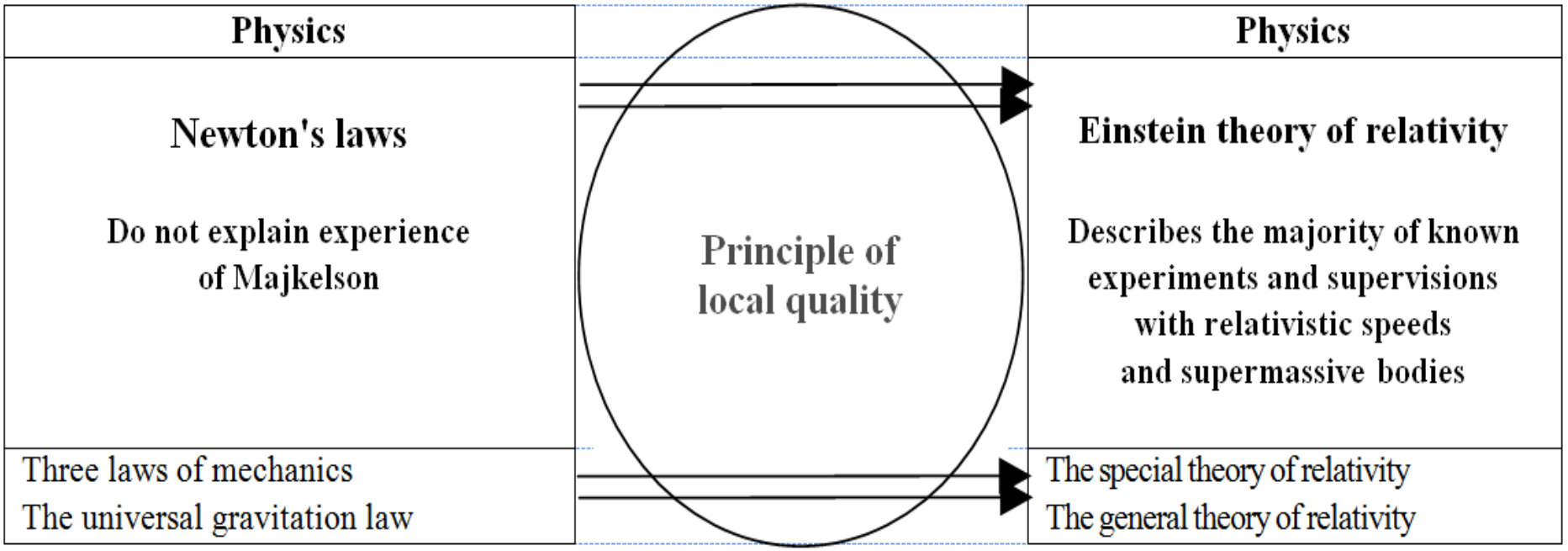
"Re-invention"
of an internal combustion engine

Communication facility		Communication facility
Radio telegraph **Absence of possibility of transfer of sounds** For transfer and reception of sounds aerials of very big size are necessary. Radio stations will create hindrances each other	Principle of the intermediary. Copying principle.	**Amplitude Modulation** **Aerials of the same sizes, as for radio telegraph are required. Radio stations do not create a hindrance each other**
A cable key, an amplifier, an aerial.		A microphone, amplifiers of low and high frequencies, a modulator, an aerial.

