

Triz Theory and Mind Map to the Cultivation of Students Innovative Ability

Qing Wang¹, Ping Wang¹, Jingru Bai¹, Wenpeng Hong¹

¹Energy and Power College, Northeast Dianli University
Jilin, China
rlx888@126.com

Abstract: The importance of cultivating college students' innovation ability, domestic emphasis on it has gradually become referred to the unprecedented height with the augmentation of the national comprehensive strength and a significant boost of international status. That is, to occupy a certain status on the international community of the 21st century and have a strong competitive power of our country, training large amount of talents with innovative consciousness and innovation ability is essential. Colleges and universities as a domestic important base of cultivating high quality and innovative talents, the training quality is particularly important, and the TRIZ theory and mind map on college students' creative thinking ability has a vital role, so it is very necessary to introduce TRIZ theory and mind map to our students.

Keywords: TRIZ; Mind map; Innovation ability

1 The Importance of TRIZ Theory on College Students' Innovative Ability

In recent years, many world class companies such as Ford and Motorola have started application of TRIZ to product innovation. TRIZ has become the most powerful way to solve creative problems. After 60 years of development, TRIZ has been applied in the Soviet union, the United States, Japan and Europe many countries, and it has been extended from its initial engineering technology to the management, medicine, education, service and other fields[1].

TRIZ theory [2] is developed to solve the problem of Russian acronym, which is proposed on the basis of the formation of a set of systematic methodology through the former Soviet Union Genrich S. Altshuler professor and academic team research nearly 2.5 million patents in the world, including technical system, the contradiction and conflict, the ideal solution and other core concepts and main tools such as contradiction matrix, content field analysis model.

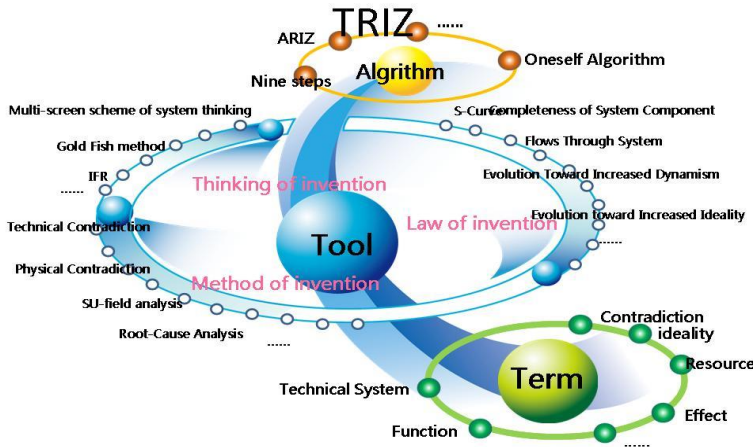


Fig. 1. TRIZ theory on innovative ability.

TRIZ is the basic idea of "eliminated by the introduction of minimum external resources encountered in the process of innovation of contradiction and make the system to the ideal development". Based on the idea, TRIZ developed a new analytical method of thinking, which is "the problem is considered as a system and before we deal with the problem, we should outline the ideal goal of settlement, and then we will try to eliminate the contradictions in the process of innovation".

College students in actual problems should think of TRIZ—convert practical problems into idealistic to get the general conclusion, and then according to the different practical problems of the solutions. TRIZ theory has a lot of help in improving college students' creative thinking ability, so it is necessary for us to introduce the TRIZ theory to students.

2 The Mind Map and the Mind Map on College Students' Innovative Ability

Mind mapping is a method of thinking. It was invented by the UK Tony Buzan. In his book "mind map", the mind map is defined as: "a mind map is the expression of divergent thought, so is also a natural function of the human mind works. It is a very useful graphical technique, which is the key that develops the potential of the brain. A mind map can be used in all aspects of life, the ability to learn and can improve the clarity of thought way can improve a person's behavior".

