Intellectual property education activity at Suzuka Technical College

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Importance of intellectual property in company

The problem discovery and the problem solving abilities are necessary and indispensable for the engineer who has the technology and contributes to the society.

3 P's of necessities for product development in company

1. **Patent (intellectual property and patent)**
2. **Paper (thesis, technological material and report)**
3. **Product (product)**

Especially, the intellectual property is important and confirmed at an article publication or a product release, and it is indispensable in undertaking activities.

Importance of intellectual property education in Technical College

Technical College is advancing a further reform aiming at the upgrade of the Technical College education on the 50th anniversary of foundation.

It is "Technical College for the society", and "Technical College for the next 50 years" that is to aim

The key word for the next 50 years is the cultivation of

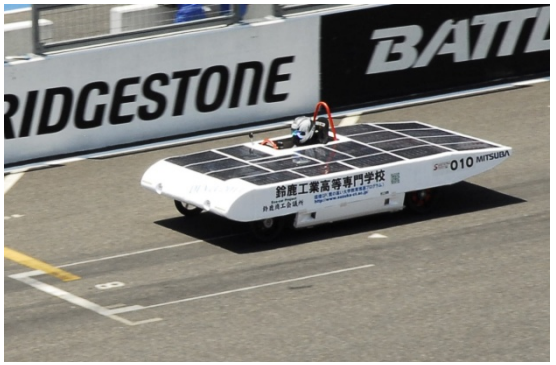
[1] Talents (global talents) who can be globally active emphasizing the community

[2] Talents who can develop sustainable technology with wide view on the environment, resources, etc.

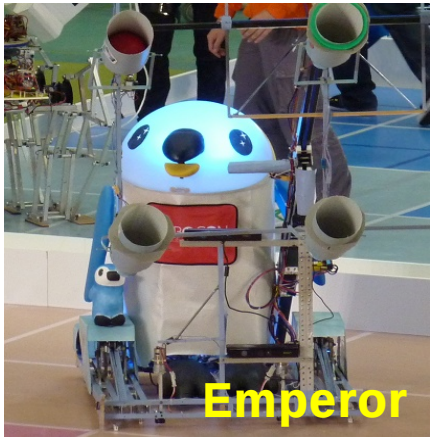
[3] Talents (innovation talents) who can develop ideas towards the above

Suzuka National College of Technology

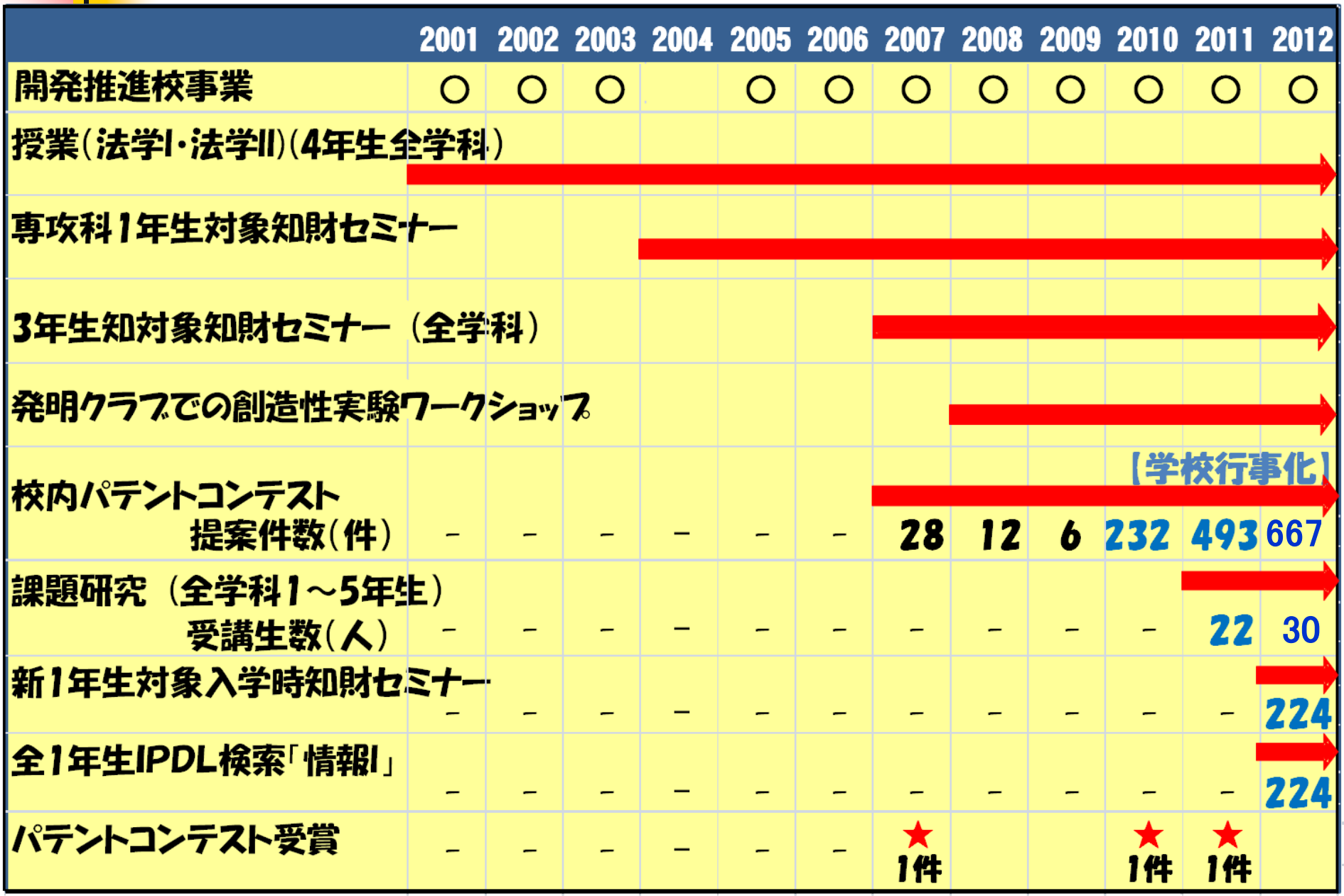
Suzuka National College of Technology is located in Suzuka City of Mie Prefecture, which has the Suzuka Circuit. On the 50th anniversary of establishment, it aims at the cultivation of value creation type engineers who spread their wings around the world, and creative activities such as Robot Contests or eco-friendly cars are active.



Won first prize in the Technical College Robot Contest of Tokai Hokuriku district, and was ranked in the top 4 in the national contest



Intellectual property education activity at Suzuka National College of Technology



Basic Innovation Education

アイデアを活かす力
売れる商品開発
キャンパスベンチャー

アイデアを権利化する力
産業財産権
（特許・意匠・著作権）
技術提携

アイデアを生み出す力
創造活動
（ロボコン、エコカー、プロコン、ジェネコン）
パテントコンテスト
ビジネスモデル

generate ideas
(creation)

acquire rights
(protection)

use for the society
(utilization)

Intellectual property education activity road map at Suzuka National College of Technology

2010 Creation

[1] Science Fair: Scientific education to schoolchildren (personnel training in the future)
[2] Patent Contest: Contest in school (promotion of intellectual property mind) < problem discovery and solution >

2011 Protection

[3] Problem research:
Intellectual property education activity after school on Wednesdays (improvement of intellectual property mind) < detailed statement writing >

2012 Utilization

[1] Strengthening of lower classes education
- Intellectual property education at freshmen joint creation activity project briefing
- Intellectual property education at Freshmen Wakasa Training
- IPDL Retrieval at Information Processing I of the first grader
- Intellectual property education to the second grader at special classes
[2] Exchange at patent contest, etc. via the cooperation between Technical Colleges with Toba National College of Maritime Technology
[3] The theme of the problem research was "Utilization"

[4] Establishment of Mie Science Network, future scientists which the regional industries raise
JST Science and Technology Communications business "Regional type"
Future talents will be cultivated in cooperation of Suzuka National College of Technology, Mie University, Toba National College of Maritime Technology with the municipality and enterprises.
(It ties the scientific interest and reason for learning to schoolchildren)
- Cooperation with regional high schools is aimed at, and the entrepreneur mind is cultivated through the "Utilization" activities

Patent contest inside the campus

Chance!

• **Purpose**: **To bring up creativity** through the approach, and to understand the industrial property right system through patent retrieval, etc.

• **Target**: **All the students in the college**

(Regular students and advanced course students: 1132 people)

• **Schedule**:

Middle of May ··· Displayed **posters** in all classrooms
Held **briefing** on the contest content (May 10, after school)

End of June ··· Application deadline

July - August ··· Selected excellent works through a two-staged evaluation by intellectual property subcommittee members and **8** staff

September ··· Applied excellent works for the nationwide patent contest

Early February ··· Highest award, outstanding performance awards, encouraging prizes and effort prizes (individual and class) were commended at the awards ceremony


Patent contest inside the campus awards ceremony in 2012

Nationwide patent contest awards ceremony

Person for patent application support

3rd patent receiving student in our college

Ayano Saka of the Mechanical Engineering Department in our college visited Nitta principal with Professor Touge, Professor Ohtsu and lecturer Uchida of the Intellectual Property Committee of our college on Wednesday, December 19 and reported the **registration of a patent** named “Lip cream,” which was selected as a candidate for patent registration in the National College category at the Patent Contest 2011 (Sponsors: Ministry of Education, Culture, Sports, Science and Technology, Japan Patent Office, Japan Patent Attorneys Association, National Center for Industrial Property Information and Training)

Problem research

(Outline of the problem research)

(From the student manual)

1. Under the guidance of the teacher, to rouse the intellectual curiosity of the student and the study to various fields, and to increase the desire for studying, the study is assumed to be done at the lecture, practice or fieldwork that the teacher presents

2. (1) Studying time should be 30 hours or more

(2) Contents should be within the range of study, class or practice, etc. of the technical college which the advising teacher can teach

(3) Submitting the report, etc.