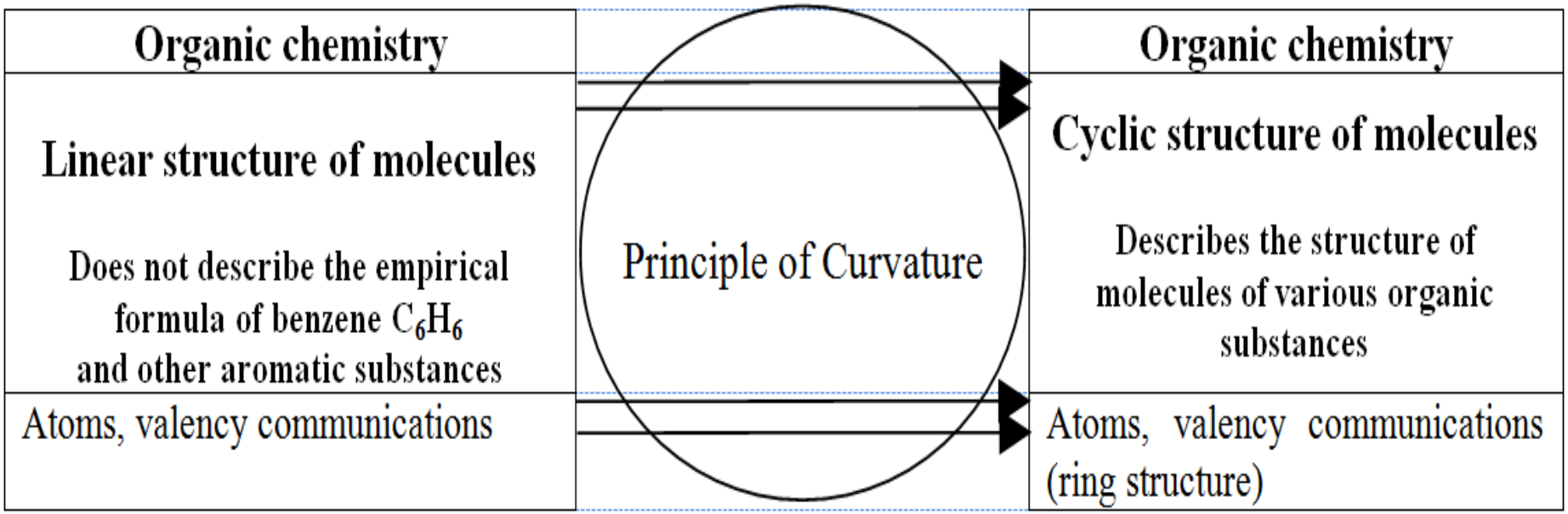
Creation of idea of amplitude modulation



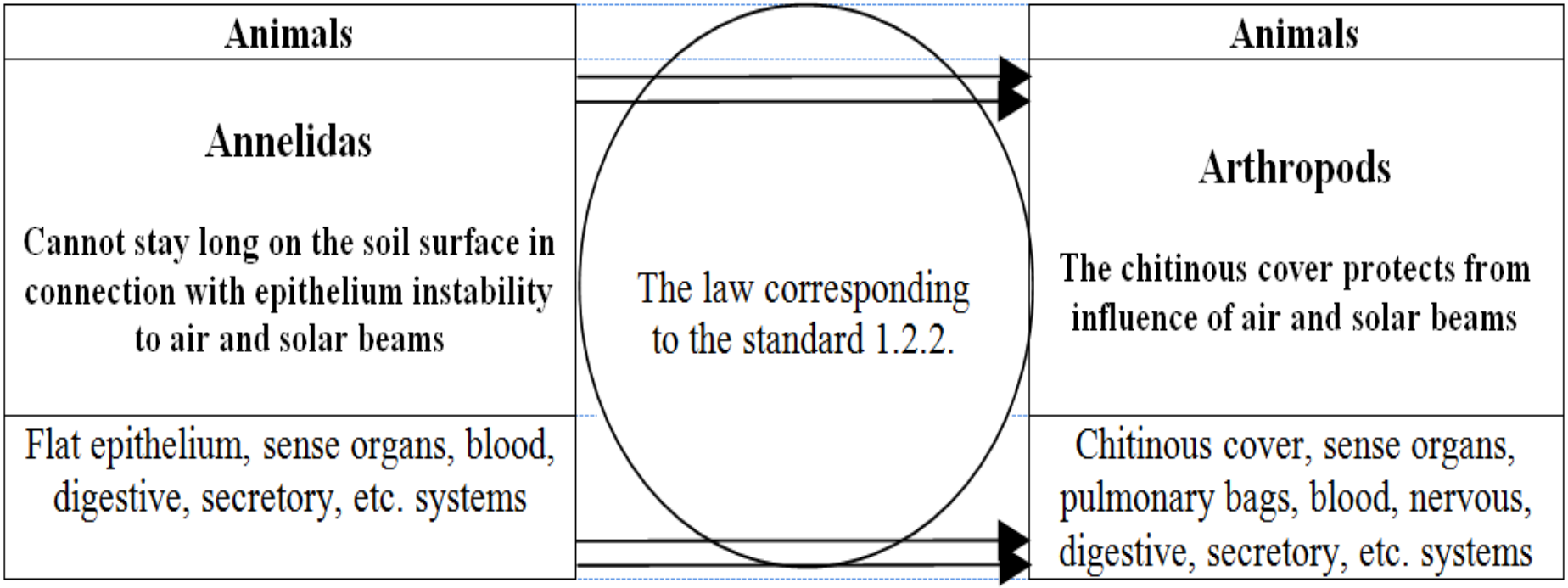
The porous silicon "re-invention"



