Introduction for Cross-cultural Engineering Project (CEP) based on Global PBL

Shibaura Institute of Technology (SIT)
FCT, UNIVERSIDADE NOVA DE LISBOA (FCT/UNL)
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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 and Members

Time:
July 9, 2019 – July 17, 2019
Venue:
FCT/UNL in Lisbon, Portugal

Team members*:
40 students
20 students from SIT, 4 students from KMUTT & other Univ.
12 students from FCT/UNL, 4 students from Spain

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.

*Both sides should be composed of graduate school student, 4th year undergraduate students.

Role of TA & Professor

Role of Teaching Assistants (TA):
3 students are from SIT,
1 or 2 student from FCT/UNL.
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.

Oh my God experience

In Global PBL, 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

Practical Process

Keywords
- Requirements/Needs from
- Environment, society, and Market

Definition: Main/Initial factor of the Problem
- The theme will cross
- Various areas/branches

Collaboration of graduate students from various backgrounds and disciplines

Proposal of
- Integrated Solution of the Models
- The solutions could be formed by constituting various science and technology each other, which has been obtained through environment and social activities

Innovation

Education*
Day 1:

**Icebreaking & Team-Forming**

**Icebreaking:**
Self introductions and team-forming through simple game for communication and questionnaire

**Team Formation:**
Total of 6 teams of 5 or 6 students. Each team is made up of 2 SIT students, 2 FCT/UNL students, or 1 or 2 students from other universities.

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**Day 1:**

**Project’s theme**

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, Unexamined Patent, Others (student’s idea)

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**Day 1:**

**Definition of the problem**

Using learned methods and thinking process in Systems Engineering courses as a systematic communication tools, such as BrainStomring, KJ method, Mind map etc.
Day 2:
Requirement Analysis and Definition

- Definition (Redefined) of the Problem
- Proposal of Integrated Solutions of the Problem

Day 2:
Attractive Quality

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

Kano model has classified the product quality into five categories.

Day 3:
Definition of needs & technologies on QFD
Deployment of function (solution) on QFD

Day 3:
Inventive solution using Contradiction Matrix

Day 4:
Goal setting and others planning

- Goal setting
- Assessment planning
- Budget planning
- Schedule planning for activities

- Preparation of design review (DR) materials

Using learned methods and thinking processes as a systematic communication tools, such as SWOT, Logograph Tree, Matrix
Day 4: Design Review (DR)

Keywords
- Requirements
- Analysis
- Design
- Implementation
- Evaluation
- Presentation

Definition (Revision):
The problem will involve multiple perspectives.

Proposal of an Integrated Solution

The solution would be to develop a system that integrates technology with each other, which has been obtained through environmental and social activities.

Day 4:

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. Is 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 4:

A3 Material for DR

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

Day 4:

Resetting goal and reschedule for the activities via DR’s comments.

- Re-requirement analysis
- Goal setting
- Assessment planning
- Schedule planning for activities

Day 5 - Day 8:

Scheduled Actions

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

Collaboration of graduate students from various backgrounds/disciplines

Requirement analysis & Development of a system to extend current skills

The solution would be for which has been
**Day 6:**
Team activity: Improvisation education produced by OMG Professor with TA

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**Day 9:**
Final Presentation

- **Keywords:** Improvisation, Needs, Environment, Society, Analysis
- **Definition:** The solution will be formed by combining various science and technology such as AI, IoT, which has been obtained through environment and social actions.

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**A3 Material**

- **Purpose:** The purpose of this material is to summarize the improvement of the process and to share it with others.
- **Method:** The A3 material is divided into three parts: Problem, Analysis, and Solution.

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**Day 9:**
Standard of Evaluation for Final Presentation

The final presentation will be evaluated on the following standards:

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?

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**Day 9:**
Final Presentation

**Evaluation Criteria for Project Deliverables:**
- Creativity
- Usefulness
- Goal-appropriate
Day 9:
Outcomes Assessment

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

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.

Day 9:
Progress Report On Generic skills (PROG)

Knowledge
Generic Skills
Experience

- Literacy
- Competency

Ability for problem solving based on knowledge: application capability of knowledge and an ability to continue learning

Behavorial characteristic mastered from experience: Capability which can be transferred to any work

Result report
Report & Training
Result report

Day 10:
Departure to Japan or Thailand

Let's exercise on Global PBL at FCT/UNL in Lisbon.

Idea area

共感図
Empathy map

Who is this person?

Last year GPBL

OMG experience

Group 2:
Group 4:

https://www.youtube.com/watch?v=KvA2e56G7G4

https://www.youtube.com/watch?v=t62a933pa1I

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