3. The evaluation will be admitted as a content corresponding to 1 unit through examination or report

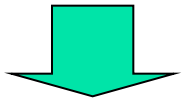
Problem research

Purpose: Cultivating creativity and practice power concerning the intellectual property through the process of making a mock filing documents, etc.

(1) Acquisition of basic knowledge of intellectual property, IPDL retrieval exercise
(2) Creativity education (Making application work for the patent contest and the design patent contest).
(3) Mock application document creating exercise

Content of execution:

Early May ・・・ Students are recruited by the theme name "Creation and cultivation activities of ideas for the patent contest and the design contest".



The number of students attending the lecture: 22

1st graders: 5, 2nd graders: 2, 3rd graders: 12, 4th graders: 2, 5th grader: 1
(Machine: 1, Electricity: 18, Information: 1, Biology and Chemistry: 2)

Problem research

June, July (5 times of about two hours after school: Taken charge by 4 Intellectual Property Committee members)

- Acquisition of basic knowledge using industrial property right standard text
- Exercise of Industrial Property Digital Library retrieval

August, September (3 times of about two hours in the afternoon: Taken charge by 4 Intellectual Property Committee members)

- Idea generation activities on invention and design
- Application for a nationwide contest

October, November (3 times of about two hours after school)

- Courses on "Writing patent specifications" and "Outline of the design system"
- Requested to 2 intellectual property specialists in the region and local business

December, January (5 times of about two hours after school)

- Writing a mock patent specification of the work applied for the contest
- Individual guidance of the specification by Intellectual Property Committee member and intellectual property specialist

February 1, after school ・・・ Holding a meeting for reporting the results

Problem research

Execution scenery

Industrial Property Digital Library retrieval practice

Idea generation activities

Problem research

Execution scenery

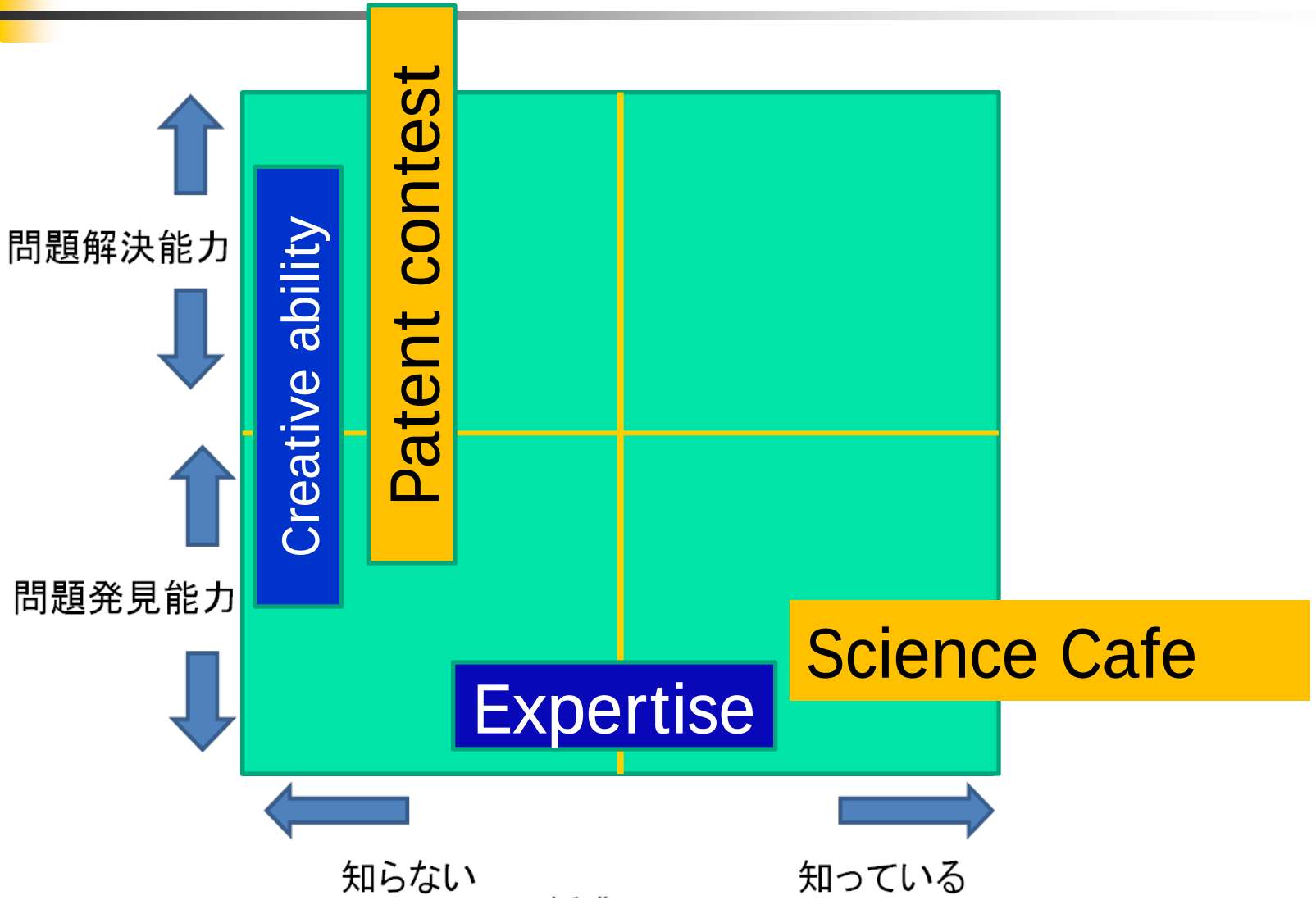
Industrial Property Digital Library retrieval practice

Courses on
"Writing patent specifications" and
"Outline of design system"

Individual guidance for
Specification correction

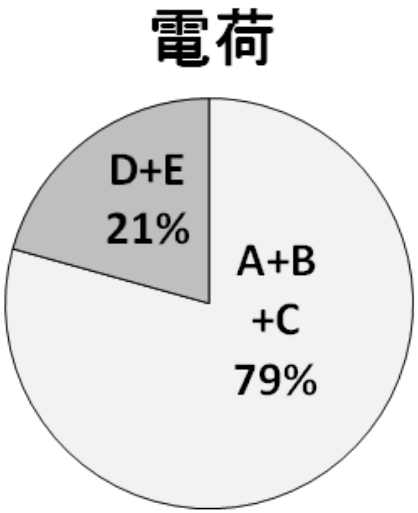
Problem research debrief session

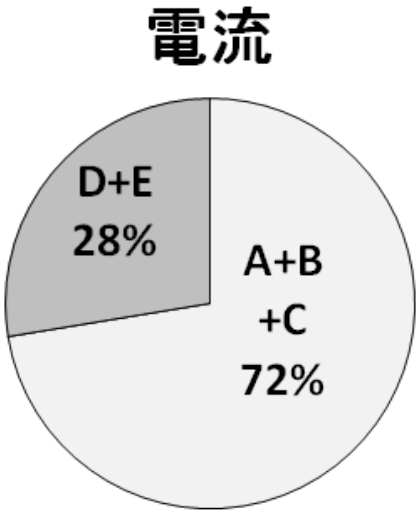
Expertise (class) and creative ability

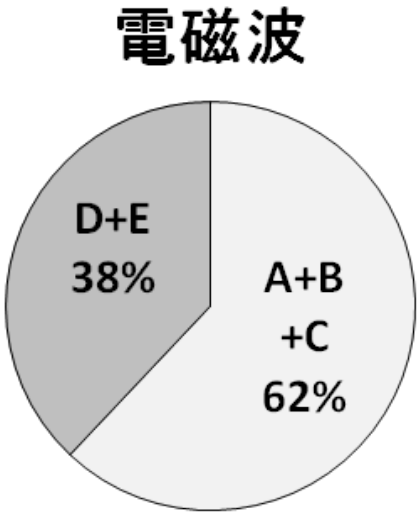


Execution of Science Cafe

	内容	電荷	電流	電磁波
A	大変良く分かった	5	5	3
B	良くわかった	11	6	8
C	だいたいわかった	7	10	7
D	少しわかった	6	8	8
E	分からなかった	0	0	3
	計	29	29	29







Grasp of problem discovery and problem solving ability

• After it explains the patent for the patent contest, creation of the idea of about 20 minutes (The idea that thinks independently is described) is executed.
• Classification from viewpoint of problem discovery and problem-solving ability.

A: Idea with immediately excellent application level
B: It is about the novelty and the progressivity of the problem solving idea.
C: There are neither a novelty nor a progressivity though it has become a problem solving.
D: The problem discovery is done.
E: White paper (There is no idea).