Creation of the theory of relativity



Creation of idea of molecule cyclic structure



"Invention" of arthropods by the nature

G.S. Altshuller

TRIZ

TRIZ-pedagogics

J. Dewey,
W. Kilpatrick

Project Method

Continuings:

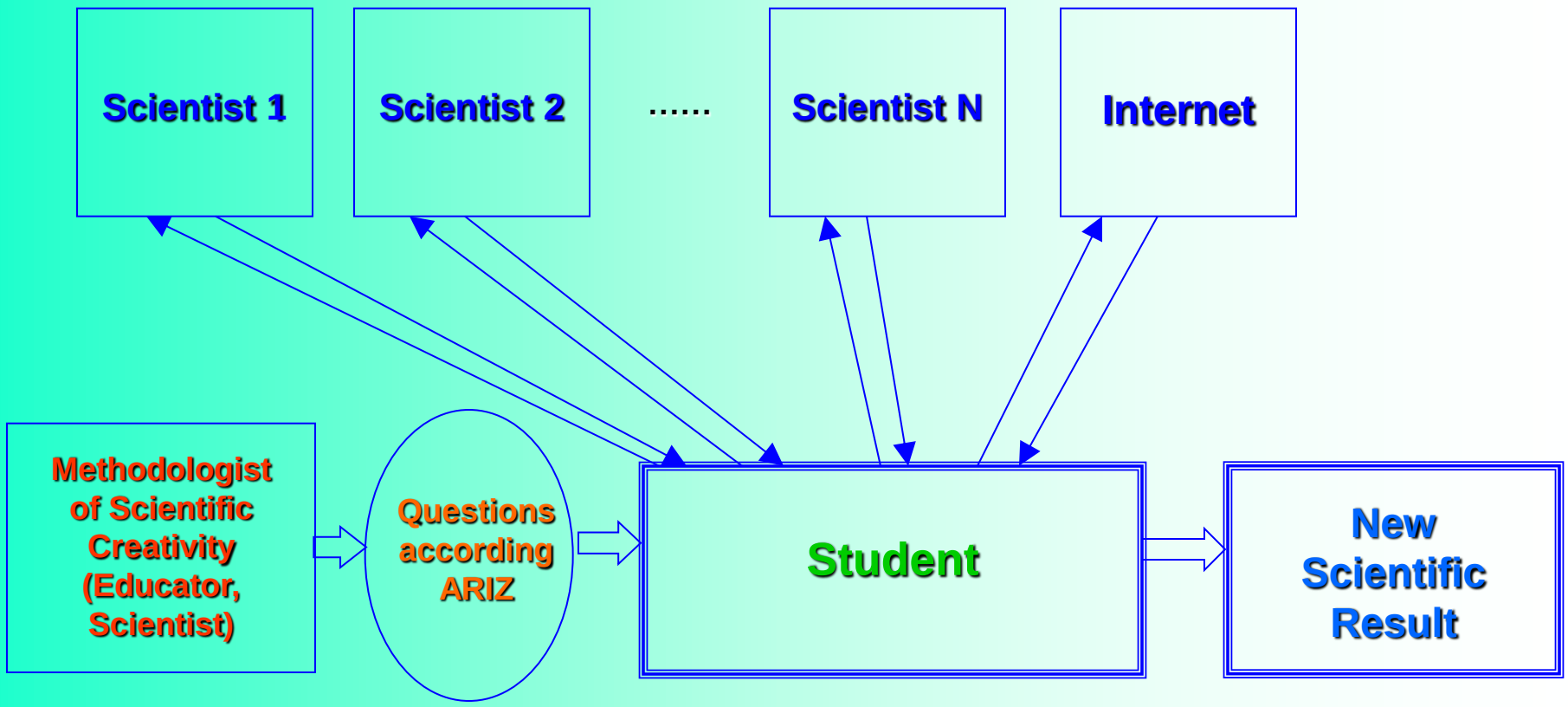
Problem-based Learning,

Inquire-based Learning,

Design-based Learning

Innovative Projects Method

Innovative Projects Method



Humboldt model of university

Friedrich Wilhelm Christian Karl Ferdinand Freiherr von Humboldt

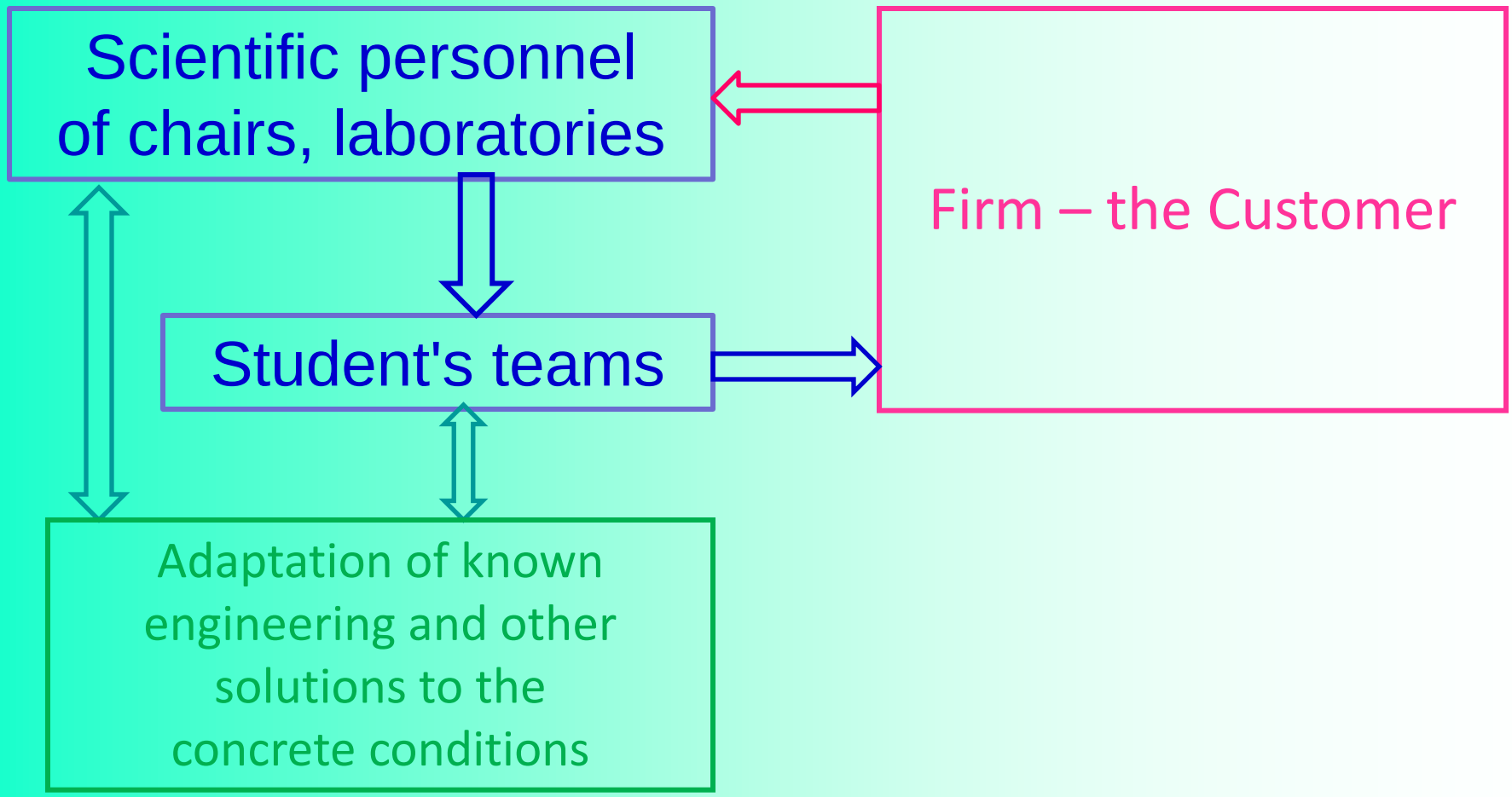
University

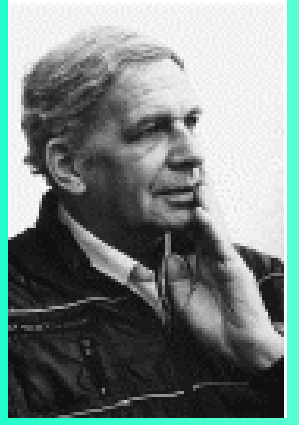
Yan Amos Komensky

Educational subsystem

Scientific subsystem

Typical Design





G.S. Altshuller
author of TRIZ

Innovative Design

Scientific personnel of chairs, laboratories

Student's teams

Problems Solving by TRIZ

Firm – the Customer

G.S. Altshuller
author of TRIZ

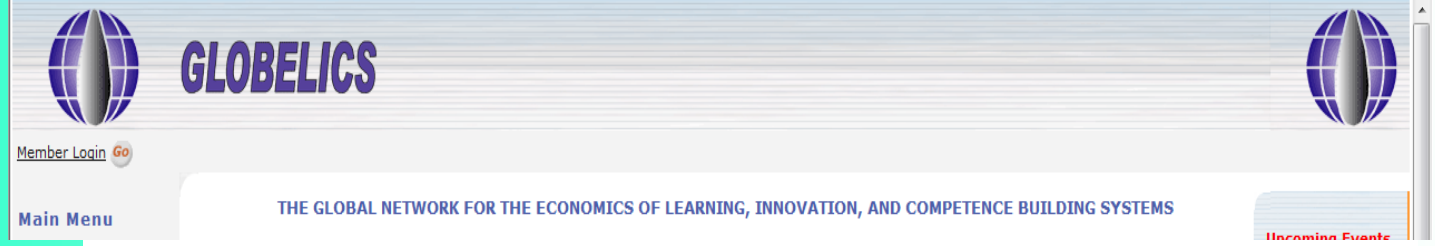
INNOVATIVE-DESIGN UNIVERSITY

University

Educational subsystem
Knowledge Invention
Method

