Joint International Conference: 8th International Conference on ESP in Asia and 3rd International Symposium on Innovative Teaching and Research in ESP

Incorporating Experiences of Training Japanese Industry Research Scientists and Engineers in EAP and ESP Courses at Engineering Graduate Schools in Japan

The University of Electro-Communications
August 19, 2016

Yoshimasa A. Ono
Senior Visiting Scientist
RIKEN Center for Emergent Matter Science
yoshimasa.a.ono@riken.jp

Outline

Part 1 Training Japanese Industry Research Scientists and Engineers to Write Proper Technical Papers in English
(Practices at Hitachi Research Laboratories)

Part 2 Application of the Methods to Creation of New Technical Writing and Presentation Courses at Engineering Graduate Schools
(Practices at School of Engineering, the Univ. of Tokyo and other engineering grad. schools)

Part 1

(1) Steps for Writing Technical Papers in English
(2) Characteristic Attitudes and Problems
(3) Four Rules for Writing Improvements
- Translate from Japanese to Japanese First, and Then Translate It into English
- State Conclusions First
- Follow the English Writing Style of Introduction, Body, and Conclusion
- Write English Following the "Leggett's Tree" Format

(4) Results: Number of Publications and PhDs
(5) Conclusions of Part 1

Steps for Writing Technical Papers in English for Industry Research Engineers

(1) Patent Application
(2) Internal Technical Reports Writing (in Japanese)
(3) Translation of Technical Reports into English
(4) Check and Correction (Rewriting) (by me): Contents and Sentence/Paragraph Structures
(5) Native-Speaker Check by English-Speaking Scientists or Engineers
(6) Final Revision of the manuscript
(7) Acquisition of Publication Permission
(8) Submission to Journals/International Conferences

Characteristic Attitudes of Japanese Engineers towards Writing in English

(1) They have only learned English composition: they can translate Japanese short sentences into English using Japanese-English dictionaries.
=>**They can manage sentence-level grammar and syntax.**
(2) They are much less skillful in managing the design of technical papers on structural level beyond sentences.
=>**They fail to connect sentences into effective patterns of arrangement. Sentences are not logically sequenced and paragraphs lack clear unity and coherence.**

⇨ **Many technical papers written by Japanese engineers fail to communicate!**

Problems of Technical English Written by Japanese Engineers

(1) Meaning of sentences the authors intended can be usually guessed by a Japanese reviewer (i.e., me). To be understood by native speaker engineers, a large portion of the original manuscript have to be revised.
(2) Technical terms in their own fields are properly used, but most sentences have flavor of Japanese way of thinking with full of incorrect use of articles and prepositions.
(3) Although most sentences are grammatically correct, it is difficult to grasp the meaning of series of sentences.

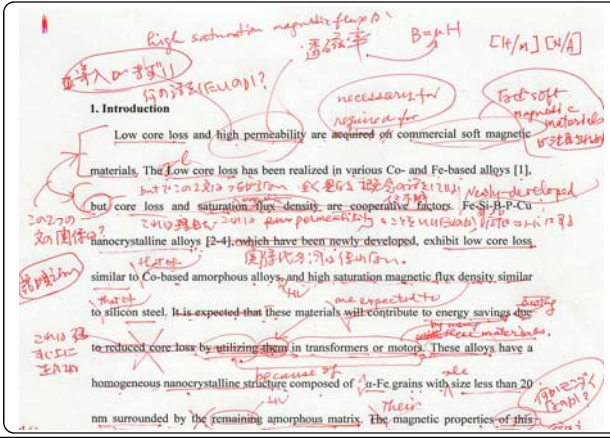
Checkpoints of Translated Manuscripts

(1) Clarification of contents of the manuscript:
Verbal explanation in Japanese by the author to me

(2) Clarification of sentences and contents:
"What is the subject of this sentence?"
"What do you really want to say in this sentence?"
"What do you mean by this choice of word?"