Idea rank according to school year

Classification of problem discovery and problem solving ability by idea creation

Application

Novelty

Problem solving

Problem discovery

White paper

ランク	3年	4年	5年	平均
A	0	0	0	0
B	3	1	4	3
C	16	19	17	17
D	18	22	18	19
E	4	3	3	3
合計	41	45	42	43

A: Idea with immediately excellent application level

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Idea rank % according to school year

Classification of problem discovery and problem solving ability by idea creation

Application
Novelty
Problem solving
Problem discovery
White paper

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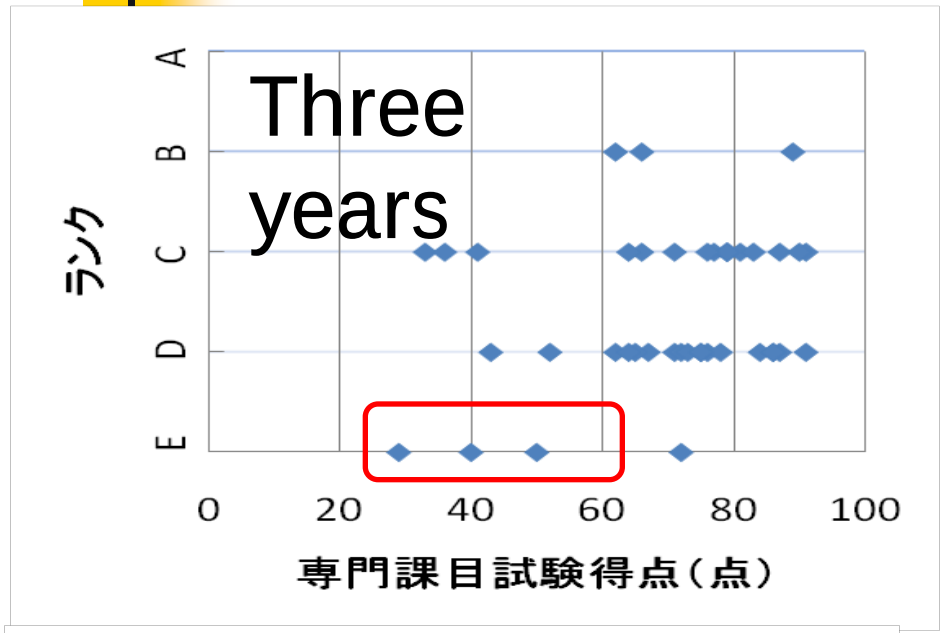
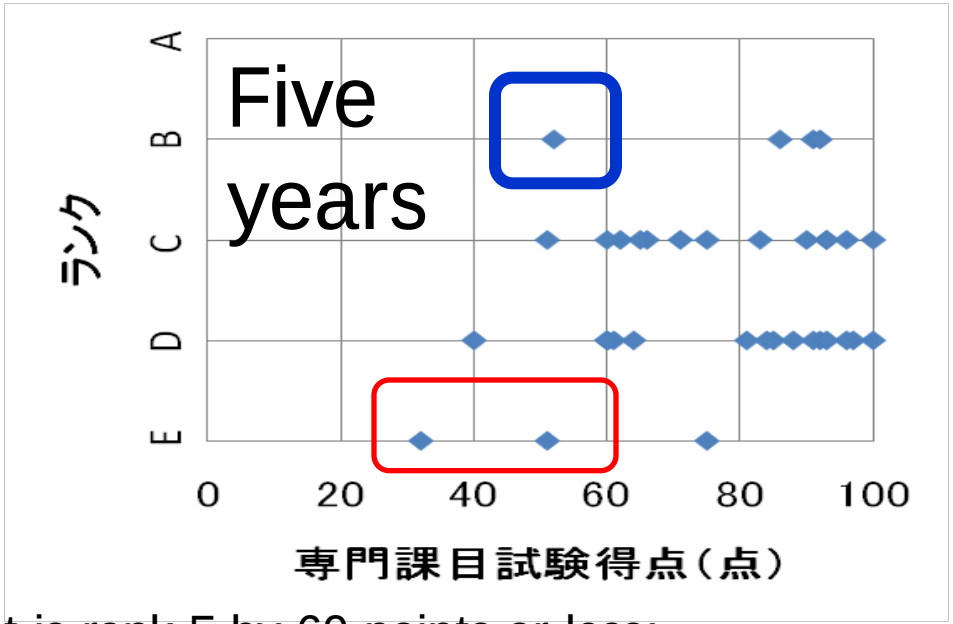
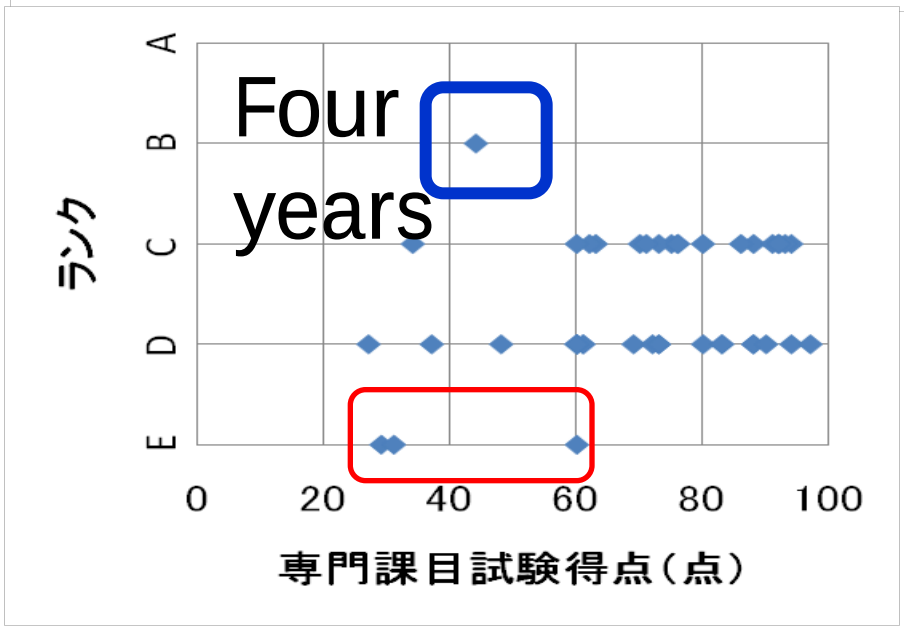
Application
Novelty
Problem solving
Problem discovery
White paper

ランク	3年	4年	5年	平均
A	0%	0%	0%	0%
B	7%	2%	10%	6%
C	39%	42%	40%	41%
D	44%	49%	43%	45%
E	10%	7%	7%	8%
合計	100%	100%	100%	100%