Scientific subsystem
Innovative Projects
Method

Inventions, Innovations



THEORY OF INVENTION PROBLEMS SOLVING (TRIZ) AS AN INSTRUMENT FOR PREPARATION OF "INNOVATIVE PERSON" IN UNIVERSITIES

S.A. Podlesniy, Y.P. Salamatov, A.V. Kozlov
Siberian Federal University, Institute of Innovative Design, Krasnoyarsk

First of all, "the innovative person" is a person, which:

- sees the world, as the complete system consisting of other systems (subsystems);
- sees the world, as the system developing under certain laws which can be learnt and used;
- sees development of the world, as process of accumulation and overcoming of contradictions;
- concerns to any object of world around as to system which it is possible and it is necessary to improve;
- skilled in intellectual tools of search, a formulation and overcoming of contradictions (now as well corresponding computer programs of class CAI - Computer Aided Invention).

It is possible to consider "the innovative person" slogan, as following: "There is no such system which could not be improved".

United Nations A/RES/57/254

General Assembly

Distr.: General
21 February 2003

Fifty-seventh session
Agenda item 87 (*a*)

Resolution adopted by the General Assembly

[*on the report of the Second Committee (A/57/532/Add.1)*]

57/254. United Nations Decade of Education for Sustainable Development

The General Assembly,

Recalling chapter 36 of Agenda 21, on promoting education, public awareness and training, adopted at the United Nations Conference on Environment and Development, held in Rio de Janeiro, Brazil, in 1992,[1]

The methods given below are developed according to the purposes and tasks of United Nations Decade of Education for Sustainable Development (2005 – 2014)

Комиссия Российской Федерации по делам
ЮНЕСКО
Commission of the Russian Federation for UNESCO
Вестник Vestnik №16'2013

Организация Объединенных Наций по вопросам образования, науки и культуры
United Nations Educational, Scientific and Cultural Organization

