

# Multi-Dimensional Critical Thinking

Some methodological conclusions of Applied Logics

Nikolaj N. Nepejvoda

e-mail [nnn@uni.udm.ru](mailto:nnn@uni.udm.ru)

This text is extracted from a project description. It stressed humanitarian aspects of Multi-Dimensional Critical Thinking. Its scientific and practical aspects are of equal importance.

## 1 Critical thinking is not always critical

Critical thinking increases resistance against fundamentalist and totalitarian mentality. It also can somehow increase ability to resist many forms of manipulating by human views and internal world, say, reclamation tricks or so called public relations campaigns and/or NLP.

Many western universities and other institutions try to develop this ability. One of the best examples here is the Mission Critical project in USA. It is successfully developed at least five years.

Analysis of typical projects lead to the conclusion that they are arrowed to *first level critical thinking*. It allows to find gaps and paralogisms in your and others judgements. But it is essentially not very consistent with holistic word appreciation. This is the simplest reason why first level critical thinking can defend only against simplest (though often used) demagogic or unfair mental attacks.

System theory and system approach pretend to more holistic views but they are now in very dangerous proximity to **Learning** (as opposite to **Science**). The first criterion of this proximity is if some theory rejects alternative views or treats them as primitive ones.

Moreover the first level critical thinking very often can become a bit scholastic and dogmatic. It allows us to analyse all arguments only modulo accepted postulates. Majority of these postulates are implicate. It is why the plain logical thinking can be well consistent with advanced totalitarianism. Say Stalin introduced Logics into common education, inquisition used formal logic as main tool to qualificate heretic opinions.

## 2 Intellectual safeguard

Soviet and post-soviet reality shows that some part of intellectuals (sometimes opposite to *intelligentsia*) resisted tough offence of totalitaric views. This was impossible without powerful defensive systems. Religion was one of these systems but in mainly atheistic and rationalistic society there arose another system. Now it is just alive and can resist to current zombification by reclame methods.

This system had been shown from different sides by three authors. *Double-thinking* in Orwell's "1984" was a diagnosis of some way of thinking which looks for rationalistic Anglo-Saxon mentality as a monstrous one. Stanislaw Lem in some books showed that multi-dimentional thinkig can be used by a person to defend himself from totalitary phantasms.

The best picture of relations of this mental safeguard and a totalitary society was presented by A. and B. Strugatsky in their "Inhabited Island" (1970). Some minority called as "*malefactors*" ("выродки" in Russian) are immune to propaganda rays. But when these rays are used intensively to ensure a common enthusiasm *malefactors* have instead an awful headache. This headache is used to find them. Of course a big part of elite are also *malefactors* because critical and creative thinking is also suppressed by propaganda rays.

Strugatsky's description was a bit allegoric at the beginning of 70<sup>th</sup>s, but now it becomes too realistic. Hidden information attacks (of course absolutely illegitimate and effective against routine thinking and spiritually unarmed majority) do not affect this minority directly but induce no more and less than their headache. For example me and many my colleagues had such reaction on **electorial propaganda of Yeltsin in 1996**.<sup>1</sup>

Analysis of this intellectual and mental safeguard system is necessary to survive in conditions when information attacks become stronger and numerous. This discipline is induced by rationalistic mentality but this is *not* a traditional **plain rationalism** which is *helpless against massive informational attacks*.

This system can be roughly characterized as "*Multi-dimentional Critical Thinking*" (MDCT).

**The main goal of this project is systematization of materials on Multi-dimentional Critical Thinking, development of its theory and its representation in a form of scientific text.**

---

<sup>1</sup>It is known that this propaganda was designed by a commnad of US specialists in order to test effectivity of new zombification methods. Its success was fantastical. Person whith initial rating about 2% had won "free"(?) elections!

Project is oriented first of all towards professors and teachers to provoke introduction elements of MDCT into education. Secondly, it is oriented towards researchers in different areas and towards artists. And last but not least acquaintance with MDCT would be useful to businessmen and managers of hi-tech firms.

### 3 From creativity to quasi-religion

There are a lot of related research projects. The most famous and successful is now the “*Lateral Thinking*” of Edward de Bono. This project emphasized simplest elements of MDCT but don’t stressed its defensive aspects. Moreover this project is designed inside world-wide system of reclame and emphasized so called positive aspects of lateral thinking in order to reach immediate success. Unfortunately current state of this project shows that there is a (maybe soon noninvertible) regress into quasi-religion. To be rich and successful we are obliged to claim that we can solve *all* problems and this is a big sin because we try to place ourselves for God.

