SIT SHIBAURA INSTITUTE OF TECHNOLOGY

Introduction for Cross-cultural Engineering Project (CEP)

– Global, Industrial, and Community Cooperative PBL –

Shibaura Institute of Technology
@ Omiya Campus, Japan

Cross-cultural Engineering Project (CEP)

- Global PBL (Project Based Learning) for synthetic problem solving based on multi-cultures and multi-discipline.
- Design as an engineering educational program based on system thinking.

CEP is held in three area.

1. Glocal problem at KMUTT in Thailand,
2. Industrial & community cooperative at SIT in Japan,
3. Innovative creation at FCT/UNL in Portugal

Aim of CEP

CEP enables:

- To acquire the synthetic problem solving capability to be internationally attractive
- To acquire concepts and technologies on “Systems thinking”, “Systems Method (Engineering Method)”, and “Systems Management (Project Management)”
- To acquire a capability of work as a member of an international and/or interdisciplinary team

Based on Global PBL through the problem solving experience

Time, Venue & Members

Time:
2020/12/10 – 2020/12/18

Venue:
Web based project

Team members:
14 Japanese Students
46 Other nationality Students, total 60 students
(Thai, Vietnam, Malaysia, Indonesia, Mongol)

1. SIT, Shibaura Institute of Technology
2. BUA, Bunsei University of Art.
3. KMUTT, King Mongkut's University of Technology Thonburi
4. SUT, Suranaree University of Technology
5. HUST, Hanoi University of Science and Technology
6. ITS, Sepuluh Nopember Institute of Technology
7. Malaysia’s universities
8. IET, Mongol Koosen college of Tech.

English Communication (More is better):

Students have to communicate in English, even if they use freely various devices and services, such as electronic dictionaries, smartphones and the Internet.

Role of TA & Professor

Role of Teaching Assistants (TA):

5 students (Japanese & Thai) from SIT

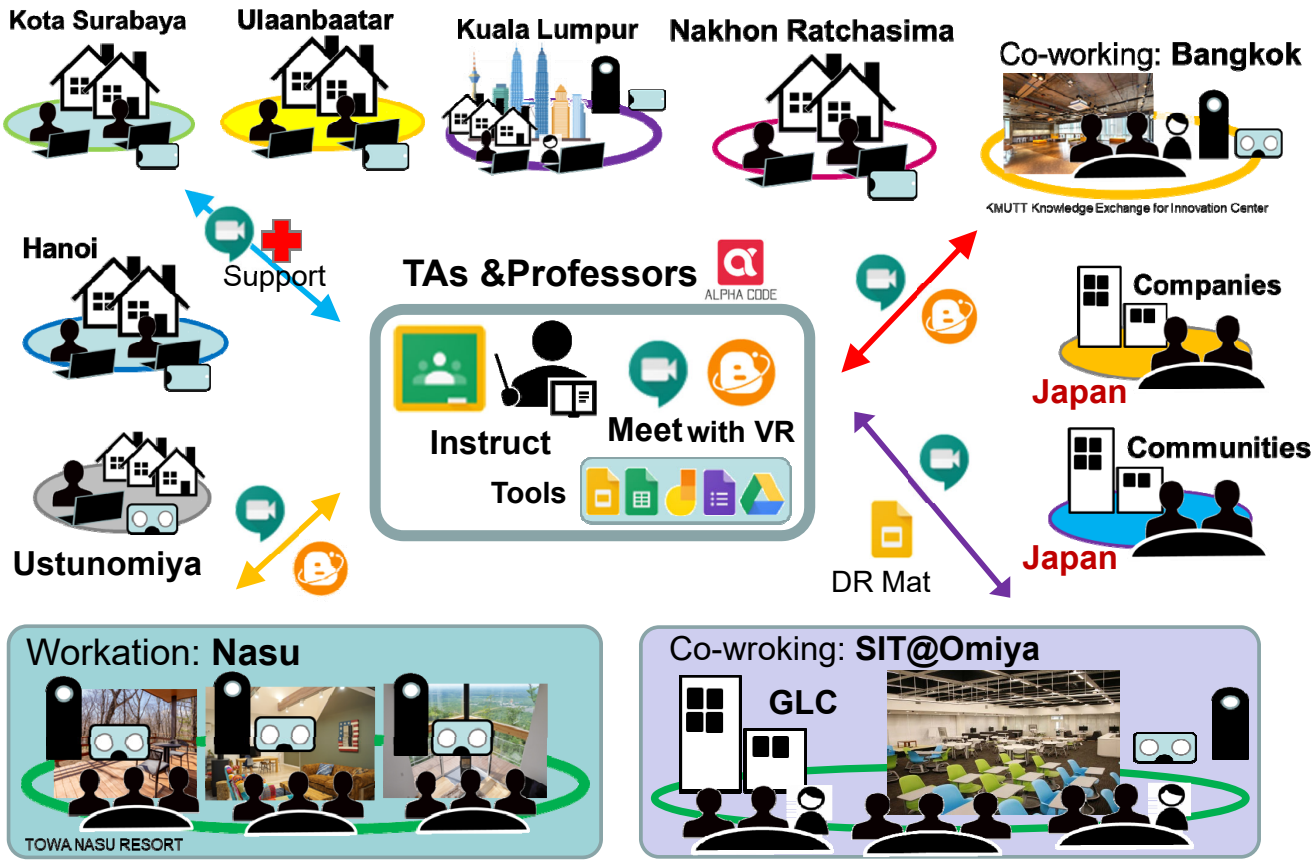
TAs advise the teams to coordinate with the local staff, to support the management of teams.

Role of Professors:

Professors act as an assumed investor to project. They make various kinds of comments and suggestions in the Design Review (DR).

Comments from various points of view among lecturers are allowed.
Basic stance is to pay respect to students' ideas and opinions;
The lecturers should not force the students to follow their comments.