In class lectures, learners generally need to take notes; in the past we have often taken as a linear manner such as 1, 2, 3, 4. As learners generally can not summarize the content which is taught in the classroom in a timely manner[3]; notes which are taken in a classroom is just a mechanical explanation of content teaching by teachers (and this

copy is often absolutely incomplete); there is no correlation and focus between each other. As the crisis is over, the memory is no longer on the complete lectures, wait until the end of the course before finishing summarizing, lecture notes will become mutilated, unsystematic, having little value for the future's review. And the mind map will mobilize left brain's logic, order, regulation, text, numbers, and the right brain's image, imagination, color, space, entirety, and all kinds of factors. It takes the long list of boring information into a colored, easy to remembered, highly organized chart; what's more, it is very simple to draw and very interesting. Not only can the use of mind mapping improve concentration and memory, enhanced thinking skills, more importantly, it can inspire our association and creativity.

Radioactive thinking is a natural way of thinking of the human brain, each kind of information into the brain, whether it is a feeling, memory, or idea, including text, numbers, codes, food, fragrance, line, color, imagery, rhythm, musical notes, etc., can become a thinking center, and the center spread out tens of thousands of outward branch, each branch on behalf of the central theme with a link, and each link can be another central theme, then emanate outward tens of thousands of branches[4]. And through the mind map's radioactive thinking method, in addition to accelerate information cumulants, more data is managed hierarchically and classified based on the correlation between each other, make data storage, management and application is more systematic and increase operation efficiency of brain, it allows you to explore the brain to create infinite lenovo's world.

3 How to Make Students Master the Theory of TRIZ and Mind Map Better

TRIZ theory is derived from the innovation methods of knowledge, but how to enable students to understand thoroughly the rule and principle of TRIZ theory and better use of mind mapping, how to make TRIZ theory and mind mapping combined with practical engineering problems effectively, we should take the interactive teaching mode to cultivate students better grasp the TRIZ theory and application of the ability of a mind map.

Interactive teaching mode in line with the concept of people-oriented, take the student as the center, Make the teacher's dominant and the students' subjectivity unifies. In teaching methods, the one-way "force-feeding" teaching to the two-way communication between teachers and students "interactive" teaching, using the participatory, heuristic teaching, arouse the students' learning initiative and enthusiasm. The participatory teaching method, can through class presentations and discussions, small teacher, lets the student participate in the teaching process, achieve the interaction between teachers and students in the process of teaching. Speaking in classroom is a teacher's questions of knowledge or the case listed answered after the students thinking. Class discussion is under the teacher's inspiration and guidance, students through the way of study, research to self education. During the discussion, the teachers must organize conscientiously, guide correctly, and make the discussion to the predetermined direction. In class of large number people, it can be discussed grouping first, and then on the basis of group discussion, the elected representatives illustrate the

group's point of view. Finally, the teacher completes the review, to conduct the student's thought to the correct understanding. Little teacher is a teacher according to the teaching content which is divided into a number of problems, the information prepared by the student, then make it into PPT formal, teaching in classroom, teachers and other students to review. Through this several ways, so that the students are really involved in the teaching, stimulated student's creation enthusiasm is stimulated, give students a stage to develop and display their own ability and the opportunity to apply, and then to be able to feel the fun of learning. This way of teaching, strengthens the students' understanding of the teaching content, and promotes the improvement of students' comprehensive ability.

Through the TRIZ theory and mind map teaching and practice, students understand the basic principle of mind map and the basic method of TRIZ theory. It also can improve the enthusiasm of the students participate in class, change the inertial thinking of students, increase the quality of scientific research project, students' innovation competition and graduation design, inspire the students' innovation enthusiasm and potential and cultivate the students' scientific innovation consciousness, innovation spirit and innovation ability.

Acknowledgements. Authors are grateful for support from key research subject of Jinlin province higher education teaching research.

Reference

- 1 S. Butdee , F. Vignat, TRIZ method for light weight bus body structure design. Journal of Achievements in Materials and Manufacturing Engineering, 2008, Vol.31 (2), pp.456
- 2 DarrellMann, An Introduction to TRIZ: The Theory of Inventive Problem Solving, Creativity and Innovation Management, 2008, Vol.10 (2), pp.
- 3 Shamma Al Naqbi, The use of mind mapping to develop writing skills in UAE schools. Education, Business and Society: Contemporary Middle Eastern Issues , 2011, Vol.4 (2), pp.
4. Qing Wang, Jingru Bai, Zhang Bai, Chunxia Jia: Training methods of theory of TRIZ for engineering college students. Energy Education Science and Technology Part B: Social and Educational Studies. 2012 Volume (issue) Special Issue 2:49-54