Relation between result and creation rank





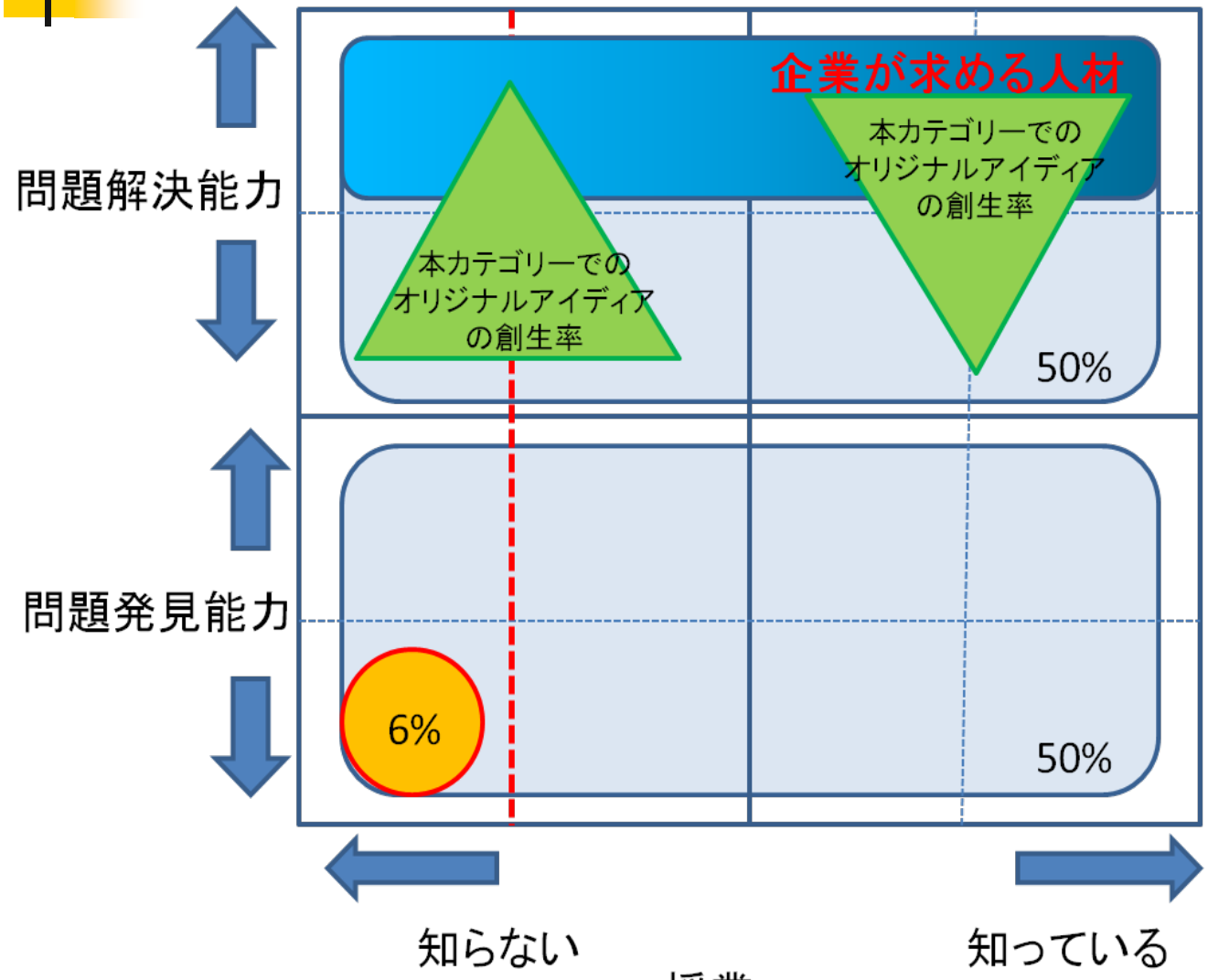


It is rank E by 60 points or less:
They are three people for three years (7%).
They are three people for four years (7%).
They are two people for five years (5%).

6％ on average

On the other hand, there are someone to have the ability of B even by 60 points or less, too.

Relation between result and creation rank



・クラブ活動
・創造工学
・卒業研究

<考える>訓練

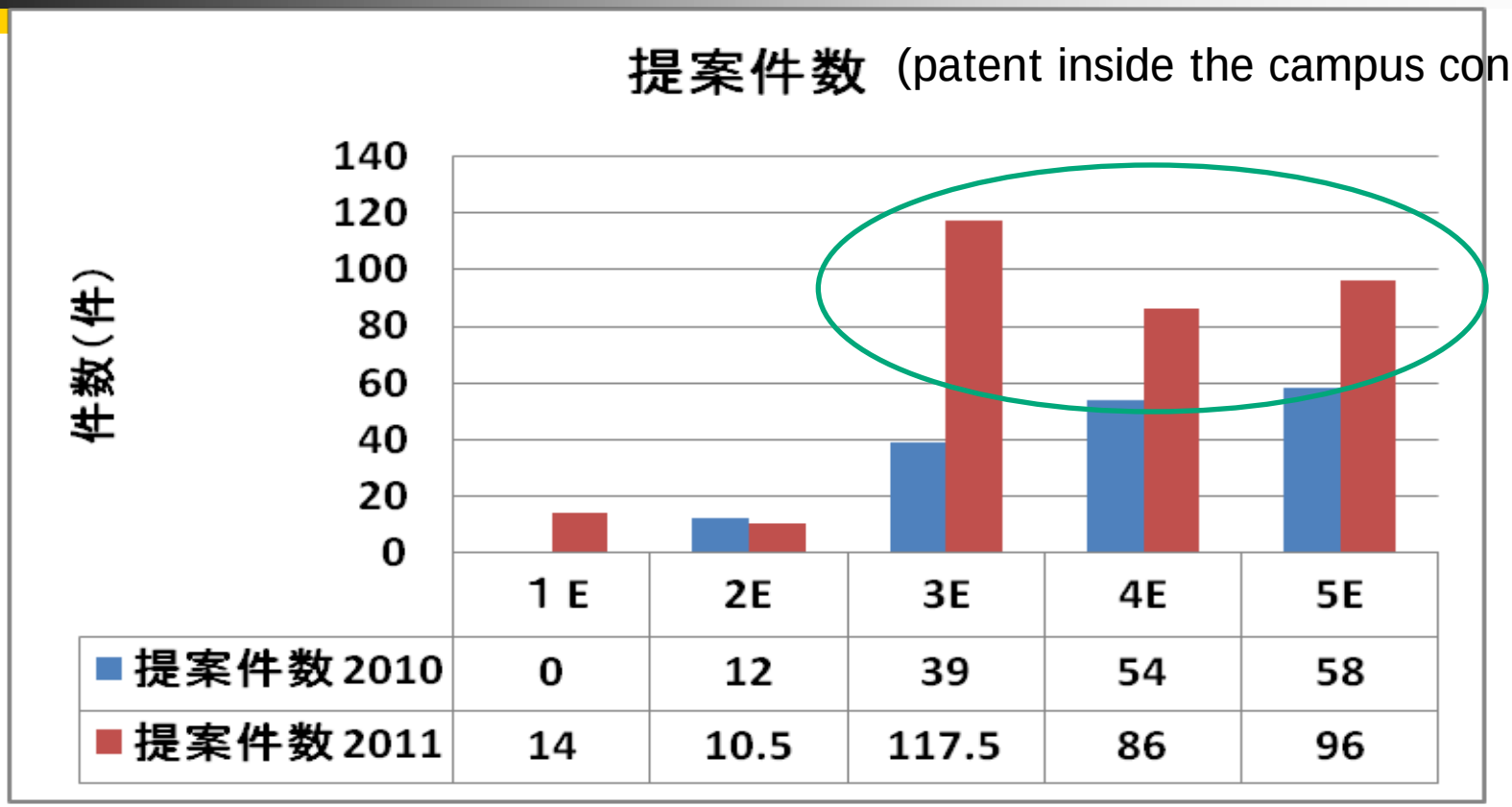
発想の訓練/経験

・授業

<あるもの>を知る

受け身型が多い(考えない)

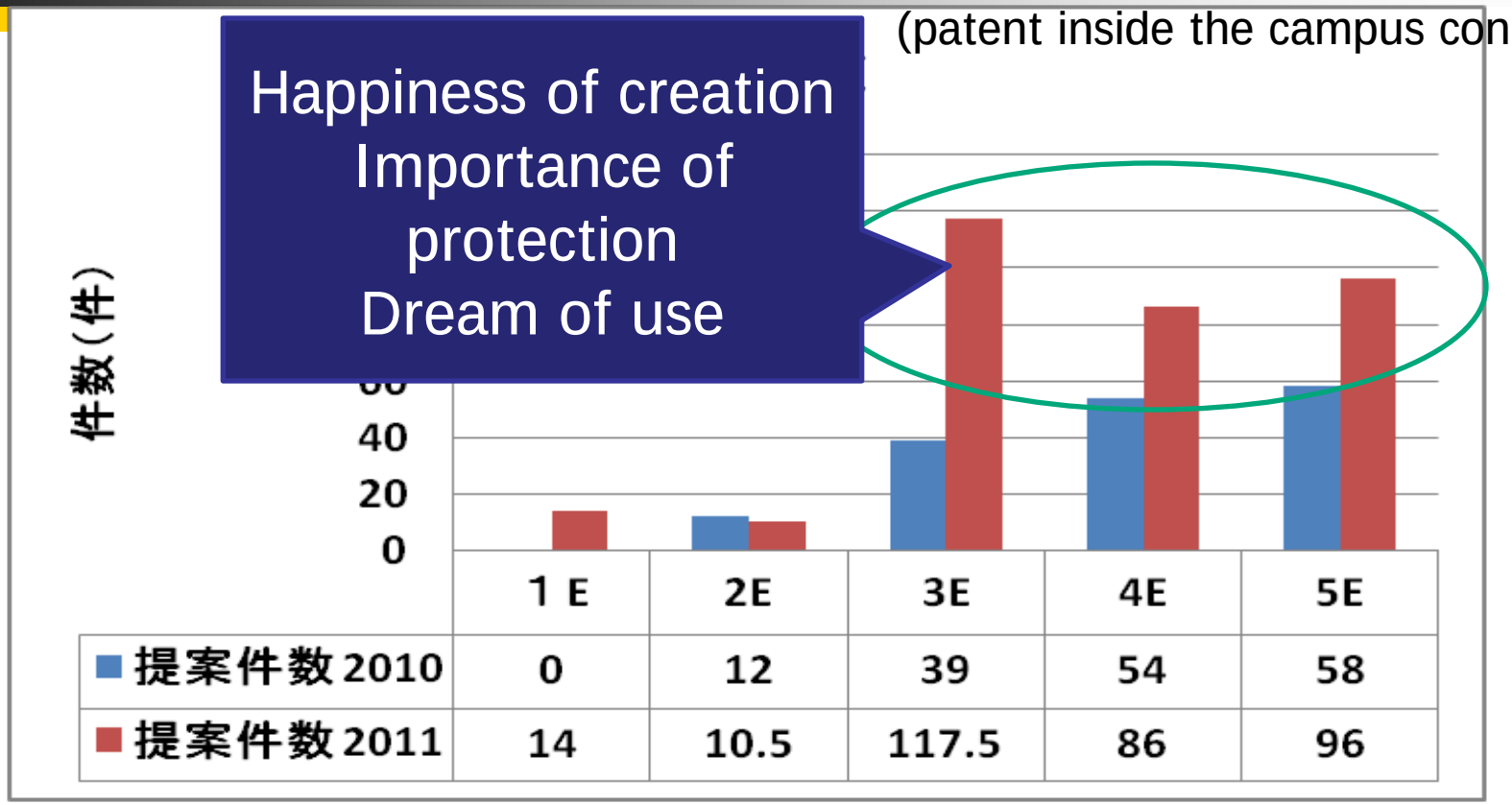
Idea proposal number improvement



1.Proposal number twice
2.It is 3.0, 1.6, and 1.7 times for proposals rates 3 and 4 or 5 years.
3.It is 9.8, 2, 2, and 1.8 times for growth rates 3 and 4 or 5 years.
4.Lower classes "Bud" (approach from lower classes)

