

# Cross-Cultural Student Seminar for Communication Training in Multidisciplinary Field of Study: Application to Biomedical Engineering

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## ABSTRACT

Misunderstanding occurs often in multidisciplinary field, because each field has its own background of thinking. Communication training is important for students, who have a potential to develop multidisciplinary field. Because each nation has its own cultural background, communication in an international seminar is not easy, either. A cross-cultural student seminar has been designed for communication training in multidisciplinary field of study. The seminar has been applied to biomedical engineering field. Students from variety of back ground have joined in the seminar. In the presentation training, each student proposes his own project, which relates to the biomedical engineering field. After the other students review the presentation, one project has been selected and its contents have been discussed in the group of students. Equations and figures are effective tools for communication in the field of science. The seminar works well for communication training in the multidisciplinary field of study of biomedical engineering.

**Keywords:** Multidisciplinary Field, Biomedical Engineering, Cross Culture and Communication.

## 1. INTRODUCTION

Common base is necessary for communication. Similar experiences develop the common-base. When common rules are defined, the communication becomes easier. That is the reason why you learn language, mathematics, SI unit, etc.

Biomedical engineering field is interdisciplinary [1-7]. In the field, communication is important between engineering and medicine. Both experimental procedures and technical terms are different between these fields. Both figures and formula, on the other hand, are convenient tool for communication in the interdisciplinary fields.

In an international project, you may experience misunderstandings, which depend not only on the language, but also on the cultural background. In a research project in interdisciplinary field, you also experience misunderstandings, which depend on the methodological background [7]. In this point of view, both international projects and interdisciplinary projects have common problem. The problem supplies a good

chance for communication training.

Explanation of a project on biomedical engineering is not so difficult, while biomedical engineering is interdisciplinary. Every project in biomedical engineering relates to human-being, so that people can image the contents related to himself.

In the present study, a cross-cultural student seminar has been designed for communication training in the multidisciplinary field of study.

## 2. METHODS

### Presentation training in international student seminar on biomedical engineering

- 1) Each student makes presentation on his research plan related to biomedical engineering (Fig. 1). The slides are available for the presentation.
- 2) Foreign students of different special field of study review the presentation, whether it is easy to understand.
- 3) After the exercise in the seminar room, students visit some cultural site, and take training for introduction of their culture.

### Visiting departments

- 1) International student seminar on "Introduction to biomedical engineering" (Fig. 2).
- 2) Seminar on "How do you create interdisciplinary field between engineering and biology" (Fig. 3).
- 3) Experimental project for students in biomedical engineering: transportation through membrane, which is clinically applied to the dialyzer (Fig. 4).
- 4) Visiting laboratory of biomedical engineering (Fig. 5).

### Exercise on "Find a project to be solved in biomedical engineering field"

- 1) Find an interdisciplinary topic, which biomedical engineer may be interested in.
- 2) Make presentations on the topic for a competition.
- 3) After the competition, vote a topic for discussion.
- 4) Group discussion on the topic (Fig. 6).



**Fig. 1:** Presentation training in international student seminar on biomedical engineering.



**Fig. 4:** Experimental project for students in biomedical engineering.



**Fig. 2:** International student seminar on "Introduction to biomedical engineering".



**Fig. 5:** Visiting laboratory of biomedical engineering.



**Fig. 3:** Seminar on "How do you create interdisciplinary field between engineering and biology".



**Fig. 6:** Exercise on "Find a project to be solved in biomedical engineering field".

### 3. RESULTS

#### **Presentation training in international student seminar on biomedical engineering**

The seminar was held five times in Japan from 2002 to 2010. Approximately fifteen students from Thailand and fifteen students from Japan joined in the seminar. It was the first experience for Japanese students to make a presentation in English. The evaluation to their presentation was not very good, but the presentation of every Japanese student was understandable. The figures in the slides might help for Thai students to understand the outline. The presentation gave Japanese students good opportunity to express themselves to the person of the first meeting. After the seminar, some students took Thai students to sight seeing in Japanese traditional places. Some students kept in touch with the participants by e-mail.

#### **Visiting departments**

The group of students visited some departments of biomedical engineering abroad four times, since 2005: USA and Thailand. It was not easy for the students to understand the lecture in English. The experimental project for students is familiar to Japanese students, because they have experience to see the medical instruments. Visiting laboratory was interesting for the students. Students made exchange of ideas looking the experimental system.

#### **Exercise on “Find a project to be solved in biomedical engineering field”**

The seminar was held in 2011 in Thailand. Five Japanese students and five Thai students joined in the seminar. The topic, which every student found, was as follows:

- 1) Freeze technique for erythrocyte bank.
- 2) Serum for boosting cell regeneration.
- 3) Simulator on human nerve system.
- 4) Intelligent walking stick for blind-deaf person (both sight and audio assist).
- 5) Telemedicine network for rural health care (counseling).
- 6) Controller for emotion of a subject with medicine.
- 7) Can we distinguish mechanical properties between cancer cells and normal cells?
- 8) Collaboration between engineering and medicine to make a rescue system for a sever accident.
- 9) Temperature regulator to control viscosity of blood.
- 10) Tissue engineering for reconstruction of cartilage.

“Intelligent walking stick for blind-deaf person” was selected for discussion. Students found several different back-ground between countries through the discussion: traffic situation in the city, etc.

### 4. DISCUSSION

Recently, we have many tools for communication. Although e-mail system is very convenient for communication, communication on face to face has more information than digital signals: movement, atmosphere, and many expressions. Letters can reveal feeling by hand writing. Telephone can give tone of the voice. Shaking hands tells temperature, and force of muscle. Paying attention to the background is important for

communication training. You may surprise if some language systems do not have a term, which means “Reflection”. The culture might be positive.

At the beginning, students tend to pay attention to the language itself. After the seminar, students found: “it is easy to find the rule, but difficult to understand the background”. The common background of “Biomedical Engineering” helps them find a way of thinking.

The shocking experience of cross cultural seminar makes students to notice “It is important to understand the background of thinking to learn multidisciplinary field of study”. One of the students advanced the experience to the internship abroad.

### 5. CONCLUSION

A cross-cultural student seminar has been designed and applied to the biomedical engineering field. The seminar works well for communication training in the multidisciplinary field of study of biomedical engineering.

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