(3) Other important items to be checked:
Articles ("a" or "the" or no article)
Countable or uncountable nouns (singular or plural)
Prepositions

Correction Example


1. Introduction

Low core loss and high permeability are acquired on commercial soft magnetic materials. The low core loss has been realized in various Co- and Fe-based alloys [1], but core loss and saturation flux density are cooperative factors. Fe-Si-B-P-Cu nanocrystalline alloys [2-4], which have been newly developed, exhibit low core loss similar to Co-based amorphous alloys, and high saturation magnetic flux density similar to silicon steel. It is expected that these materials will contribute to energy savings due to reduced core loss by utilizing them in transformers or motors. These alloys have a homogeneous nanocrystalline structure composed of α-Fe grains with size less than 20 nm surrounded by the remaining amorphous matrix. The magnetic properties of this

Four Rules for Writing Improvement for Japanese Industry Engineers

1. **Translate from Japanese to Japanese first**, and then translate it into English. **Do not translate directly from Japanese to English**.
2. **State your conclusions first**, then state causes or give explanations.
3. **Follow the English writing style of introduction, body, and conclusion**. Do not follow the Japanese writing style of "ki-sho-ten-ketsu."
4. Write sentences in the English-way-of-thinking style: Write English following **the Leggett's tree formats**.

Example of Japanese to Japanese Translation

Word-for-word direct translation

When there is oil on the floor,
it can cause you to fall down.

Problems:
- Do not use "There is (are). . . ." sentence structure in technical writing.
- Since "it" means "oil," "it" is redundant.

Solution (Japanese to Japanese Translation):
- Choose the most important word "oil" as the subject, and write an SVO-format sentence.

⇨ Oil on the floor can cause you to fall down.

Japanese to Japanese Translation First; Then Translation into English

First Step:
Necessary items of the translated Japanese

1. Every sentence must have **a subject (S)**, **a corresponding verb (V), and an object (O)**: it must follow the English writing style.
2. Only one result or one cause in one sentence.
3. Sentences must be placed in the English order of reasoning.

Second Step: Translate each sentence into English.

Japanese Structure vs. English Structure

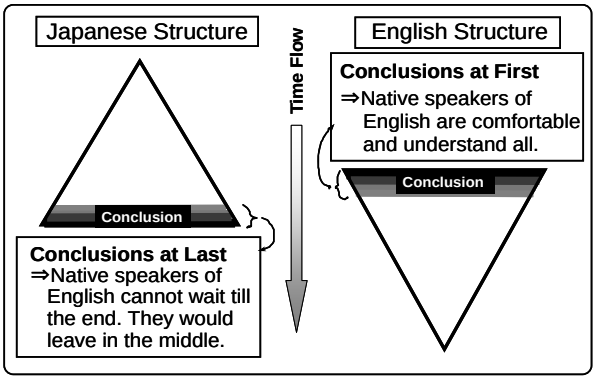
Japanese	English
Reasons first, then conclusions	Conclusions first, then reasons

Example: How to turn down an invitation

[E] : "Thank you, but no thank you, because I am already engaged.

[J] : "I have to prepare my report for tomorrow, and in addition I have a slight cold. So I am sorry to say that I cannot join you this evening.

Japanese Structure（△）vs. English Structure（▽）



外山滋比古（著）、「英語の発想・日本語の発想」（日本放送出版協会、1992）

English Sentences in Three Steps vs. Japanese Sentences in Four Steps

English sentences are written in **three steps**:

Introduction -- Topic Sentence
Body -- Supporting Sentences
Conclusion -- Concluding Sentence

On the other hand, Japanese sentences are written in **four steps**: **ki** (introduction), **sho** (development), **ten** (turn: jump to something else), and **ketsu** (conclusion).

To native speakers of English:
- ten (turn) puzzles them
- ketsu (conclusion) is different from that of English.

Example of "ki-sho-ten-ketsu" Verse

大阪、本町　糸屋の娘　（起（ki））
In a thread shop on the main street in Osaka, are living two pretty girls. - Introduction

姉は十八、妹は十六　（承（sho））
The older one is eighteen and the younger is sixteen. - Development

諸国大名は弓矢で殺す　（転（ten））
Japanese feudal lords in various regions are killing people with bows and arrows. - Turn

糸屋の娘は目で殺す　（結（ketsu））
Each girl is killing men with an alluring wink. - Conclusion

Rewritten Verse in the English Style

In English, conclusion must be stated first.

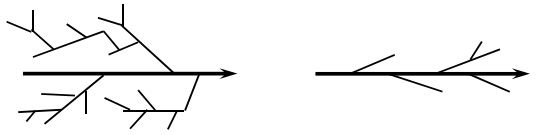
In a thread shop on the main street in Osaka, are living two pretty girls **with beautiful eyes**. - Introduction

The older one is eighteen and the younger is sixteen. - Development

Men in the neighborhood **have lost their heart to girls' charming dark eyes.** - Conclusion

Write in the English Way of Thinking (Follow the Leggett's Tree Format)

Leggett's Trees of Sentence Structure and Flow



Japanese-English Style

You have to read till the last to get the meaning.