Idea proposal number improvement

(patent inside the campus contest)



	1 E	2E	3E	4E	5E
提案件数2010	0	12	39	54	58
提案件数2011	14	10.5	117.5	86	96

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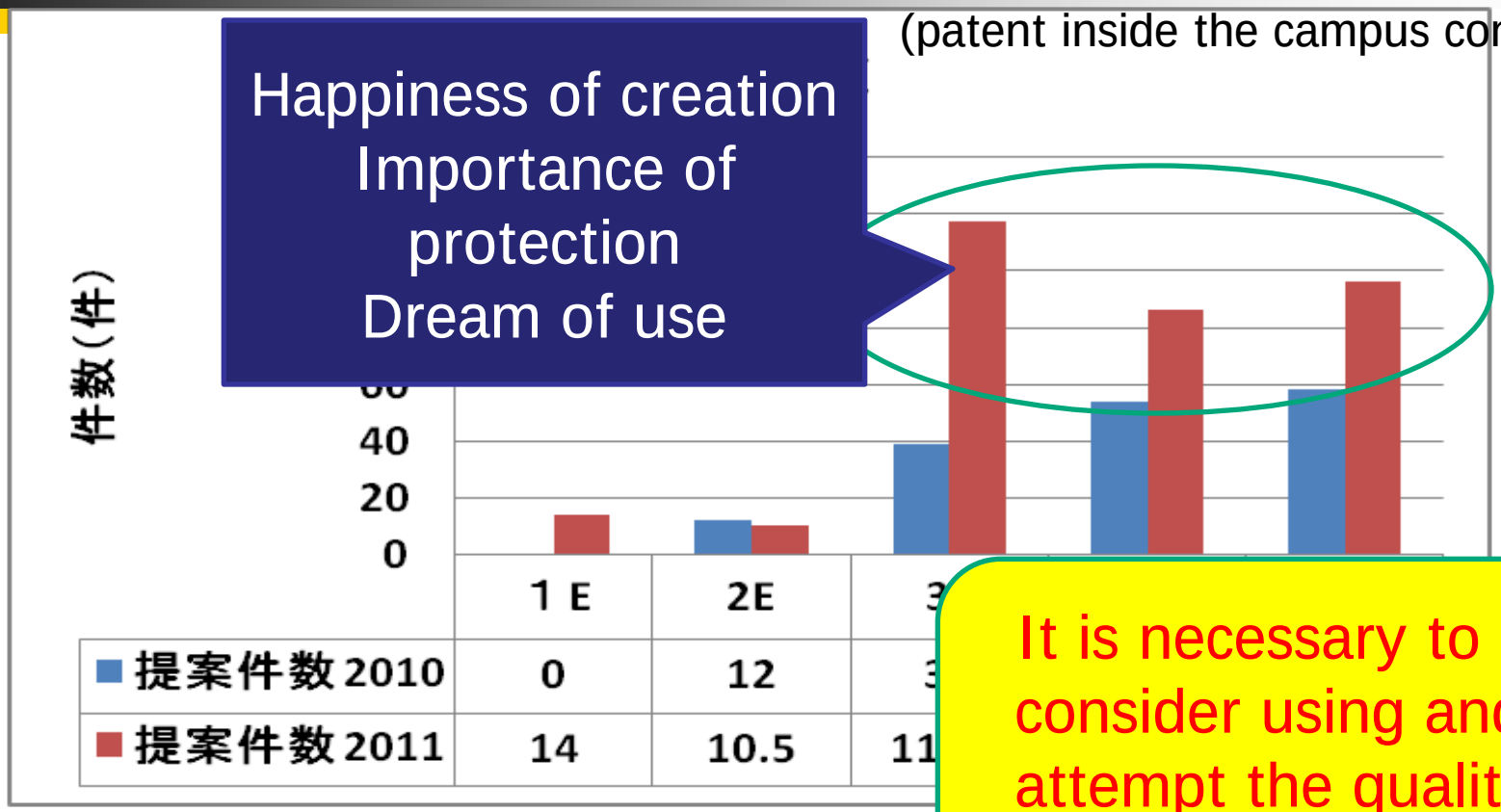
Idea proposal number improvement

(patent inside the campus contest)

Happiness of creation
Importance of protection
Dream of use



It is necessary to consider using and to attempt the quality enhancement

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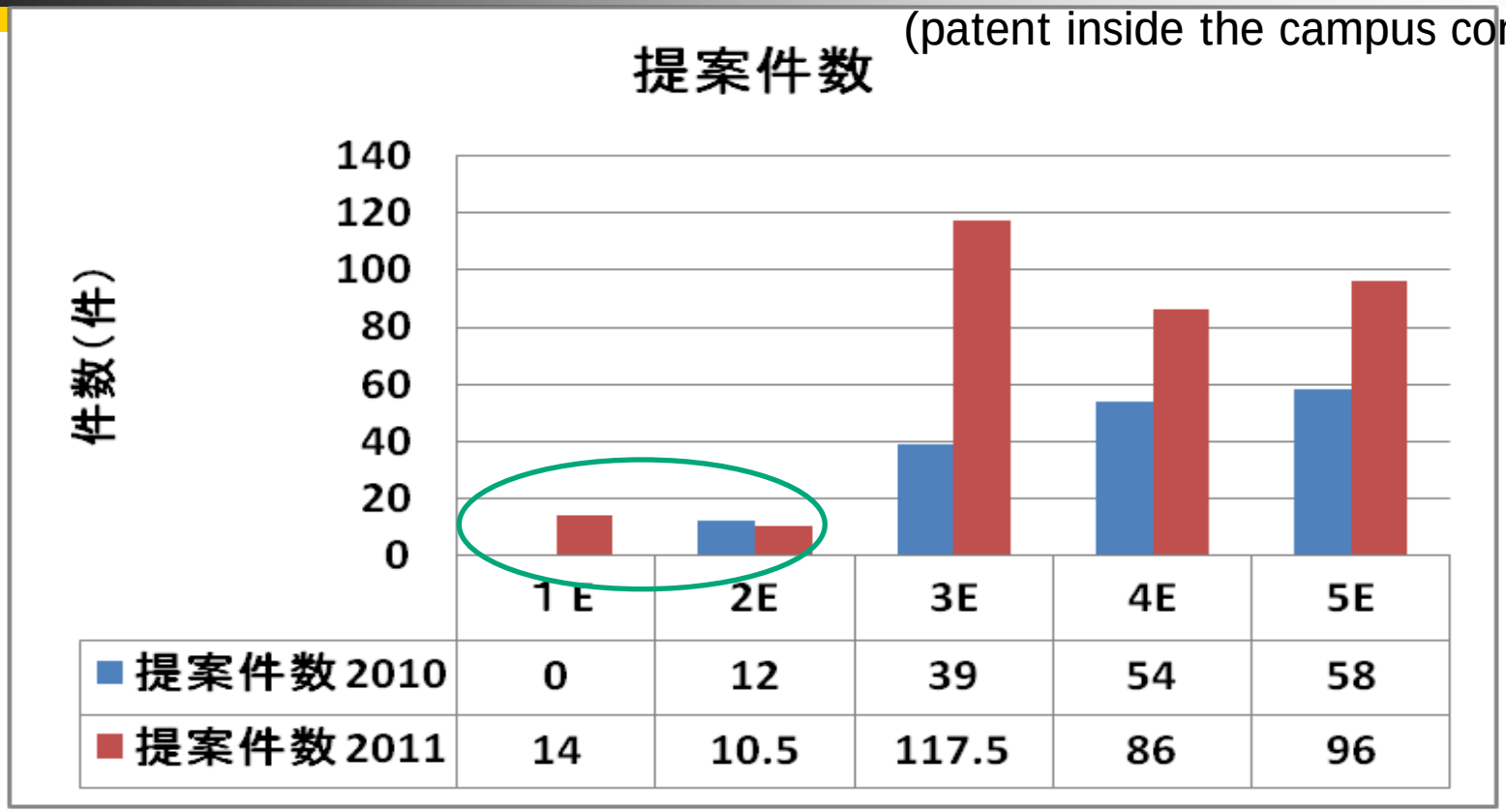