Кафедры ЮНЕСКО в России: лучшие практики

UNESCO Chairs in Russia: best practices

Руководитель кафедры:
Лепешев Анатолий Александрович,
профессор, доктор технических наук

Chairholder:
Anatoly Lepeshev, Professor,
Doctor of Technical Sciences

TECHNOLOGY OF EDUCATION FOR SUSTAINABLE DEVELOPMENT

By the end of the International Decade of Education for Sustainable Development, while carrying out and approving our own works and systematizing results of colleagues, the Chair created a technology of Education for Sustainable Development. This technology is based on Theory of Inventive Problems Solving (TRIZ) created by the Russian scientist G.S. Altshuller and developed by his followers. The Theory is becoming popular in the world. It is applicable not only to universities, but also to vocational and comprehensive schools.

Specialists of the Chair established that TRIZ – continuation of dialectics – can effectively be applied as the general science about sustainable development. One of fundamental bases of TRIZ – the law of ideality degree increase – allows to project future development so that to save resources for future generations. Respectively, the TRIZ-based education that is developing in a global scale, may become a type of Education for Sustainable Development.

For realization of this potential TRIZ-pedagogics system was essentially improved by scientific and pedagogical staff of the Chair. The method of the knowledge invention – study of various systems and concepts from various disciplines and subjects by their «reinvention» by TRIZ methods is created. For example, in physics classes students can "re-invent" an internal combustion engine, improving the steam engine by means of the expansion-curling law, or "re-discover" the theory of a relativity of A. Einstein, improving the homogeneous model of space and time created by I. Newton, by means of the principle of local quality. In chemistry classes students can "re-invent" F.A. Kekul's guess about ring structure of a benzene molecule by means of the principle of curvature. In mathematics classes it is possible to "re-invent" negative numbers (the inversion principle), irrational numbers (the principle of a continuity of useful action), imaginary and complex numbers (the principle of transition to another dimension), variables (the dynamise principle), matrixes (laws of transition into supersystem and polysystem) and many other things.

It is possible to "re-invent" non-anthropogenous systems too. For example, metaphytes are "re-invented" by application to monocelled the same laws of

ESD IN UNESCO ASSOCIATED SCHOOLS. DIDACTICS OF SUSTAINABLE DEVELOPMENT

Anatoly Kozlov,
Tatyana Pogrebnaya – teacher of Krasnoyarsk Comprehensive school No. 10 of a name of academician Yu.A. Ovchinnikov
Olesya Sidorkina – teacher of Krasnoyarsk Comprehensive school No. 82

The UNESCO Scientific-Educational Centre "New Materials and Technologies" of SibFU includes a group of teachers working on integration of Education for Sustainable Development (ESD) in different types of education. There was formed the didactic system applicable in teaching of various subjects and disciplines: natural-science, humanitarian, technical, etc., at various steps of education (in options corresponding to age).

It not only motivates trainees on a sustainable development, but also forms the constructive attitude towards it. At the same time the system allows to solve a number of key problems of education modernization that promotes its introduction.

The named didactics is based on integration of various subjects and disciplines with applied dialectics – the theory of the inventive problems solving (TRIZ) [1, 2] expanded out of limits of technique: on social, art, economic, non anthropogenous (live and lifeless) systems [3]. TRIZ is widely recognized in the world, is applied to generation of innovative solutions by leading multinational corporations, taught at leading world universities, among which, for example, there are Massachusetts Institute of Technology and the Oxford University. TRIZ not only significantly accelerates search of innovative solutions, but also in principle aims at the solutions minimizing risks of non stability: excessive expenses of non-renewable natural resources, ecological disasters, economic crises, social excitements, etc. TRIZ, thus, helps the solution of problems of a sustainable development.

Respectively, the didactics based on the description of structure and functions of studied systems and concepts of terms of applied dialectics (TRIZ), on TRIZ application for generation by trainees of own ideas is a didactics of a sustainable development. Such didactics, developing, exists in Russia and the neighboring countries from the middle of the 80th and received the name TRIZ-pedagogics.