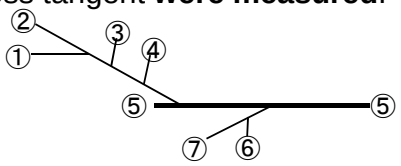
English Style

You can get the meaning as is written.

Ref.: A. J. Leggett, "Notes on the writing of scientific English for Japanese physicists," Butsuri (Journal of the Physical Society of Japan) **21** (1966) 790-805.

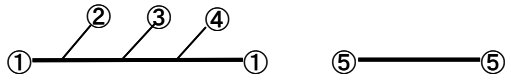
Experiment Description in the Japanese-English Format

① In this connection, ② at room temperature ③ at the measuring frequency 10 kHz, ④ with Au-electrodes evaporated on the whole area of the crystal surfaces, ⑤ **the dielectric constant** and, ⑥ at the same time, ⑦ the loss tangent **were measured**.



Experiment Description in the English Format

① **Measurements were made on the dielectric constant of the crystal** ② at 10 kHz, ③ with electrodes evaporated on the whole area of both surfaces, ④ at room temperature. ⑤ The loss tangent was simultaneously measured.



Results: No. of Publications and PhDs

(1) More than 100 papers revised and rewritten by me have been published in the following society journals:
IEEE: Electron Devices, Power Electronics, Power Engineering, Solid State Circuits,
American Physical Society, American Chemical Society, Materials Research Society, Electrochemical Society, Society for Information Displays,
American Society of Mechanical Engineers,
Japan Society of Applied Physics, and others.
(2) Twenty research engineers received Ph.D. degrees in science and engineering based on their research results while working at Hitachi Research Laboratories.

Conclusions of Part 1

Four rules for writing improvements are very effective for Japanese industry engineers:

1. Use two-step translation (Japanese to Japanese to English).
2. State your conclusions first, and then state causes or give explanations.
3. Follow the English writing style of introduction, body, and conclusion.
4. Write sentences in an English-way-of-thinking style, i.e., write sentences in the Leggett's tree English style.

Part 2

1. Introduction of New Graduate Course on Technical Writing and Presentation (at Engineering School of University of Tokyo)
2. A: Lecture: English for Engineers and Scientist
   2.1 How to write technical papers in English and How to make technical presentations in English
   2.2 Evaluation Method
3. B: Presentation Practice
   3.1 Class Operations
   3.2 Evaluation Method
4. Results of Introduction of New Course
5. Conclusions of Part 2

Introduction of New Graduate Course: English for Engineers and Scientists A, B at School of Engineering, Univ. Tokyo

- Started in the 2003 spring semester (one day/week with100 minutes for 15 weeks)
- Offered to engineering graduate students (Spring semester and fall semester)

A: Lectures on technical writing and technical presentation in English (8 weeks)
B: Practice session on technical presentation in English (7 weeks)

Challenges for Creating the Technical English Course in School of Engineering of the University of Tokyo (2003)

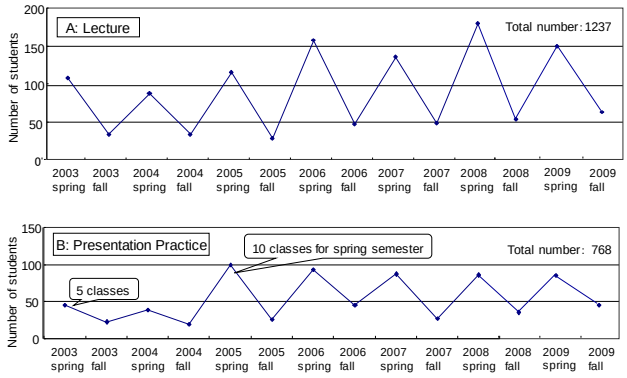
- Very few (practically none) teachers for technical writing and presentations in English with science and engineering background
- Scattered abilities in English proficiency among 900 engineering graduate students (per year)
- Insufficient lecture and practice time for the introduction of a new English course
- Difficulty in assessing students' accomplishments