Because natural sciences and technics were relatively most free area of creative activity in communist countries elements of MDCT were developed as an explicit system mainly by engineers. The famous system [TRIZ \(Theory of Inventory Problem Solution\)](#) extensively exploited more deep aspects of MDCT than Lateral Thinking.

There can be mentioned other projects but two above are most powerful.<sup>2</sup>

The common place and common mistake of these (and lesser) projects was their ill treatment of [Logic](#). They try to state repeatedly that Logic is the instrument of routine direct thinking, that logical criticism kills creative efforts and makes person highly constrained in his/her views and solutions. There is a big part of truth in these claims but they are false and disorienting in common.

*The traditional way of teaching and explaining [Logic](#) (both Philosophical and Mathematical) stresses its weakest sides. It trains students in one-dimensional, low-level critical thinking which is of course extremely conservative and opposite to all creative moments.*

**This project is opposite and unical in that aspect that *Logics* is treated as the main theoretical instrument and one of practical backgrounds of MDCT.**

*Modern Logics is the first science which leads us into essentially new stage of rational reasoning.* This science becomed *reflexive one*. First reflexive results

---

<sup>2</sup>Now I must add the [Programmer Stone](#).

of modern science were [Löwenheim](#) theorem that there are non-standard models of numbers, [Tarski](#)'s theorem on non-expressibility of truth and couple of [Gödel](#) results on incompleteness, completeness, non-provability and independence.

Logical analysis of TRIZ transformations shows that most of them have purely logical nature. It gives similar results for Lateral Thinking but its level is somehow lower. Therefore anti-logical tendency in creative rational thinking is too plain and self-constraining. They *mix Logics with routine Logic courses*. At this point they become routine direct-thinkers.

Thus modern systems of creative thinking are really not systems but mere methodic and teaching methods. This leads most successful ones to the tendency to form new quasi-religion. Author at first noted this phenomenon dealing with TRIZ people, and web site of [de Bono](#) brings up suspicion that there is analogous tendency in Lateral Thinking.

**To develop a system of creative scientific and rationalistic views based on last advancements in Logics and alternative to traditional rationalism and independent from *quasi-religion of progress* is another goal of this project.** This is a positive and offensive goal but *this is only a secondary goal because it is too dangerous to be involved into reclame campaign or unprepared offensive*.

Possibility to make Logic teaching creative and not routine was at first demonstrated by [Lewis Carroll](#). But his textbook on Logics was too far from traditional strictly understood rationalism ("*Some chickens are cats*" was not the most striking phrase in his exercises). This tendency was brilliantly developed in books of [R. Smullian](#).

Some logic textbooks printed by Soros program also continue this new trend. Author's book "[Applied logics](#)" is as well oriented towards this direction.

Methods of MDCT now are introduced into education in Udmurt University. New fashioned courses of logic-based mathematics are now taught to linguists and informatics. For informatic speciality a new course is introduced: "*System and Logical analysis*". At 3 last years author visited with courses based on this approach 4 leading Russian universities (St-Petersbourg, Vladivostok, Kaliningrad, Novosibirsk). Courses were well appreciated by students and professors of philosophical and informatics departments.

## 4 Theoretical background

Theoretical background of this project goes from different branches of science according to its interdisciplinary essence.

**Philosophical background.** They are, from one hand, rationalistic critical philosophical traditions of Kant, positivism, fallibilism and structuralism together with those critical directions which are usually treated as anti-rationalistic: Taoism, Platonist view on the world, some branches of intuitivism.

**Logical background.** Powerful system of expression transformations (developed in traditional and modern logic) grants us preservation of their sense but sometimes completely changes their external linguistic form. Non-classical logics and hybrid logical systems. Theory of informalizable notions.

**Mathematical background.** Hilbert's ideas on relations between real and ideal objects and judgements. Intuitionistic ideas *how to use ignorance as positive knowledge* (L. E. J. Brouwer). Well-developed system of ideal mathematical notions which provide us precisely formulated examples of higher order methods and transformations. Irrelevancy of too sophisticated or too primitive mathematical models.

**Psychology and sociology.** Some facts about human comprehension of complex formal notions (*common person tends to understand complex formal notions as informalizable ones*(author, 1982)) and on tendencies to formalize informalizable. Current results of cognitive science.

**Practice.** Lateral Thinking and TRIZ system as positive examples, NLP as negative one, Mission Critical as intermediate one. Programming practice as an example how human can deal really complex formal notions. World informational space and electoral reclame as examples of massive open and hidden informational attacks.

