

# The Acceleration of TRIZ Propagation in SAMSUNG ELECTRONICS

Jung-Hyeon, Kim, [todd.kim@samsung.com](mailto:todd.kim@samsung.com)

Jun-Young, Lee, [junbbang@samsung.com](mailto:junbbang@samsung.com)

Sung-Wook, Kang, [andy.kang@samsung.com](mailto:andy.kang@samsung.com)

Samsung Electronics, R&D Innovation Center

## ***Abstract***

Since TRIZ was introduced to Samsung Electronics in 1998, a major achievement in various fields has been made by using TRIZ methodology. Furthermore, Samsung has updated TRIZ education materials and trained TRIZ specialists certified by international TRIZ association every year. They have played key roles in solving technical problems and securing core patents.

In 2004, the company could have financial contribution over approximately \$70 million and more than 100 patents are produced by applying TRIZ to R&D projects.

This year, Samsung has consistently made an effort to make people in Samsung think TRIZ as an inventive thinking tool as well as problem solving tool. So TRIZ was introduced to education course for new employees and it helped them to take an interest for inventive thinking.

And recently, the demands on the TRIZ education have been significantly increased in Semiconductor Business and LCD Business, but the existing offline education method had limitation in providing satisfactory education for all R&D engineers who want to learn TRIZ. Therefore, the need for new education method became necessary for the acceleration of TRIZ propagation in Samsung electronics. In this paper, the practical results of TRIZ activities in Samsung Electronics and new approach of TRIZ education are described.

*Keywords: TRIZ, Samsung electronics, propagation, acceleration, inventive thinking*

## **1. INTRODUCTION**

In digital era, we are facing severe competition and rapid change, and it is believed that prior occupation of core technologies is a key for surviving in business fields under these circumstances. The company without core technologies can not lead the world and the bright future can not be guaranteed in 21 century. Thus TRIZ can be a good methodology for the companies that need effective approach for innovation and

invention.

Since TRIZ was introduced to Samsung Electronics in 1998, TRIZ methodology has contributed to various fields of Samsung product and manufacturing process. Until now, the history of TRIZ in Samsung has been divided into 3 stages, preparation, propagation and acceleration. In preparation stage, TRIZ promoting department was established and TRIZ education program for Samsung employees was developed. In propagation stage, practical results from TRIZ projects were produced. TRIZ also made large contribution toward securing core patents, reducing cost and solving engineering problem. Thus large financial effects through TRIZ project were produced.

From 2005, It is believed that TRIZ in Samsung Electronics is in the acceleration stage which is similar to rapid growth stage in S curve.

From this year, new employees have to take TRIZ introduction course in the education courses that the company provided them for two weeks.

By introducing TRIZ to new employees as inventive thinking tool through that chance, they began to realize the importance of creative thinking and became interested in taking regular TRIZ education courses. TRIZ propagation in Samsung electronics has been accelerated from this year because TRIZ is believed to be an inventive thinking tool for R&D engineers. A lot of R&D engineers including 6 sigma- black belt engineers could have a chance to take TRIZ education course.

In this paper, TRIZ activities in Samsung electronics to accelerate TRIZ propagation and application are described. In addition, new approach for TRIZ education is described.

## **2. TRIZ ACTIVITIES IN SAMSUNG ELECTRONICS**

### ***2.1. Activities of STA(Samsung TRIZ Association)***

Since TRIZ promoting department was organized in 2001, it has been playing a core role in propagating and activating TRIZ in Samsung Electronics. In 2003, STA(Samsung TRIZ Association) was established as a local organization of International TRIZ Association(MATRIZ).

Up to now, STA have developed and updated TRIZ education programs. More than 200 R&D engineers per year are educated on TRIZ through those programs. The engineers who finished TRIZ education have carried out their own project related to

engineering problem of their department.