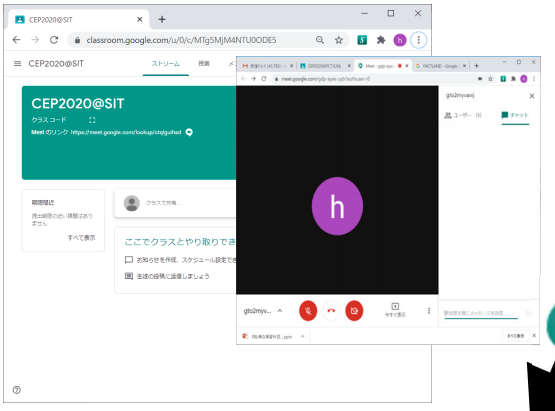
Cyber & physical space



Google Class room

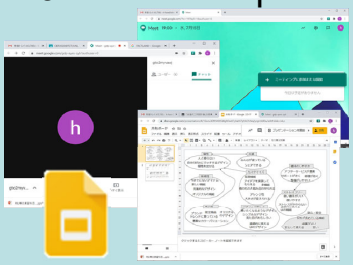
Google Classroom

1. **Announce and Instruct for the whole by Classroom's Meet**

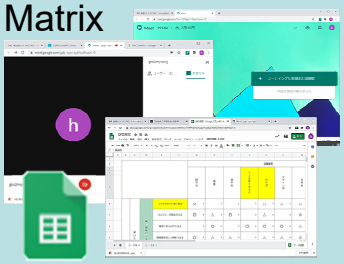


2. Work in each team By Google Meet using tools

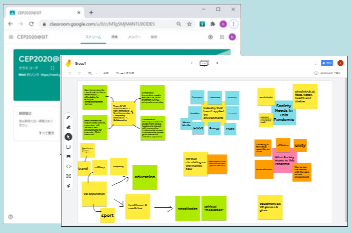
KJ & Mind map



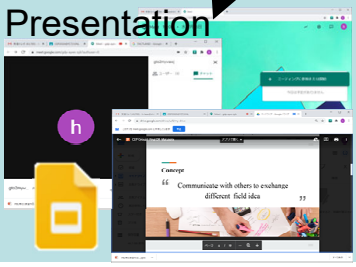
Matrix



Idea creation



Presentation



Team 1	KMUTT	SIT	ITS	Team 6	KMUTT	SIT	HUST
	KMUTT	BUA	ITS		KMUTT	SIT	HUST
Team 2	SUT	SIT	IET	Team 7	SUT	SIT	ITS
	SUT	BUA	IET		SUT	SIT	ITS
Team 3	KMUTT	SIT	HUST	Team 8	KMUTT	Malaysia	IET
	KMUTT	SIT	HUST		KMUTT	Malaysia	IET
Team 4	SUT	SIT	Malaysia	Team 9	SUT	HUST	ITS
	SUT	SIT	Malaysia		SUT	HUST	ITS
Team 5	KMUTT	SIT	Malaysia	Team 10	SUT	Malaysia	ITS
	KMUTT	SIT	Malaysia		SUT	Malaysia	ITS

Oh my God experience

Improvisation Education*

In CEP, unexpected troubles, which people meet with very frequently in the real world, will be induced by intention.

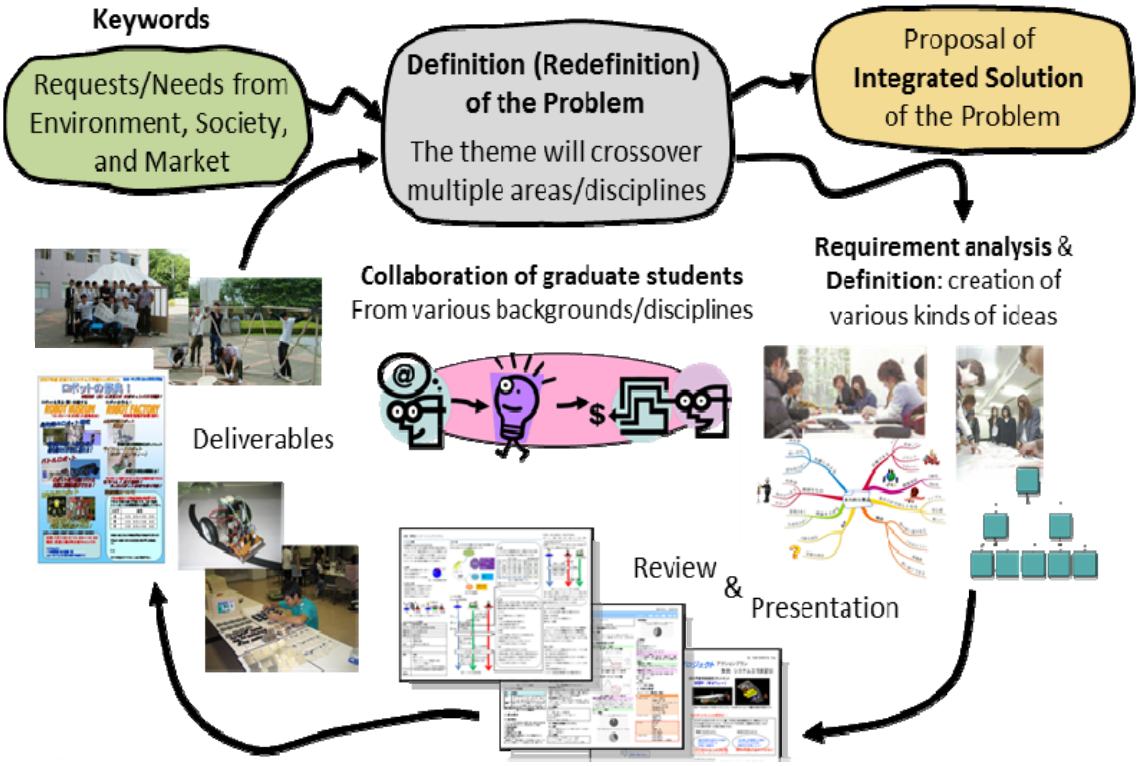
This “Oh my God” experience should trigger the improvement of competency.

Each team will be requested to reconstruct the process of solving the problems by rescheduling.

Creatively adaptation skill to unexpected changes in a project

* Improvisation education has been performed to obtain creatively adaptation skill to unexpected changes in a project. As an examples, MIT and Stanford.

Practical Process



The solution would be formed by correlating various science and technology each other, which has been obtained through environment and social activities

CEP Schedule

Day		Project activities
Pre Process	Web form	1st outcomes assessment (Rubric) Video presentation for project themes (5min/themes) Team-Forming questionnaire
Day 1 Thu. 12/10	AM	Opening ceremony and Guidance Self introduction by Prof., Staffs & TAs and Icebreaking Group announcement
	PM	Give details of theme for each group from companies & communities Confirmation of theme
Day 2 Fri. 12/11	ALL	Requirement analysis and definition Goal setting with including prototyping
Day 3 Sat. 12/12	AM	Schedule planning for activities Budget planning and its submission Preparation for Design Review
	PM	Design Review (DR)
Day 4-6 at NASU Sun. - Tue. 12/13 - 12/15	ALL	Thinking and activities for NASU TABIMAE
Day 7 Wed. 12/16	ALL	Reset goal and reschedule for the activities via DR's comments Remake business model with a prototype
Day 8 Thu. 12/17	ALL	Decide business model through evaluating a prototype Preparation of the final presentation
Day 9 Fri. 12/18	AM	Final Presentation
	FM	Closing ceremony
Post Process	Web form	Report of Expenditures and 2nd Outcomes assessment, PROG competency test

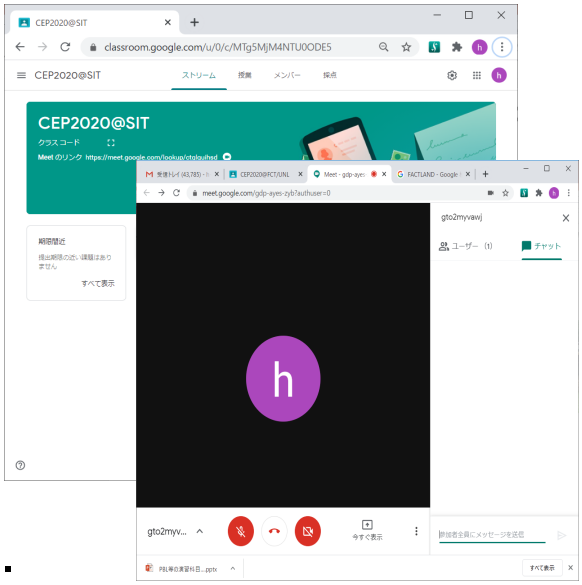
Pre-process:
The web based project

Video presentation:

Issues and problems raised by companies and communities are delivered via video presentations.

Group Formulation:

Total of 10 teams.
Each team is made up of a total of six students, two from each nationality.