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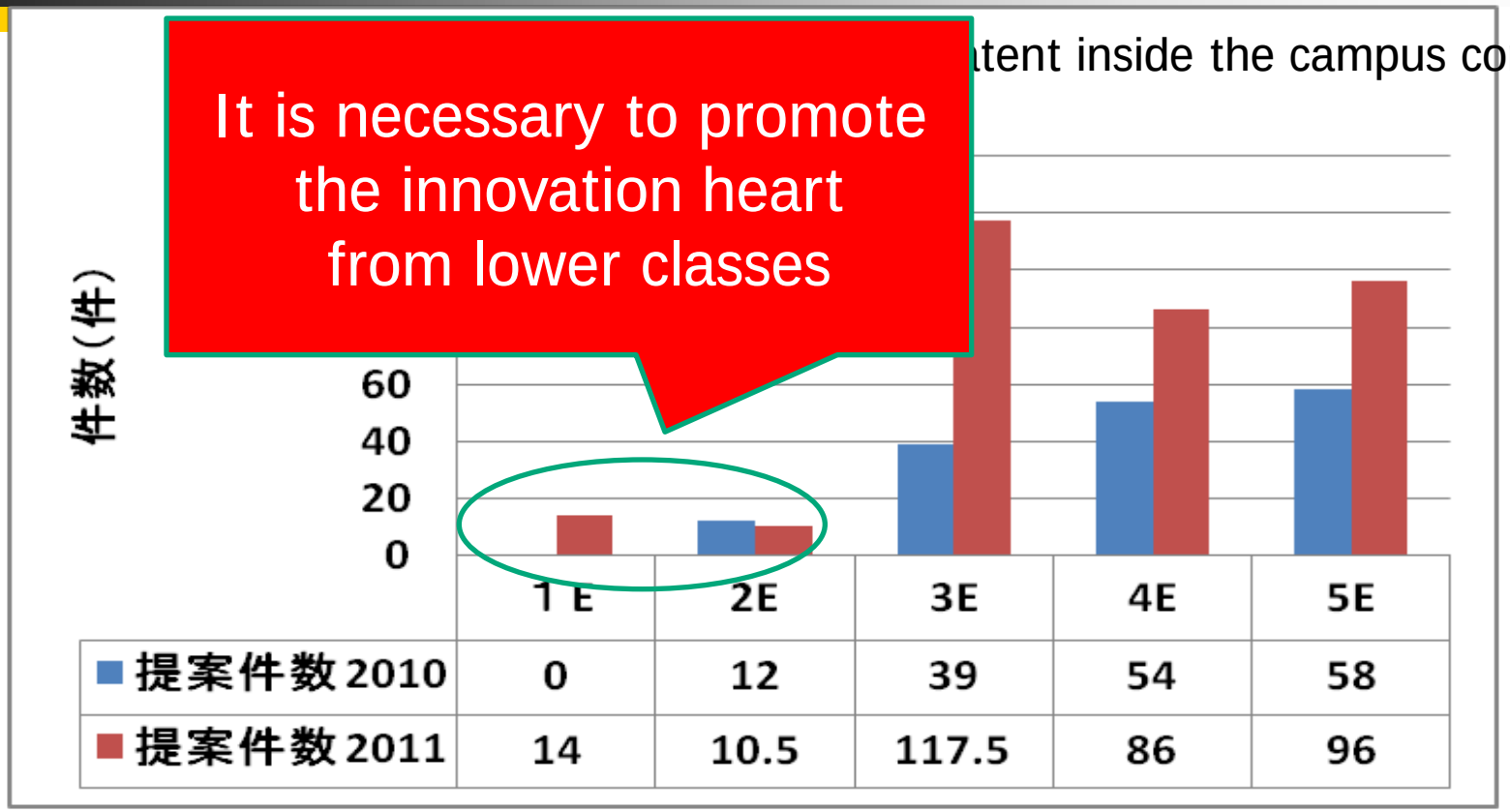

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Enhancement of intellectual property education by lower classes

(1) New student training camp training: Whole training
(Wakasa bay natural youth's house)
・It explains the importance of the creation, protection, and use.
・Guide of patent contest application and problem research

(2) All subjects of the first school year: Information processing Ⅰ
・・・ The maneuver of the IPDL retrieval was executed.

(3) The first school year : Mechanical engineering introduction , Electric and Electronic engineering outline, Electronic information engineering introduction
・・・It examined it by teaching a basic content of the wisdom fortune by using a standard text (integrated chapter), and using the quizzes problem etc. of the guidance manual publishing by a part of class.

Intellectual property education of the 3rd and 4th graders

(4) "Lecture meeting" The third school year all student object: student: 231 people

- **Wednesday, 31st 13:00 of October, 2012–14:30・・ Part of special activity**
- **Lecturer: Visiting lecturer (Murata Mfg.)**
- **The content: It was born during the development of the robot.**
  Lecture concerning intellectual property

(5) The fourth school year all student object : "Optional subject"

Law Ⅰ (52 participants at the first term)

Lecturer : Visiting lecturer including the former principal

Content : Property right including copyright

Law Ⅱ (48 participants at latter term)

Lecturer : Visiting lecturer

Content : Patent system

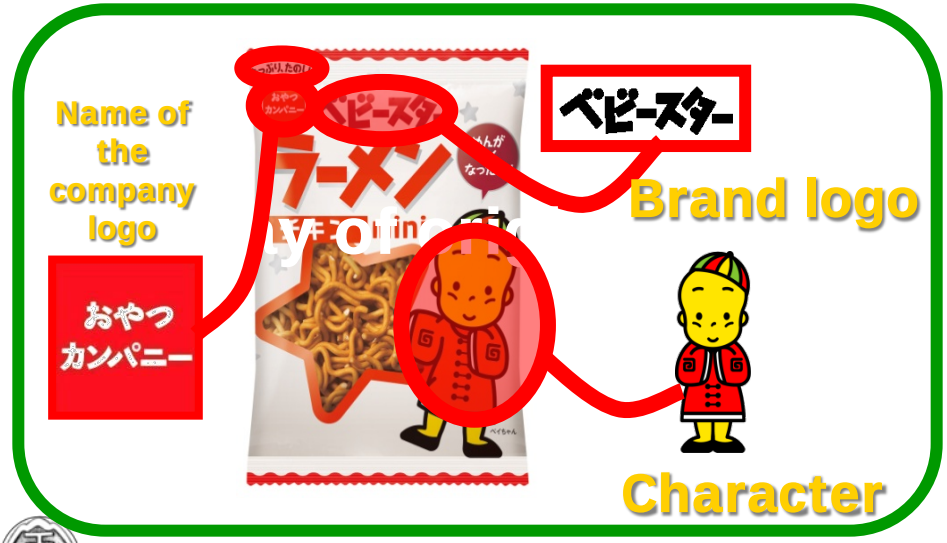
Text : Industrial property right standard text (patent chapter)

A lot of print distributed material

Intellectual property education of advanced course students

(6) "Lecture meeting" The first advanced course grader object:
student: 26 people

- Friday, 13th 15:30 of July, 2012-16:40
- Lecturer : Visiting lecturer (chief of sweets company development department)
- Content : Intellectual property as company with explanation of outline of patent



Intellectual property education of advanced course students

(7) The second advanced course grader "Sensor engineering": Students 41 people

・Four times of lecture of 95 minute , started between December and January, 2013 (Friday)

・Lecturer: Visiting lecturer (Suzuka Nokyo farming supervising instructor and regional business administrator)

・The content: The knowledge of the studied sensor and the knowledge of the machine, electricity, information, the material, and Biochemistry are put to use, and problem in the region: The idea of "Birds and beasts damage measures" is considered, and making to intellectual property is aimed at.

① Topic offer concerning current state of birds and beasts damage by lecturer

② It proposes the measures idea dividing into five groups of eight people.

③ Holding of idea symposium

Grappling with the problem in the region

Problem research “Application"

19 students worked on problem research "Intellectual property education activity (Application)" in fiscal year 2012.

The theme was “Application"

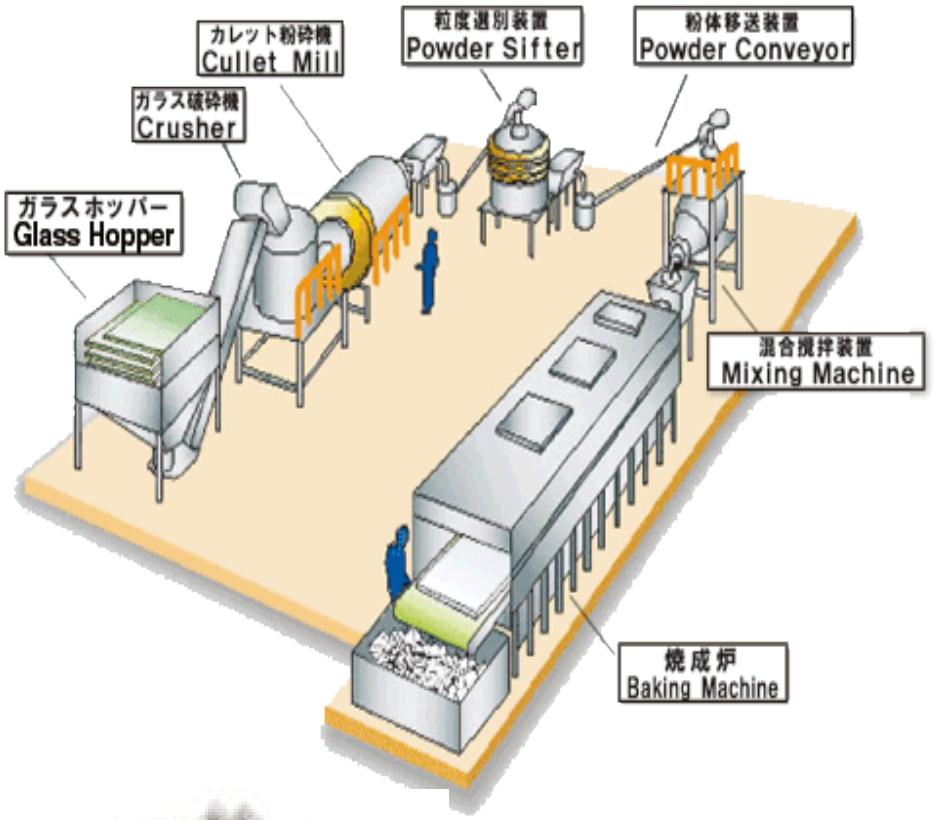
・The student grapples with the problem in the region (region & student).