In addition, STA holds monthly TRIZ research meeting. TRIZ specialists in Samsung electronics and other Samsung-related companies (SDI, SAIT, Samsung electro-mechanics) participate and discuss TRIZ issues and TRIZ projects.

STA also holds annual TRIZ conference in October every year. Excellent TRIZ projects are exhibited and presented. STA also awards a prize to the engineer who achieved excellent TRIZ application results and produced high-level patents by using TRIZ.

The R&D engineers who pass the criteria for level 2 are awarded certificates also. The president and many executives of Samsung Electronics attend the conference to encourage the activity of STA and TRIZ specialists.

Figure 1 shows the TRIZ implementation process in STA through 3 stages of preparation, propagation and acceleration.

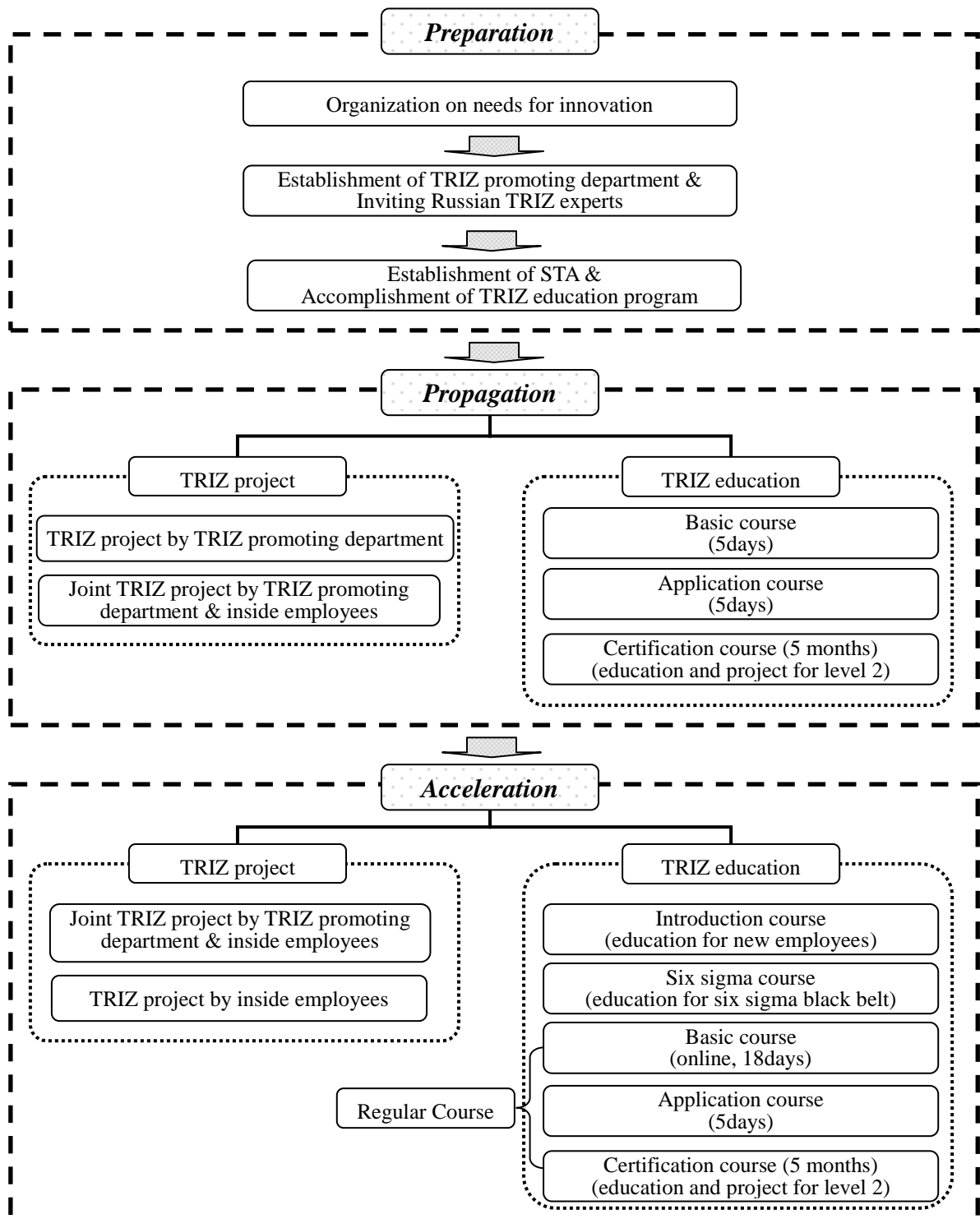
## ***2.2. Organization of STA(Samsung TRIZ Association)***