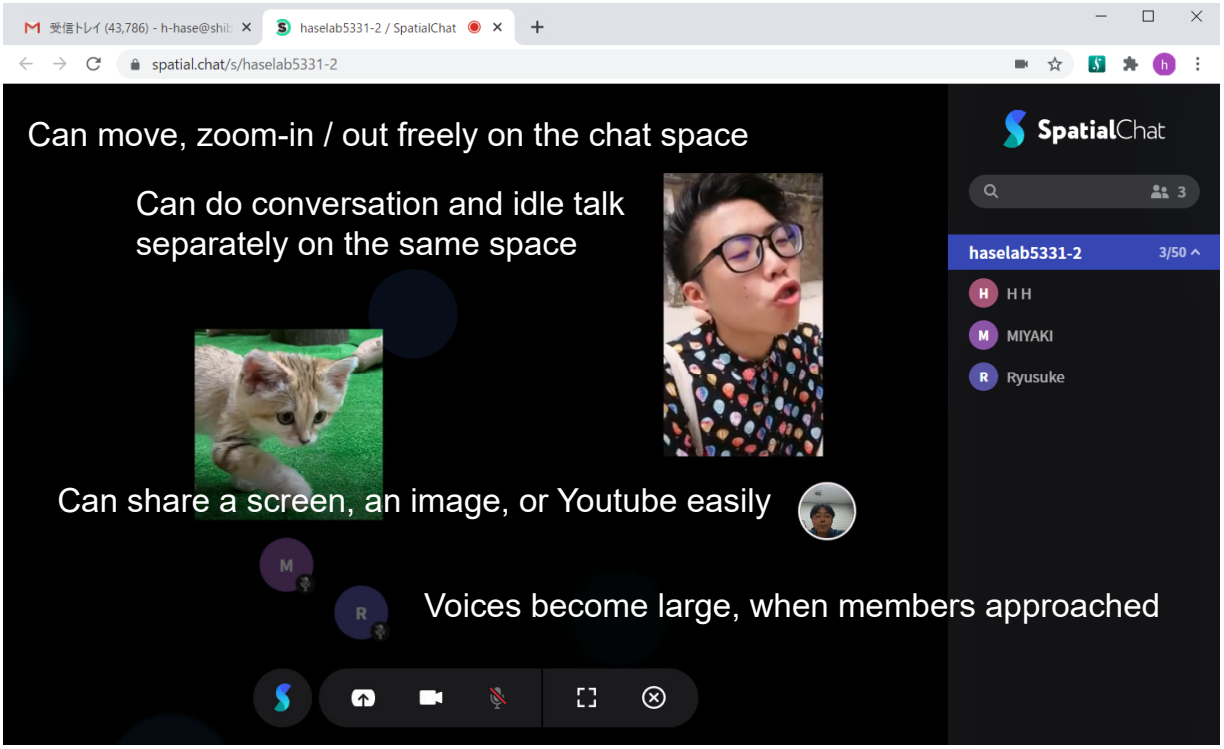


1st outcomes assessment:

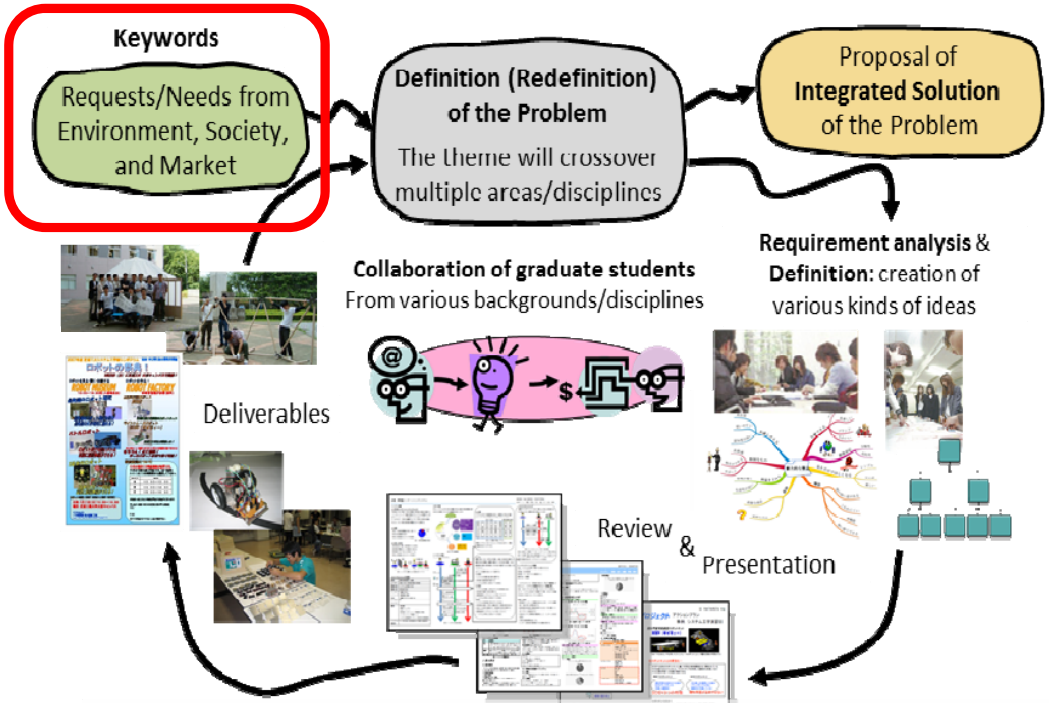
Self-evaluation by the rubric.

Day 1: Icebreaking on SpatialChat

Self introductions and team member fellowship through simple games.



Day 1: Theme of the project



The solution would be formed by correlating various science and technology each other, which has been obtained through environment and social activities

Day 1: Theme of the project

The theme of a project:

- The issues are provided from companies and communities. The issue should be referred for setting the theme.

- Theme setting is started from finding student's interested problem.

Free theme

All through the project, students are expected not only to make a plan but also make a design, implementation and a fieldwork.

The Issues from Company & Community

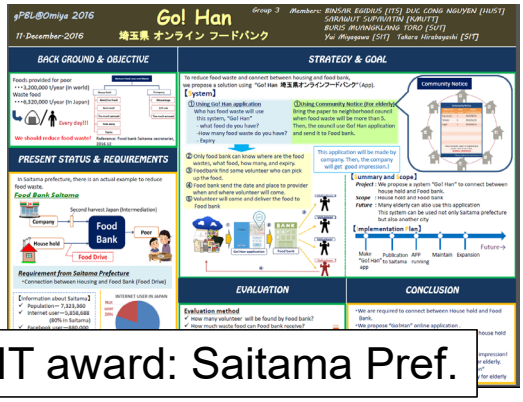
From company candidates:

(1) SHIZEN ENERGY Inc.
(2) Kanepackage Co., Ltd.
(3) Alpha Code Inc.
(4) INDUSTRIAL-X Inc.

TA award: Kanepackage

From community candidates:

(1) Nasu-machi, Tochigi Pref.
(2) The Tourism Bureau of Nasushiobara city
(3) Saitama Pref.
(4) Saitama-shi & Open Street Inc.



SIT award: Saitama Pref.

Day 1: Free theme of the project

Some keywords should be referred for setting the theme.

All through the project, students are expected not only to make a plan but also make a design, implementation and a fieldwork.