・Idea creation as virtual company

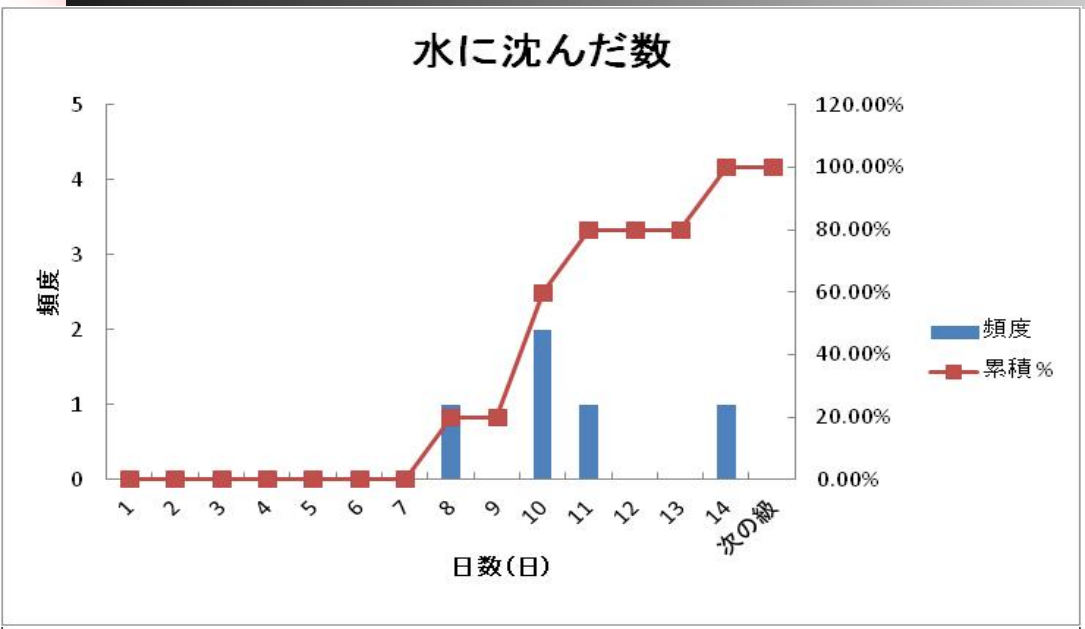
The foam glass (Glacera)

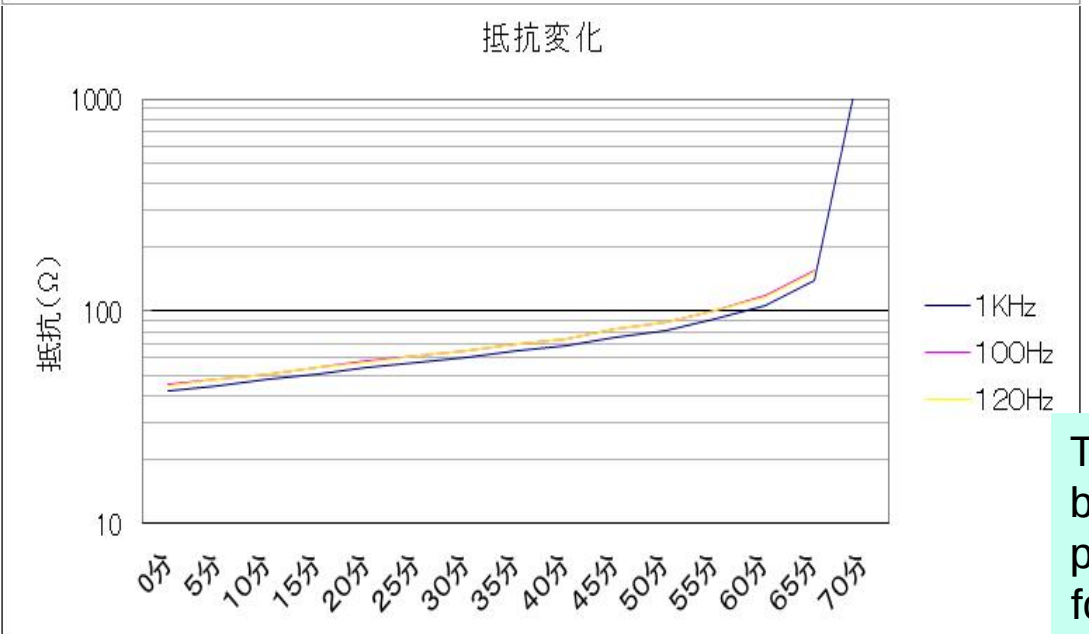
Regional Companies & students

“Glacera" is a porous inorganic system quality light materials that make the abolition glass a raw material.
About 70% of the element of the glass that becomes a raw material is a lot of silicons (SiO2) contained in the soil.
Because it is a thing both sodium (Na2O) and calcium (CaO), etc. other elements are used for daily life articles etc. and without toxicity, it can be called safe, safe materials.



Germination experiment that uses the foam glass





The germination of 80% (4/5) was able to be confirmed by arranging the polymer polymer (aqua ball) in surroundings of the foam glass.

Excellent prize for poster of high school students from the Zoological Society of Japan

Regional companies & students

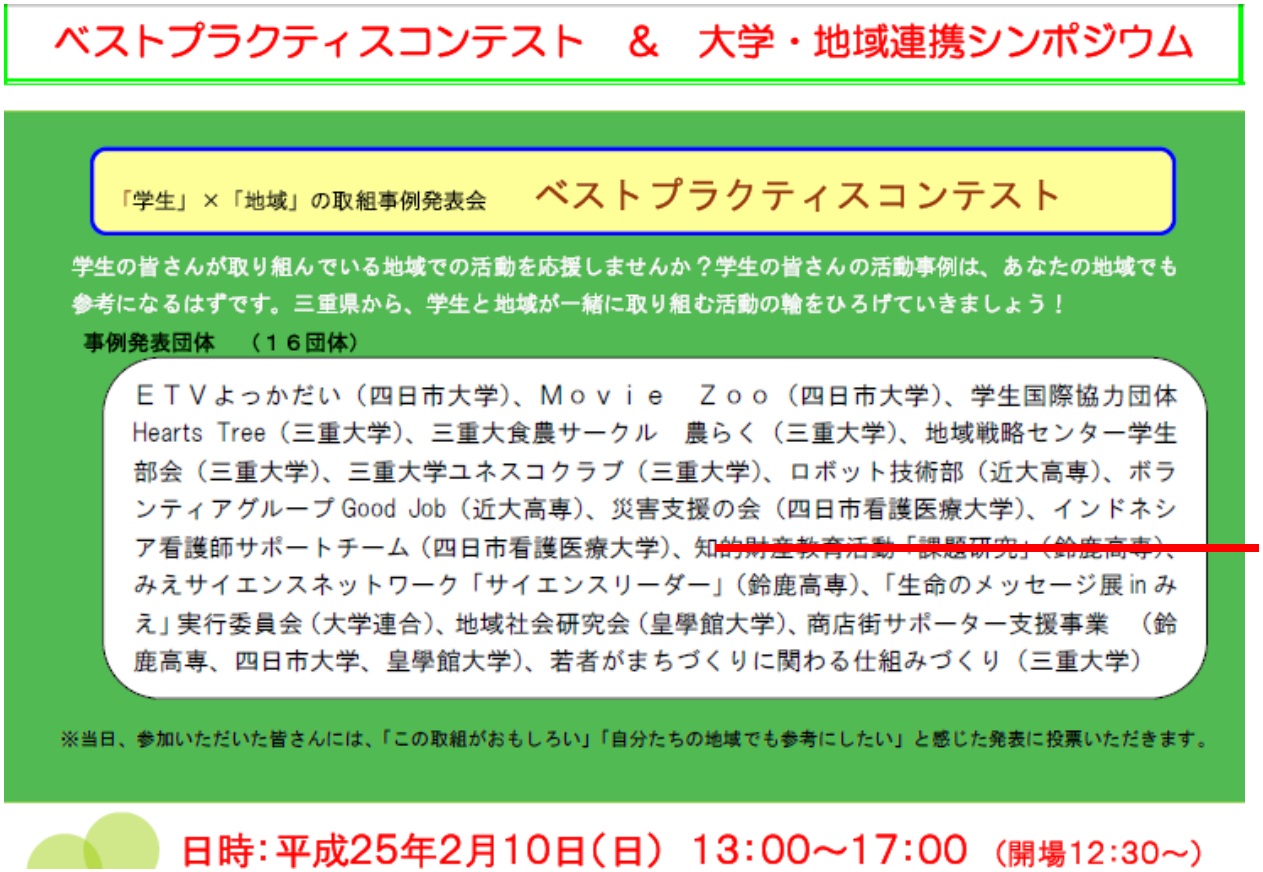
"Pure research into the plant cultivation that uses the firing glass ([gurase-ra])" that the student of this school Electric and Electronic Engineering Section ([saimizu] Goto and [benisai] Oto) announced is an excellent prize.