STA consists of members of TRIZ promoting department and the inside employees who have TRIZ certificate higher than Level 2. It is administered by the methodical board consisting of members of TRIZ promoting department.

Since TRIZ promoting department invited Russian TRIZ experts in 2001, they have been playing considerable roles in making application results of TRIZ and in guiding STA. They have more than twenty-year TRIZ experiences in TRIZ application and education and have specialty in specific engineering fields. In propagation stage showed in Figure 1, TRIZ promoting department made the best practice of TRIZ project. It is also carried out through joint project with inside employees and lots of successful results have been produced. And now, in acceleration stage, most of projects of TRIZ promoting department have been performed together with inside employees, furthermore the projects conducted by inside employees are increasing more and more. TRIZ project of Samsung Electronics is moving to the stage of “TRIZ projects by inside employees” in Figure 1.

After inside employees finish TRIZ education course, they solve engineering problem in their own department and produce patents for core technology by using TRIZ for themselves.

They are playing key roles not only in propagating TRIZ in their department but also in securing core patent as TRIZ specialists.



*Figure 1. Flow Chart for TRIZ implementation in Samsung TRIZ Association*

### **2.3. *Achievements of TRIZ in Samsung Electronics***

In 2004, more than 70 TRIZ projects were carried out and a considerable financial effects and contribution toward cost saving and solving engineering problem were made. TRIZ also played key roles in producing more than 100 patents through R&D projects.

Until now, more than 90 TRIZ specialists who have certificates for level 2 were trained by applying TRIZ in their own project. This year, Samsung has consistently made an effort to make people in Samsung think TRIZ as an inventive thinking tool as well as problem solving tool. So TRIZ was introduced to education course for thousands of new employees and it helped them to take an interest for inventive thinking. And TRIZ was recognized as a useful method to compensate the weak point of Six-Sigma in Samsung Electronics, so the integration of these two methodologies are progressing and the synergy effects have been generated.

In 2005, TRIZ has been applied to more than 90 practical projects and made large contribution toward solving engineering problem and securing core patents. TRIZ has been also applied in solving problems that six-sigma methodology could not solve especially in semiconductor project.

Samsung Electronics has been able to retain its market leadership position with a constant emphasis placed on innovation. For the past four years, Samsung Electronics has been in the world's top ten in U.S. patents. In spite of huge sales and profit in business, Samsung Electronics has a sense of crisis that the company without providing products with creativity can not survive anymore in 21 century. Innovative products should be developed constantly if the company wants to survive and to lead the market.

To be an innovative and inventive leader in business, TRIZ is an adequate methodology. For the product development and manufacturing process in Samsung Electronics, TRIZ has been applied in solving engineering problem, reducing cost and development period, avoiding patents, and planning R&D strategy through technology evolution.

## **3. NEW APPROACH FOR TRIZ EDUCATION**

### **3.1. *Regular Education Courses***

Samsung Electronics has well-organized TRIZ training programs. There are 3 courses in regular TRIZ education, basic course, application course and certification course as shown in figure 1. In every course, we are focusing on guiding R&D

engineers to proficient TRIZ users.

Forty-hour basic course consists of basic concepts and problem solving methodologies of TRIZ. The main objective of this course is to let TRIZ students have capability to define contradiction and have basic skill to solve contradiction problem.