Keyword:

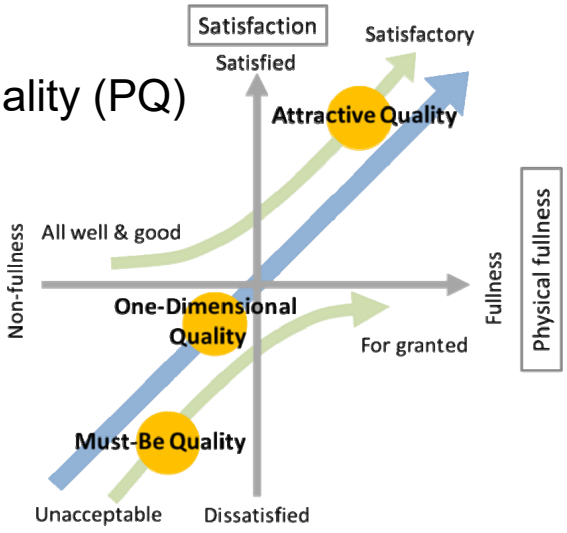
Ecology, Energy, Eco-tourism, Community development, Service, Mobility, Welfare and medical system, Disaster prevention, Multi-language communication, User experience, Innovation, Education system, Global leadership, Others (student's idea)

Day 1: Attractive Quality

- Introduce viewpoint of Product Quality (PQ)
- Apply Kano model for PQ

Kano model has classified the product quality into five categories.

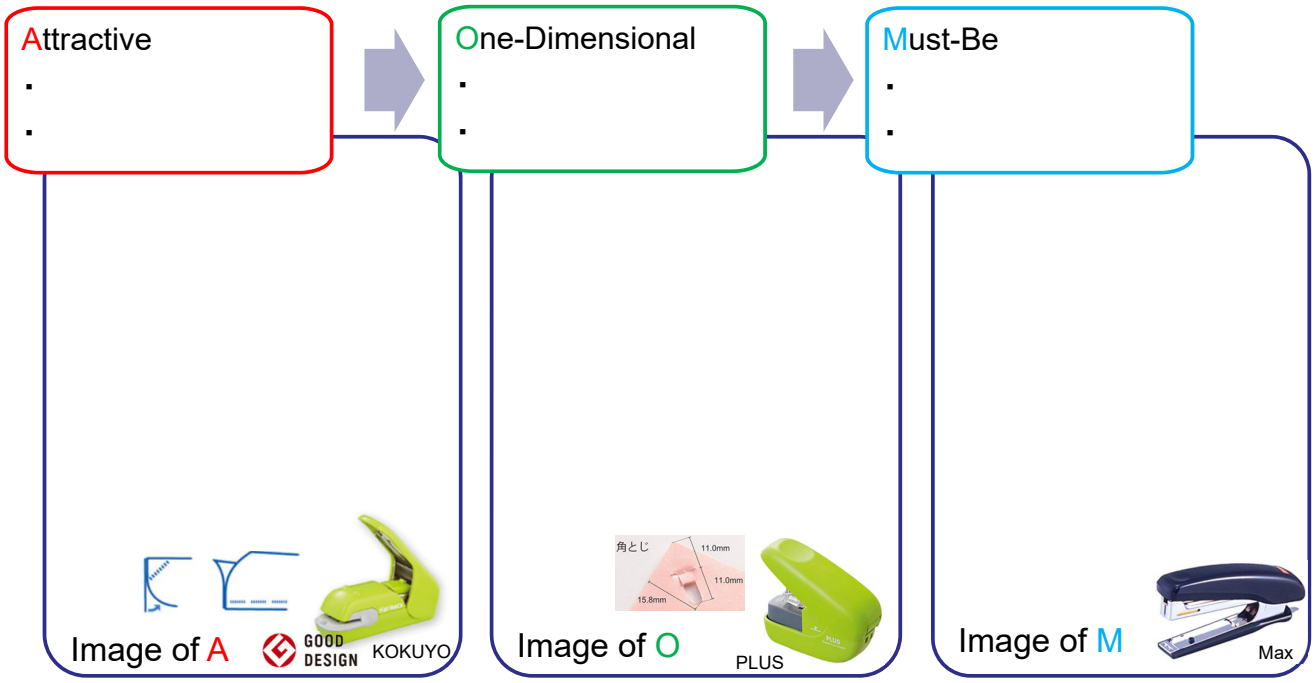
Evaluations of same quality element through progress of time change with “AQ -> ODQ -> MBQ".



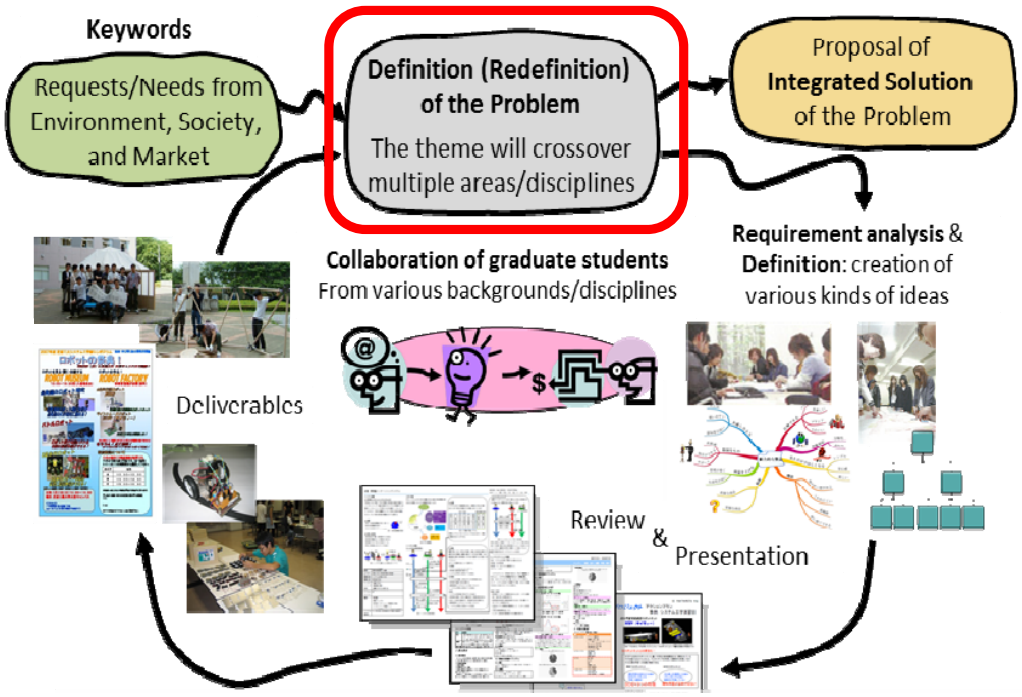
Quality elements	Customer response	
	Fullness of Quality	Non-fullness of Quality
Attractive Quality (AQ)	Satisfaction	All well and good
One-Dimensional Quality (ODQ)	Satisfaction	Dissatisfaction
Must-Be Quality (MBQ)	Taking for granted	Dissatisfaction
Indifferent Quality (IQ)	Not provide satisfaction and dissatisfaction	
Reverse Quality (RQ)	Dissatisfaction	Satisfaction

Day 1: Explore to Attractive Quality

To explore product for each quality, and draw an image



Day 1, 2: Definition of Project



The solution would be formed by correlating various science and technology each other, which has been obtained through environment and social activities