## 5 Tools and methods

The leading method is a *logical analysis*. The main difficulty here is necessity to combine formal and informal methods, to express results both in formal and informal language, and to gather and systematize huge amount of very distinct knowledge. Second complexity is that mistakes, deadlocks and unsuccessful decisions are the most valuable data for this research but they are rarely exposed explicitly because all current practice forces us to represent everything as a success (e.g. in science to get new grants . . . )

Other tool and at the same time an important subgoal of this research is to collect information of post-communist intellectuals how they opposed to totalitarianism propaganda and how this can help them to endure a reclame propaganda.

## 6 Main principles of MDCT

Very briefly and roughly they can be listed as follows.

1. Only useless is doubtless. Each successful method is restricted. Full safety cannot be achieved for any reasonable method. Consequently, each scientific method demands alternatives and in some sense must generate them itself. But this generation is very hard process, simple negation cannot help here. Negativism is a mere form of conformism.
2. Alternatives are not equally valuable and applicable, but knowledge of alternatives drastically increases safety and successfulness for main one.
3. Formal conclusions are to be re-examined informally. Informal, intuitive conclusions are to be re-examined formally.
4. A particular expression of a judgement is almost irrelevant. It is to be transformed by all known methods in order to clarify its sense. We need knowledge but no spells.
5. Moreover, knowledge can be called this name only if we master transformation methods, can express it by completely different means. This is useful both for safeguard and for successful applications.
6. Each tool is useful only for its own level. To apply it for lower or higher levels is practical mistake but sometimes it is a necessary theoretical experiment if we don't stress only its successful results.
7. High order ideal notions and transformations provide the real tool to achieve new theoretical and practical insight. Plain practicism and utilitarianism is simply a practically poor method. These notions give also a powerful and relatively safe method to achieve artistic and spiritual insight, incomparably more powerful than drugs.

At the very first stage of the project it is planned to open a web-site and electronic conference devoted to MDCT. Results of the research will be immediately published here and presented for publication in traditional form elsewhere. As the result of the research there will be series of publications forming two books. First book will explain theoretical background and scientific methods and results of MDCT. It will be designed in such a way that can be used to introduce its ideas

into educational practice especially for students their work demands deep processing of huge amount of knowledge (philosophy, applications of mathematics, informational systems, cognitive science, structural linguistics).<sup>3</sup>

Second one will be more popular introduction into ideas of MDCT and into its use for two purposes. First purpose is how to find new solutions and how to evaluate proposed solutions. Secondary purposes are simplest methods how to repel attacks of NLP, multi-level marketing, totalitarian sects, political and electoral propaganda and other methods to deprive a person his/her free will.

The main results of this research will be published and presented in Russian because so complex and multi-dimensional text cannot be written in *lingua franco*. Moreover, some peculiarities of Russian language (for example its extremely un-logical structure) helped to develop this system of thinking. This does not imply that this research is connected with Russian mentality only (author had a personal experience that some Latvian, Estonian, Polish and Hungarian intellectuals mastered this thinking method). Complexity of Russian language simply prevents some over-simplifications here provoked (say) by more consistent and logical structure of English text. Of course short papers and research summaries will be given in English.

I apply here as independent researcher. This form is chosen because this project demands full independence from political, administrative or religious authorities.

Nikolaj N. Nepejvoda

Dr. Sc., full professor of Udmurt University

## References

- [1] L. Carroll. *Symbolic Logic*.
- [2] Neil M. Browne and Keeley M. Stuart. *Asking the Right Questions: A Guide to Critical Thinking*. Prentice Hall, 1994.
- [3] W. Teays. *Second Thoughts: Critical Thinking from a Multicultural Perspective*. Mayfield, 1996.
- [4] E. de Bono. *Lateral thinking*. 22nd ed. 1999.
- [5] J. Barwise, J. Etchemendy. *Situations and attitudes*. Stanford, 1985.

---

<sup>3</sup>Draft of this book is placed on author's homepage at [www.uni.udm.ru/home/~nnn](http://www.uni.udm.ru/home/~nnn)

- [6] Mission Critical. <http://www.sjsu.edu/depts/it/>
- [7] St. Lem. *Doskonała Próznia*. Warszawa, Czytelnik, 1971.
- [8] Г. С. Альтшуллер. *Теория решения изобретательских задач (Theory of Invention Problem Decision)*. М.: Сов. Радио, 1989.
- [9] А. Стругацкий, Б. Стругацкий. *Обитаемый остров*. М.: 1974.
- [10] Н. Н. Непейвода. *Прикладная логика. (Applied Logic)*, Ижевск: 1997.
- [11] Н. Н. Непейвода. *Первые шаги к теории неформализуемых понятий. (First steps towards informalizable notions theory)* Логические исследования, вып.1, М.: 1993.