Another forty-hour application course consists of TRIZ-based CAI tool(Goldfire Innovator) training and ARIZ training with hands-on task.

In certificate course, after finishing forty-hour education course, TRIZ students have to solve two practical tasks in 5 months by using TRIZ.

In this course, TRIZ students can have consultation of TRIZ specialists from TRIZ promoting department and have to produce practical application results and patents during project period.

### ***3.2. Background for developing new education method***

For accelerating propagation of TRIZ in Samsung electronics, the most important thing is education for R&D engineers. Unfortunately all engineers in Samsung who want to learn TRIZ could not have chance to get regular education course because of high education fee and long education period (5days).

Recently, the demands on the TRIZ education have been significantly increased in Semiconductor Business and LCD Business.

This year, TRIZ also has been introduced to about 4000 new employees in creative thinking course. TRIZ promoting department had difficulty in arranging TRIZ lecturer due to lots of education request.

Existing education method has limitations in providing satisfactory education to all R&D engineers who really want to learn TRIZ.

Thus, new TRIZ education method was needed.

### ***3.3. Online TRIZ education***

To fulfill these needs for new education method, TRIZ promoting department decide to develop online TRIZ education course so that students can get TRIZ education through computer and internet with small education fee at any time.

For first stage, TRIZ basic course was changed into online course, so most of TRIZ concepts will be educated by online education method.

If so, more application and certification course can be opened and more TRIZ projects can be performed.

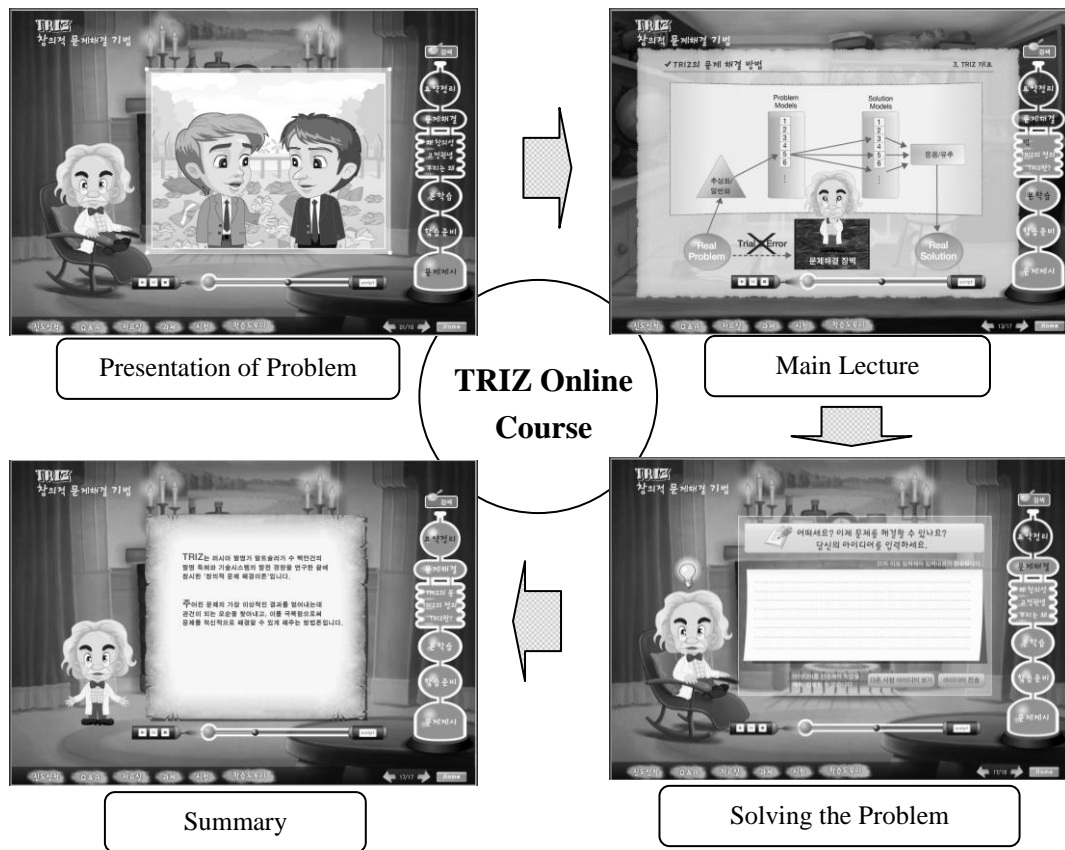
We started developing online education in the beginning of this year and scheduled to finish by the end of October.