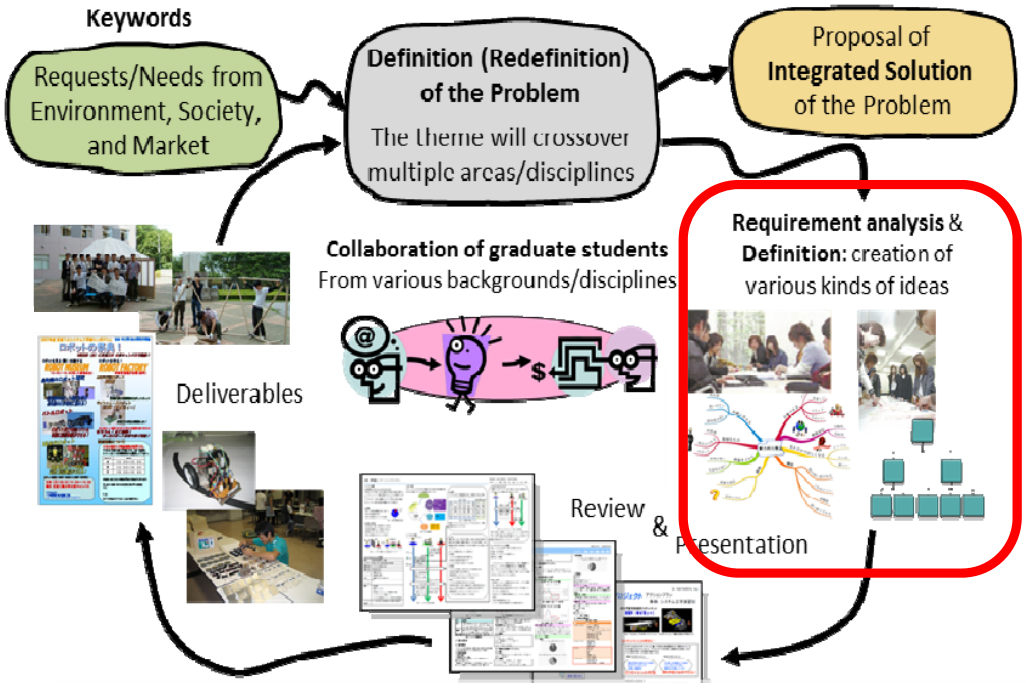
Day 1, 2 : Definition of the Problem

Using learned methods and thinking process in Systems Engineering courses as a systematic communication tools, such as BrainStorming, KJ method, Mind map etc.

Go to field research in each country, if required.

Using sticky notes during discussions open to any challenge

Day 2: Requirement Analysis and Definition



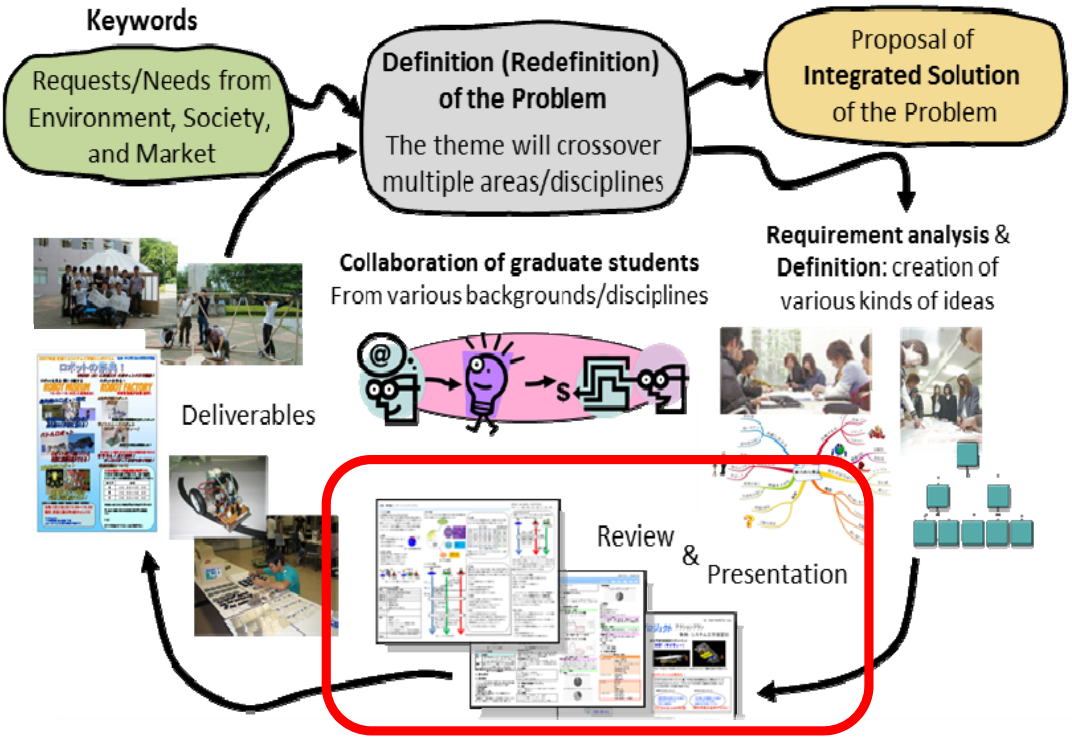
The solution would be formed by correlating various science and technology each other, which has been obtained through environment and social activities

Day 2, 3: Requirement Analysis and Definition

- ✓ Requirement analysis
- ✓ Goal setting
- ✓ Assessment planning
- ✓ Budget planning
- ✓ Schedule planning for activities

- ✓ Preparation of design review (DR) materials

Day 3: Design Review (DR)



The solution would be formed by correlating various science and technology each other, which has been obtained through environment and social activities

Day 3: Standard of Evaluation for DR

In DR, evaluation is made with scale from 1 to 5, by using the standards (1) through (6) shown below.

The actual evaluation will be conducted in 2 levels consecutively; (a) Evaluation by students among groups, (b) Evaluation by the professors and TAs.

(1) What are the requirements for the theme?
- Are Background and Objective stated clearly?
- Are Present Status and Needs analyzed well?

(2) What is the goal to meet the requirements?
- Are any ideas and proposals clearly described to reach the goal?

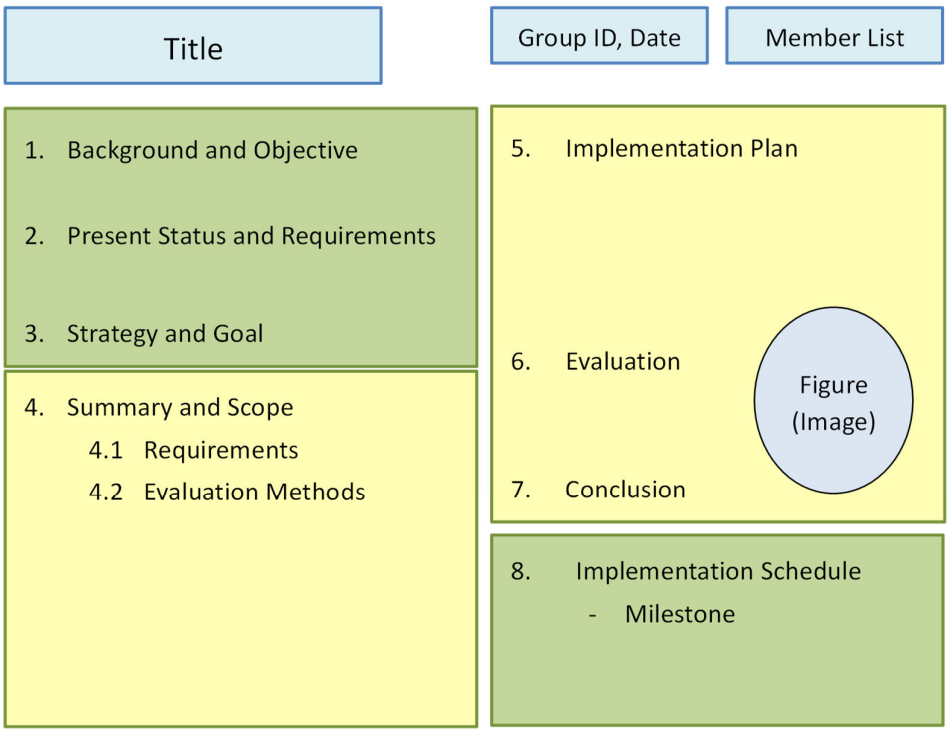
(3) Was the relationship between Requirements and Goal an appropriate one?