The TRIZ-pedagogics began with creation of a creative tasks method (A.A. Gin and his colleagues) [4, 5]. However this method covered not all stages of a lesson, but only the stages devoted to the solution of tasks. Developments of the author's scientific and pedagogical collective united at UNESCO chair of SibFU: the knowledge invention method and innovative projects method extended TRIZ-pedagogics to all stages of educational process, including studying of a new material and project activity [6 – 8].

When training by a knowledge invention method each studied system (according to any training program) is considered as result of contradictions overcoming in system – its predecessor. (For example, the predecessor of an internal combustion engine is the steam engine, of the Einstein theory of a relativity – Newton mechanic, of arithmetic multiplication operation – addition operation, of birds – amphibious, etc.). These contradictions were overcome therefore there system appeared which now trainees study according to the program. Applying methods of contradictions overcoming containing in TRIZ, trainees quickly pass "an intellectual way" of the developer of anthropogenous system (the technical device, the scientific theory, etc.), or "invent together with the nature" as it is established (with participation of UNESCO chair of SibFU collective) that contradictions overcoming regularities in evolution of non anthropogenous systems are the same as in anthropogenous systems.

Results of Innovative Projects Method.
The Big Scientific Cup of Russia for an absolute 1 place at the All-Russia conference «Step to the future» 2007 – at delegation of the Siberian Federal University

ТЕХНО ДОКТРИНА

ТЕХНО ДОКТРИНА

ФОРУМ ТЕХНОЛОГИЧЕСКОГО ЛИДЕРСТВА РОССИИ

Мы в соцсетях:

Поделиться:

6-7 НОЯБРЯ В EVENT-ХОЛЛЕ «ИНФОПРОСТРАНСТВО»

ТЕХНО ДОКТРИНА 14 1-Й ВСЕРОССИЙСКИЙ ФОРУМ ТЕХНОЛОГИЧЕСКОГО ЛИДЕРСТВА РОССИИ

НАЦИОНАЛЬНЫЙ СТРАТЕГИЧЕСКИЙ ФОРУМ ИНЖЕНЕРОВ

РЕГИСТРАЦИЯ

1-Й ВСЕРОССИЙСКИЙ ФОРУМ ТЕХНОЛОГИЧЕСКОГО ЛИДЕРСТВА РОССИИ

ПРОГРАММА ФОРУМА

Организаторы

НИУ

Российский союз научных и инженерных общественных объединений

СОВЕТ ФЕДЕРАЦИИ

Совет Федерации Федерального Собрания РФ

МИНПРОМТОРГ РОССИИ

Министерство промышленности и торговли РФ

ДОСААФ России

Партнеры

АНОР 1992

Ассоциация инженерного образования России

ИНИОН РАН

ИНП РАН

Институт народнохозяйственного прогнозирования РАН

МГТУ им. Н.Э. Баумана

Межрегиональная общественная организация

24 ноября 2014 года состоялся брифинг по вопросам подготовки кадров в рамках новой экономической политики «Нұрлы жол – путь в будущее».

В брифинге приняли участие вице-министр образования и науки Республики Казахстан Т. Балыкбаев, а также руководство Казахского агротехнического университета имени С. Сейфуллина.

Т. Балыкбаев отметил, что подготовлена карта по обеспечению производства высококвалифицированными кадрами по 14 индустриальным программам и проектам. Это сферы: редкие металлы, геологическая разведка, автомобили и автомобилестроение, технология пищевой промышленности, производство строительных материалов, производство железнодорожной техники, нефтегазовая химия, электрические приборы и др.

На сегодняшний день с учетом данной специфики определены 11 вузов и будут отобраны 10. В этих вузах подготовка кадров будет осуществляться по новым образовательным программам, разработанным совместно с зарубежными партнерами, с учетом новых технологических процессов.

В целом, для кардинального решение проблем аварийных школ и трёхсменного обучения в течение трех лет будет построено 190 объектов образования, в том числе около 120 школ и более 70 детских садов.

Кроме того, с 2014 года планируется строительство 2-х колледжей мирового уровня в городах Астана, Алматы.

С учетом региональных потребностей эти колледжи будут готовить кадры для приоритетных секторов экономики, в том числе в сфере инжиниринга, архитектуры и строительства, информационных и коммуникационных технологий, дизайна и проектирования, АПК, металлургии и машиностроения.