Mie Prefecture best practice contest

Intellectual property education activity that cooperates with regional enterprise"Problem research-creation, protection, and use-"

"Pure research into plant cultivation that uses firing [garasugurase-ra]"?

By [benisai] Oto (four years), [saimizu] Goto (two years), and Osamu Wakabayashi (five years) Temple [yamahideyuki] (five years) and Matsuda [keimigi] (four years), Matsuda..male.



Thinking countermeasures against bird and animal damage

Student “It was possible to work by knowing the problem of the agriculture of actual Suzuka City, and enhancing it very much. I think such a thing to be good when working using the synectics of the fourth subject grader and the class of the first advanced course grader etc. , and early. Moreover, if it is possible to contribute to the region through proof and the improvement, etc. , it is glad.

Cooperation with handmade market in region

The Robot Contest project of this school executed the exhibition and the demonstration of a large-scale robot that won a technological prize in the Technical College Robot Contest district rally last year and a small humanoid robot on Sunday, July 22 by "Festivity and handmade market" (sponsoring of Fukinofuji) held at Mie prefectural the synthesis and the culture centers.
⇒It challenges from needs from the region and & of seeds of the Ohtsu laboratory student's ideas to the product development.

Transparent frame specimen

Ms. Iwazaki and Ms. Kasai of the second grader participated in the challenge contest of the laboratory animal substitution law association of "Transparent frame specimen" to work during summer vacation as "Research of the problem of the intellectual property education". This was able to be made the best use of for the application to the scientific education as the use important teaching and on the other hand of the life through the transparent frame specimen. On the other hand, it was assumed that the development in the future was expected, and the commemorative gift was presented by the academic society.

JST science and technology communications business "Regional type"

Scientist in the future whom regional industries bring up “Mie science network"

- construction of Mie science network studied from agricultural, commerce and industry -

Regional company and higher education organization that makes the best use of trait of industry in Mie Prefecture like industry in the north central part, agriculture, forestry and fisheries industry in southern part, and travel industry, etc. , and practices science and scientific education, the science and technology communications network by cooperation with the volunteer group in which it acts, and it works on the promotion of the scientist and the engineer who bears the deepen of understanding to a regional business and the region of the future is constructed.

Long-Term Goal

(1)The education of the science of Technical College and the university power, a technological, educational power, and the research power are added while taking a regional enterprise, the volunteer group, and cooperation that has individually developed the science, the scientific education, the career education, and the educational activity such as environmental education up to now in various places, the skirt is wider, and the enhanced science and technology education activity is created.

(2)It touches the intellectual property education, the uplift of the science search heart and the wisdom fortune heart is attempted, and it develops one's imagination and creativity by discovering it about the creation and the improvement of the idea through practicing science communications activity that cooperates with the region now at the time of be made the innovation talent's promotion a pressing need. It thinks voluntarily, and it aims at the personnel training in a science and technology lover bright as for intellectual property.

(3)Everyone accumulates the teaching material obtained by cooperation and the education activities and the knowhow of the instructional method, makes the offer of appropriate scientific communication according to characteristics of the region and needs, cooperation enterprise, organization, and lecturers, etc. a data base furthermore, and constructs accessible “Mie science network". And, it makes the best use of for continuance and the development of the activity after the scientific communication is promoted in various places, it improves leadership of the lecturer, and it ends furthermore for this business support period.

Junior high school student Ene-1GP

Region & Student

The base from the junior high school student is expanded.

- Improvement and activation of understanding of regional industries (Suzuka City)
- The motor sports talent's promotion in the future (Suzuka Circuit)
- The science lover's promotion (board of education)
- The science and technology talent's promotion in the future (region)
- The regional industrial talent's promotion in the future (regional enterprise)

However, the participant in the junior high school is few. The team costs and it costs the cost of making of the machine ..it is not possible to make it.. only by one school. Then, Mie science network supports junior high school student Ene-1 GP in cooperation with the prefecture, the city, and the board of education.

What is Ene-1GP?

・Ene-1 races running with 40 rechargeable AA dry batteries held in Suzuka Circuit on August 4 when it challenges the creation in the future through" and "Energy management", and the next generation energy car has the concern.

・The international racing course (5.8 km) is done three times and the total time competes.

It participates in the car section and the bicycle section at current year.

Electric vehicle (KV-40)

Where it is possible to run in the racing course in Suzuka where ups and downs are intensely said, "Severity" by 40 rechargeable AA battery car competes.
79 participates at current year (..inside.. junior high school students are four teams).

Electric bicycle (KV-BIKE)

Eight including two girl junior high school students participates in adults.

- Sports type (It is good-looking).
- City Type (It is happy).

Sports type

Adult example

City type

Subjects for junior high school student at Ene-1GP

【TRIZ】

①Do so that the junior high school student may manufacture the car?
There is no knowledge of metalworking and the welding.
How do you do?
②Can the junior high school student run in the Suzuka Circuit international racing course?
The method to go up even slowly in inclination of 7.8% by junior high school student's knowledge?
③It cannot be balanced in the bicycle though the car can go up even slowly on the slope when slow.
Method of no retreat even if it stops in acclivity?

How can junior high school students manufacture a car?

【TRIZ】

① Do so that the junior high school student may manufacture the car?
There is no knowledge of metalworking and the welding.
How do you do?

Metalworking, it doesn't weld, it is possible to process, and it looks for the method of securing strength.

Improved item: Easiness to make
Worsening item: Strength

How can junior high school students manufacture a car?

【TRIZ】

3. Local quality

・It makes it to composite materials that stick carbon fiber on both sides of not a uniform metal but the firing acrylic fiber.

10. Preliminary action

・The carbon fiber reinforced plastic can be made by one self by doing the work of soaking plastic into carbon fiber.

1. Segmentation

・It is assumed on flat board of the chassis the BOX structure that the front wheel axis and the rear wheel axis are installed.

How can junior high school students manufacture a car?

【TRIZ】

How to climb up the ascent of 7.8% with junior high school student's knowledge?

【TRIZ】

② Can the junior high school student run in the Suzuka Circuit international racing course?
The method to go up even slowly in inclination of 7.8% by junior high school student's knowledge?

The knowledge of the changing the speed gear looks for the method of putting out power by the knowledge that not is learnt in the junior high school.

Improved item: Power
Worsening item: Easiness of operation

【TRIZ】

28. Replacement of mechanical technique

A mechanical effect is replaced in technological, the sound or the effect of the smell etc. The place such as an electric, magnetic electromagnetisms is used to interact with the object. It shifts from the fixed one to a changeable place with the time passage.

⇒How for the battery connected with the motor to tie is changed at high speed and a high torque.
48V series 5A: High speed operation (smoothness)
24V parallel 10A: High torque (inclination)

How to climb up the ascent of 7.8% with junior high school student's knowledge?

【TRIZ】

How to keep the bicycle from retreating even if it stops at rising slopes?

【TRIZ】

③ It cannot be balanced in the bicycle though the car can go up even slowly on the slope when slow.
Method of no retreat even if it stops in acclivity?

The motor doesn't turn when the brake is applied in the acclivity. It falls when the brake is released. It looks for the method of the safe, easy movement.

Improved item: Easiness of operation
Worsening item: Durability of movement of immovable object

How to keep the bicycle from retreating even if it stops at rising slopes?

【TRIZ】

25. Self-service

The rear wheel becomes and doesn't retreat on the slope only for advancement because it fixes to the body by using the pedal of the bicycle as a step either.

The pedal was fixed to the body, and it was assumed the step.

Results of this fiscal year

【TRIZ】

Blue Deer: The first junior high school student place (two time 5200m)
Black G: The junior high school student the second place【 design prize 】is won.
Red Comet: The junior high school student the third place
Electric and Electronic Engineering Department :the first place of University and Technical College section
Electric bicycle L1 (sports type) (Quartet 1) 2nd place
L2 (Quartet 2) (city type) 5th place

The participation team order in Mie Prefecture in participating by 79 all team.
- (11) Suzuka Technical College Electric and Electronic Engineering Department, (19) team 4thChukou, (21) Matsuzaka industrial high school solar car, (38) Tsu industrial high school machine research part, (40) Mie science junior Blue
(50) Mie science junior Black, (59) Miw science junior Red, (61) Kuwana industrial high school problem research group, (62) Ise industrial high school machine

Summary

1. The engineer of the value creation type that bears the future in the region is promoted by practicing (Lived) technology education (industrial human resources development in the future) to which the problem in the region was solved by student's idea through the approach.

2. The conviction is excluded, and TRIZ is effective, and used by getting that verifies the idea as the creation method in the future.

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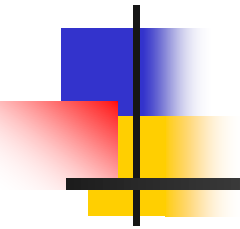

Thank you for your attention