(4) Was the Evaluation Method planned properly?

(5) Was the Budget Plan planned properly?

(6) Did the resource and the oral presentation help your understanding?

Day 3: A3 Material for DR



A3 Material is used for DR at many Japanese companies, such as automotive or electric-appliance companies, Mitsubishi, Toyota…

Day 3: A3 Material for DR

Language Connect

Group G – 16 Feb 2014 | **Yuki, Yuta, Ryosuke, Yuka, Tee, Pare**

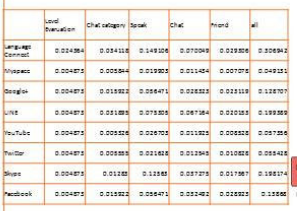
Background & Objective

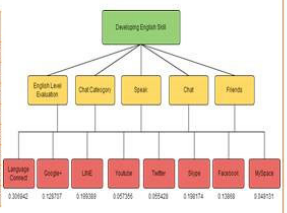
Language barrier has been one of the biggest problem since we have languages. Thai and Japanese people are not an exception. As both Thai and Japanese is not the official language, they need English in order to communicate with each other. However, both of them are not native speaker either. Therefore, we need a good solution to solve language barrier issues, as it would help in both communicating with each other and for working with international company.

Present Status and Needs

- 375 Million people use English as first language and other 375 million as second language
- Two-third of the world's scientist read English publication
- 700,000 people go to UK to study English
- Students have to learn English as a second language in their school

Thailand	Japan
English in class cannot use in the real life	Can read and write English Not good at speaking it
Good at grammar but bad at speaking	To study English for the test. After test, we forget that English
Don't have chance to practice with native speaker	There is no situations of speaking English
After test, we forgot what we learned	For the entrance examination
Thai are afraid to speak native	Too shy





Strategy and Goal

We propose the new social network system as a solution for English language learning problem. This solution would provide a lot of great opportunity for students to practice their English with native speakers.

Evaluation

Easy to join (can make some friends)

Increase the opportunity to speak English with native speaker
Keep the motivation to use our system

Keep the motivation to use our system

Improve user English skill

Schedule Action

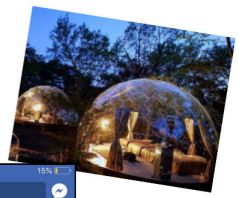
Day 6	Day 7	Day 8
Feedback from DR comment	Evaluation	Final Presentation
System Design	Final Present Preparation	

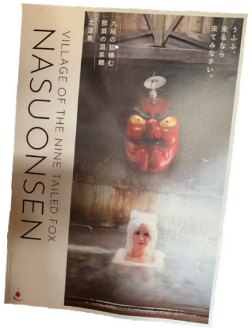
Day 4–6: NASU TABIMAE Proj.