But there is a contradiction. If Online education method is applied to TRIZ education, the chance of education for many R&D engineers who really want to learn TRIZ can be expanded, but education effectiveness compared to existing offline method is not so good because computer does not check trainee's state of concentration.

So the ideas to solve this contradiction should be added to online education.

Main concepts for online education are fun, easiness and creativity. It should be funny and easy because trainee loses his concentration if it is boring or difficult. It also should be creative because it is TRIZ education course.

Figure 2 shows the picture of schematic procedure of online course under construction.



**Figure 2. Samsung Online Education Process**

In online education, animated inventor(cartoon) guide and educate trainee with multimedia effects such as sound, animation, music and education contents.

In order to solve contradiction problem of online education, feedback inventive

principle was applied. It is like both-side education style between tutor and trainee.

When trainee applies for education course, his online tutor among TRIZ specialists in Samsung is assigned automatically. The trainee can get immediate feedback from online tutor so that he can continue his study with good attention and interest.

When trainee starts online TRIZ education, first, the problem related to main lecture is presented to the trainee. At this time, he is asked to write down his opinion for solving that problem. He should send it to his online tutor by pushing sending button. After sending his rough idea, he takes main lecture. The problem is presented to trainee again after main lecture. At that time, the trainee can think differently because he learned TRIZ knowledge in main lecture. He is also asked to write down his final idea for solution. Then, his modified idea is sent to his online tutor by pushing sending button. Then, online tutor evaluate his idea and give him appropriate points and proper advice through online internet site. The online education consists of 18 different courses. It will take 18 days for the trainee to finish all online basic courses if he studies one course per day.

It is expected to expand this online education to other Samsung-related companies (SDI, SAIT, Samsung electro-mechanics) next year.

It is also believed that this online TRIZ education method will make a large contribution toward accelerating propagation of TRIZ in Samsung.

#### **4. CONCLUSION**

Samsung Electronics has made successful achievement of TRIZ application in R&D field. And now, people in Samsung think TRIZ as an inventive thinking tool as well as problem solving tool. Therefore, TRIZ has been introduced to all new employees of Samsung electronics and six-sigma.

In 2005, TRIZ has been applied to more than 90 practical projects and produced lots of practical application results and core patents. TRIZ has been also applied in solving problems that six-sigma methodology cannot solve especially in semiconductor project.

And now, inside TRIZ experts are playing major roles not only in propagating TRIZ in their department but also in securing core patents.

In addition, online TRIZ education has been developed to satisfy increasing needs for TRIZ education. It is believed that this online TRIZ education method will make a large contribution toward accelerating propagation of TRIZ in Samsung.



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TRIZ Contradiction Analysis finds principles used by patentees to solve similar problems to yours.Â Harm, in TRIZ has a specific meaning. It means anything that that does not contribute towards achieving the primary function or anything that gets in the way. For a car, a body panel that does not contribute towards transportation, protection, status or other defined functions may be considered harmful. Removing harm is called trimming. Ideality is the principle of starting from a perfect solution that fully delivers the function with zero harm. An ideal car thus may have zero mass, infinite power and be the most beautiful thing in the world. Of course, this is not possible, so the idea is to