Royal Resort NASU

https://www.nasukogen.org/brochures/

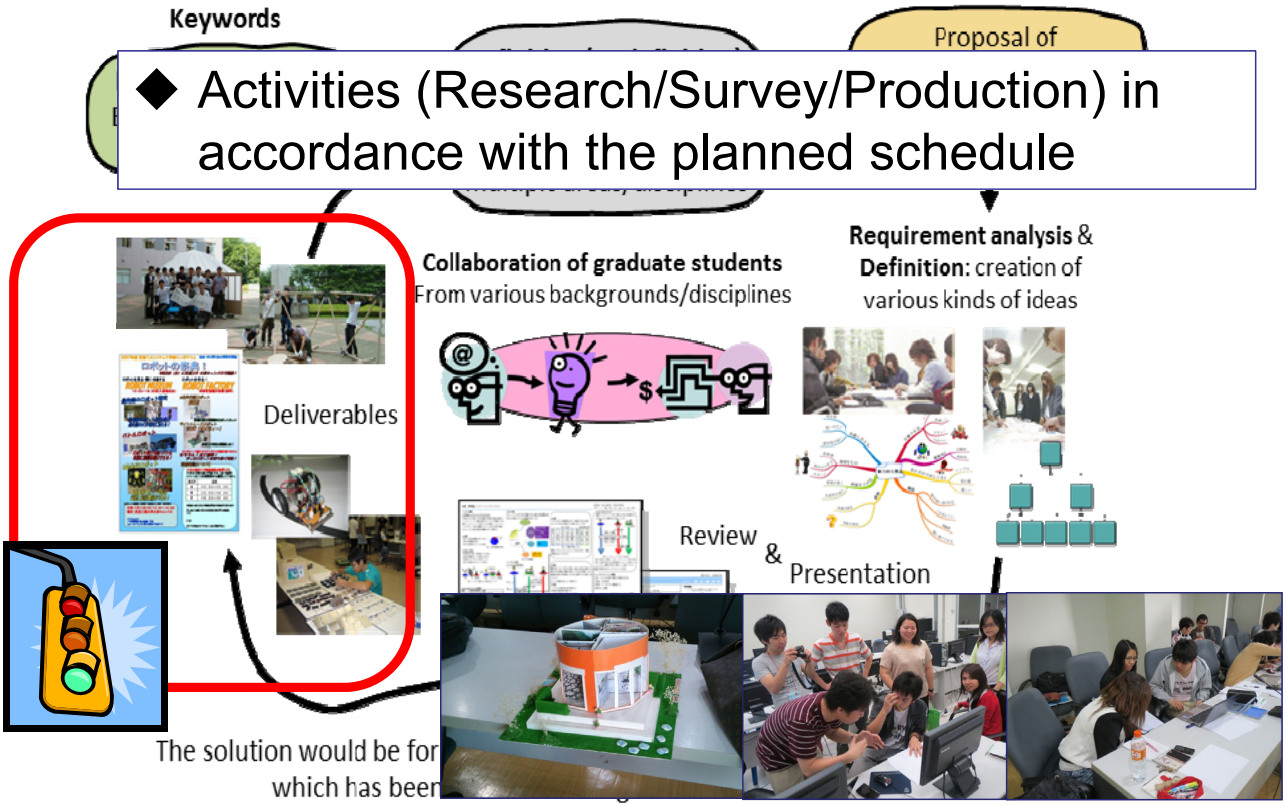
http://onsen.nasukogen.org/



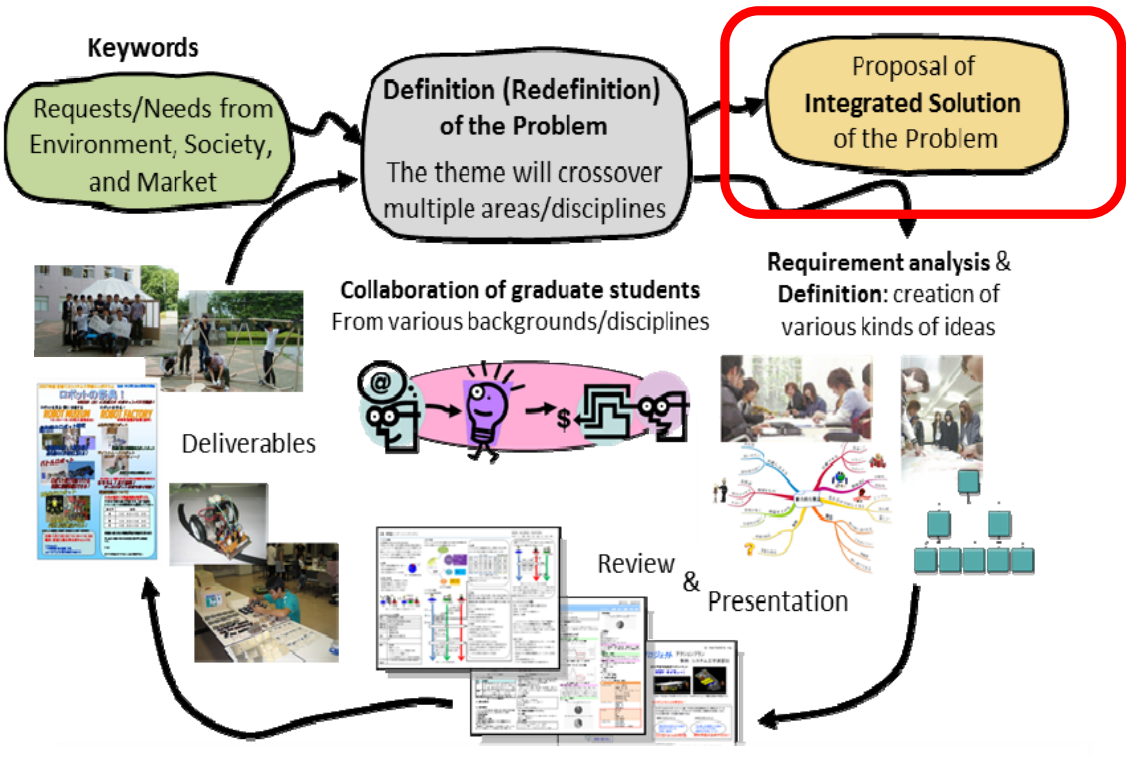


Day 7, 8: Scheduled Actions

◆ Activities (Research/Survey/Production) in accordance with the planned schedule



Day 9: Final Presentation



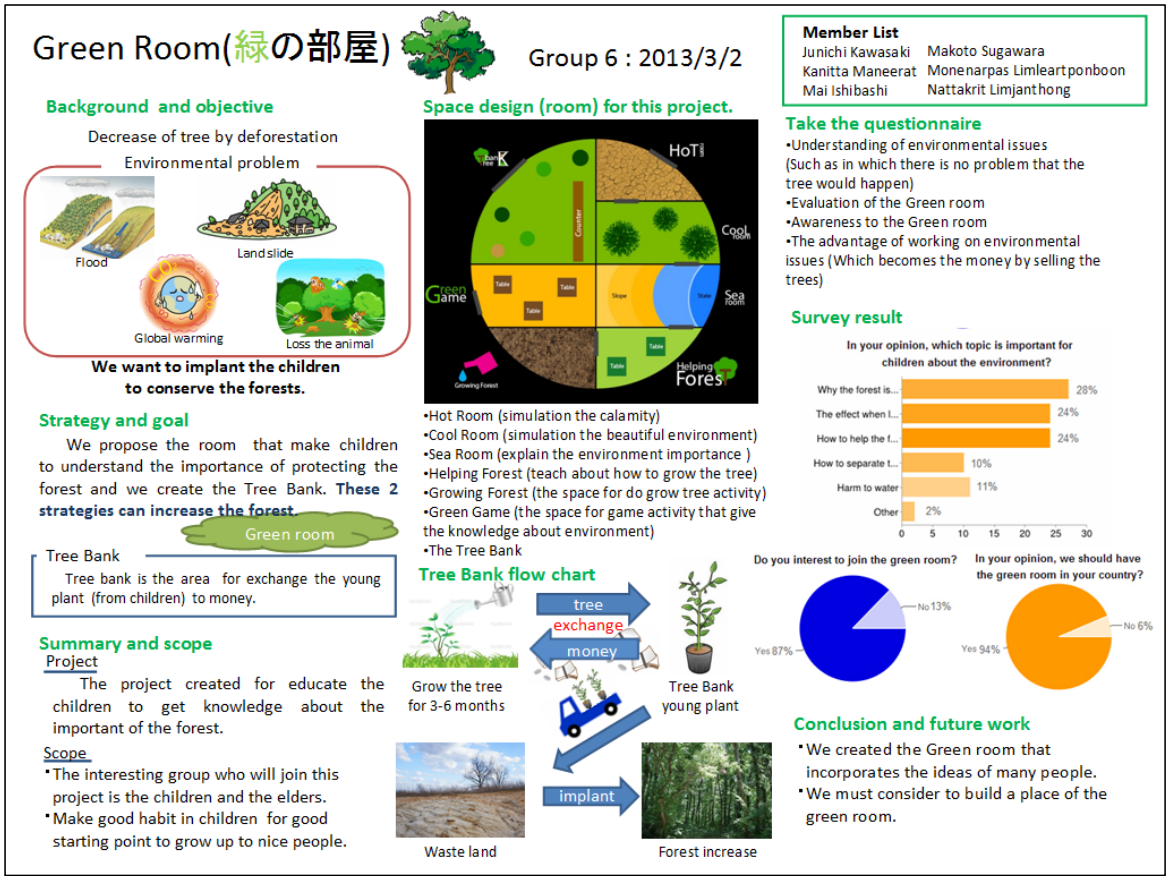
The solution would be formed by correlating various science and technology each other, which has been obtained through environment and social activities

Day 9: Final Presentation material

The A3 Material should include following points for the final presentation.

- Background and Objective
- Requirement Analysis
  - Present Status and Needs, Objective Analysis
  - Requirements, Strategy, and Goal
  - Criteria plan for evaluation
- Implementation
  - Summary and Scope
  - Implementation Plan
- Evaluation
  - Evaluation Method
  - Evaluation Result
- Conclusion

Final Presentation

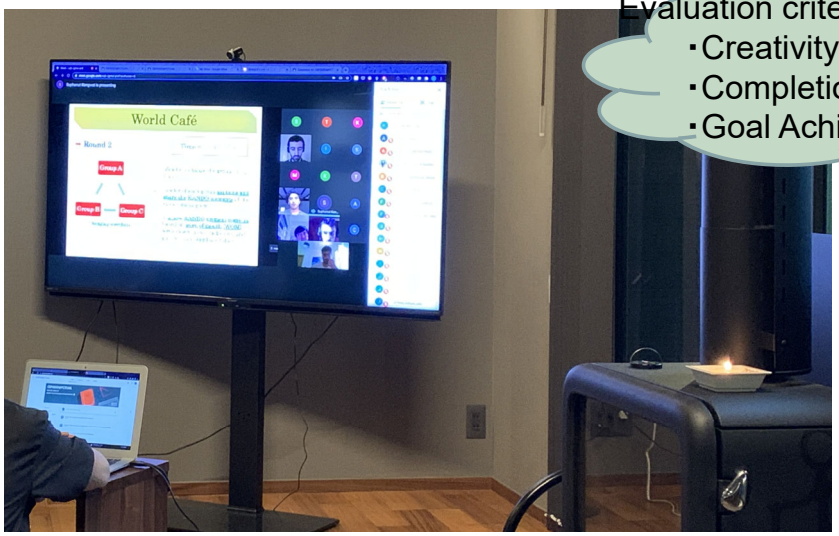


Day 9: Standard of Evaluation for Final Presentation

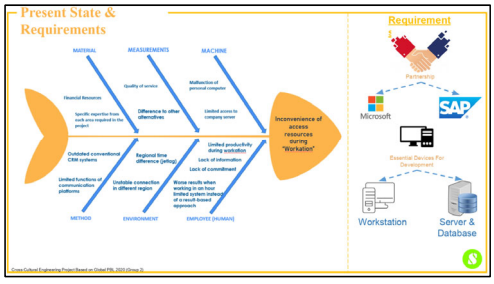
The final presentation are evaluated with scale from 1 to 5, based on the following evaluation standards.
The actual evaluation will be conducted in 2 levels consecutively; (a) Evaluation by students among groups, (b) Evaluation by the professors and TAs.

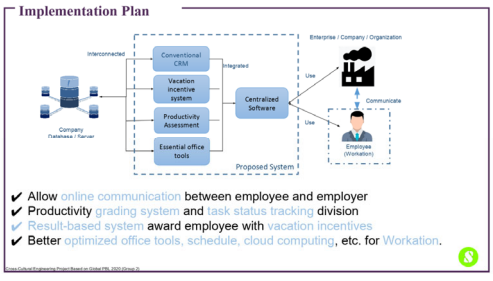
(1) Creativity: Did the group obtain creative results?
(2) Usefulness: Did the group obtain results that hit the point of the theme, which is useful in general or global problem solving?
(3) Completion: Did the group obtain results with higher degree of completion through analysis, plan, and evaluation?
(4) Feasibility: Did the group set a goal with an adequate level of feasibility?
(5) Achievement to the Goal: Did the group achieve the goal that was set at the beginning?

Day 9: Final Presentation



Evaluation criteria for Project Deliverables:
- Creativity
- Usefulness
- Completion
- Goal-appropriate
- Goal Achievement





Post-process: Outcomes Assessment

gPBL Outcomes Assessment Sheet (for student) YYYYMMDD:

Department:

Group Number : Bachelor/Master Grade: Student Number: Name:

Personal Outcomes Assessment by yourself and peer students (High:5,4,3,2,1:Low)

	Learning Outcomes	Competency	Self Assessment Pre gPBL	Self Assessment Post gPBL	Peer #1 Student Name	Peer #2 Student Name	Peer #3 Student Name	Peer #4 Student Name	Peer #5 Student Name	Peer #6 Student Name	Average of Peer
Personal Outcomes	Work in multi-culture and interdisciplinary team	Communicate and teamwork in multi-culture and interdisciplinary team									-
	Engineering Design	Design system, service and process which satisfy needs and constrains									
	"System Thinking" - Solve interdisciplinary problem by understanding engineering process	1.Understand engineering process and apply it to solve interdisciplinary problem. 2. Recognize and analyze problem, and design and evaluate solution.									
	"Engineering Methodology" - Apply engineering methodologies to solve interdisciplinary problem.	1.Understand engineering methodologies and apply them to model, and determine system.									
	Leadership (especially for graduate student)	Can find out about a situation and can exert the leadership in quick response to the status of group									

Evaluation on Learning Outcomes is made after the Global PBL was completed.

Team Outcomes Self Assessment (High:5,4,3,2,1:Low)

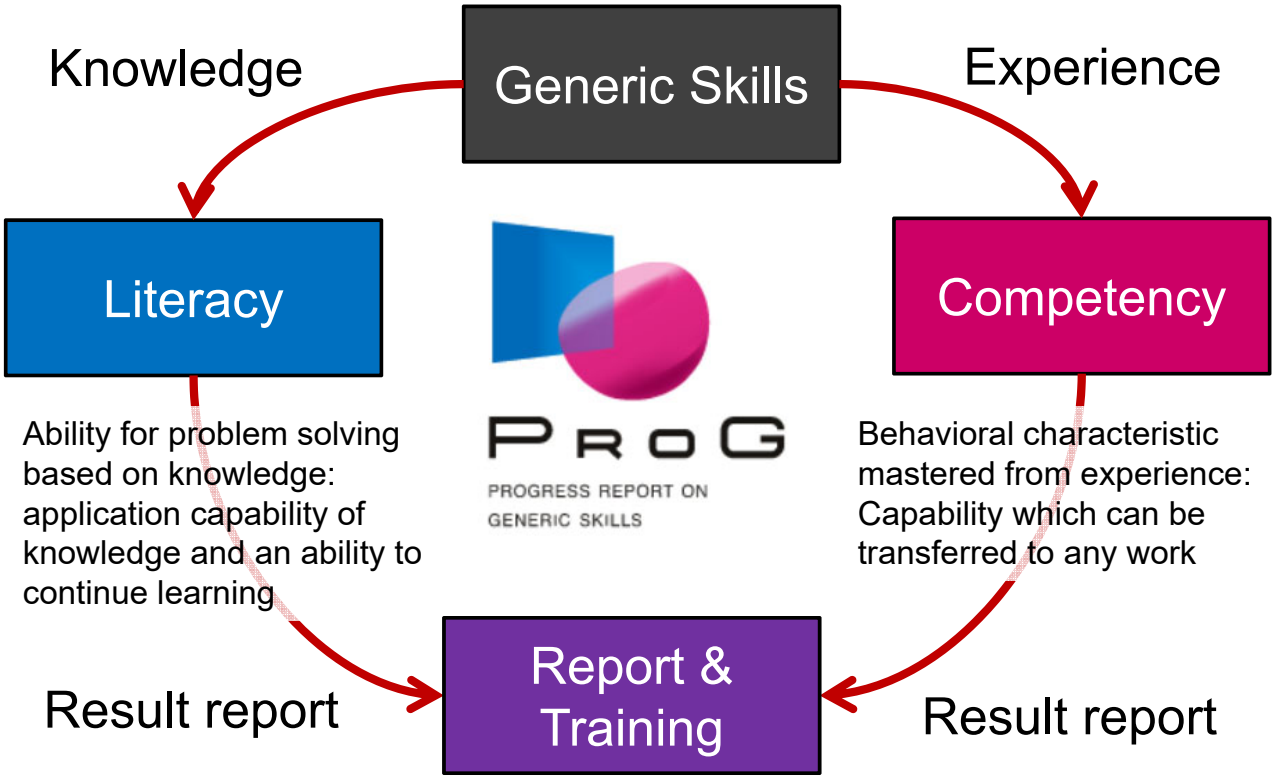
	Project Outcomes	Description	Self Assessment Post gPBL
Team Outcomes	Creativity	Propose creative system and service	
	Usefulness	Propose useful system and service	
	Completion	Obtain results with higher degree of completion through analysis, plan, and evaluation	
	Feasibility	Technically, socially and economically feasible	
	Achievement	Achieve goal	
	Written and Oral Presentation	Written presentation	
		Oral presentation	

What did you obtain from the gPBL

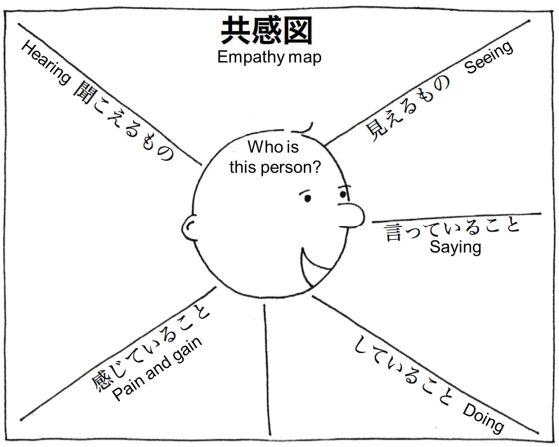
Comments and Suggestions on the gPBL

The actual evaluation will be conducted in three levels consecutively;
(a) Evaluation by students within the same group,
(b) Evaluation by students among groups, (c) Evaluation by the professors and TAs.

Post-process: Progress report on generic skills



Let’s exercise



Let’s exercise on CEP at web based PBL

Idea area