Design and Practice of the Course

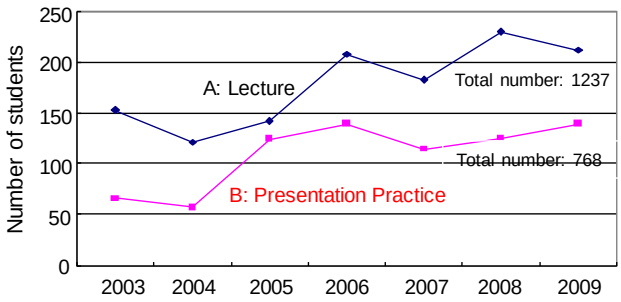
- Development of a new **lecture-practice scheme**: Lectures in a large lecture room (200 students) and 5 or 10 concurrent practice sessions in small meeting rooms (10 students each)
- Lecture by a Japanese teacher with experience in teaching technical English, and presentation practice sessions by English native-speaker instructors with teaching experience in industry.
- Development of a presentation practice scheme: two practice presentations, instructors' intensive comments and guidance.
- Lecture in the fifth period (4:30 pm – 6:10 pm) on Wednesdays.
- For students' assessment, technical-paper evaluation with corrections for the lecture part, and presentation evaluation report scores for practice sessions.

  Student evaluations for the course through questionnaires.

Number of Credited Students



Number of Credited Students



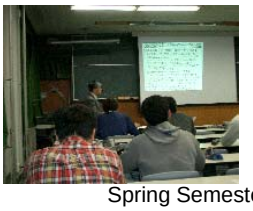
A: Lecture Contents of Technical Writing in English (four weeks)

1. Definition of "Technical Writing in English"
2. Problems in "Japanese English" and Their Remedial Measures
3. Writing Technical Papers in English Way of Thinking: Follow the Leggett's Tree Style
4. Flow Chart of Technical Writing in English
5. Structure of Technical Papers and How to Write Each Section
6. Techniques for Writing Clear and Accurate Technical Papers
7. Grammatical Tips in Writing in English
8. Check Lists and References

A: Lecture Contents of Technical Presentation in English (three weeks)

1. Key Points of Technical Presentation in English
2. Preparation for Technical Presentation in English
3. Slides: How to Make and Use Them
4. Good English Structures for Technical Presentation
5. Easy-to-Understand Speaking Techniques
6. Manuscript and Notes: To Read or Not to Read Them
7. Manners and Techniques for Technical Presentation
8. Set Phrases for Technical Presentation in English
9. Questions and Answers (Q&A) Sessions
10. Poster Sessions
11. Focusing Points and Appraisal Points in Presentation Practice Sessions:

Lectures



Spring Semester for 200 students

Fall Semester for 50 students

Typical (Bad) Behavior of Japanese Engineering Students in Making Presentations

1. Try to explain what they have achieved by pointing at figures and tables on the slides.
2. Read explanations and statements written in full sentences on the slides.
3. Look at the screen most of the time without eye contact with the audience.
4. Memorize their talks and try to recite them.

Proper Behavior in Technical Presentation in English

1. Use eye contact
2. Develop a positive attitude and relaxed style
3. Don't read your paper
4. Don't memorize your paper
5. Don't look at the screen while you are talking
6. Be enthusiastic about the topic
7. Don't hide behind a tangled web of technical terms

(from David F. Beer, "Writing and Speaking in the Technology Professions," IEEE Press, 1992)

Manners and Techniques for Technical Presentation in English

1. Thank the chair after introduction
2. Do not say "I am Dr. So-and-So just introduced"
3. Include only one main idea per sentence
4. Speak in shorter sentences
   - no more than 20 words per sentence
5. Look at the audience once in ten seconds, if you have to read your notes (Eye contact is very important)
6. Prepare for the Q & A Session, because it is considered more important than the presentation.

Useful Tips for Japanese Students in Answering Difficult Questions

Do not say "Pardon?" or "Could you repeat your question?" Instead you should say the following:

- I couldn't hear you. Would you **speak a little louder**, please?
- Would you **speak up**, please? I can't hear you.
- I'm sorry. I did not understand your question. Could you kindly **re-phrase** it slowly?
- I'm sorry. I did not understand what you meant. Can you **simplify** your question please?
- Do you mind **paraphrasing** your question?

Term Paper

Page 1

Title of the paper

Name, Affiliation, Address

Abstract
(Write only what you've done.

Page 2

Introduction

・Write the following items: Background (50%), Purpose (20%), Materials and Method (10%), Results (10%), and Conclusion (10%)

Paper Format

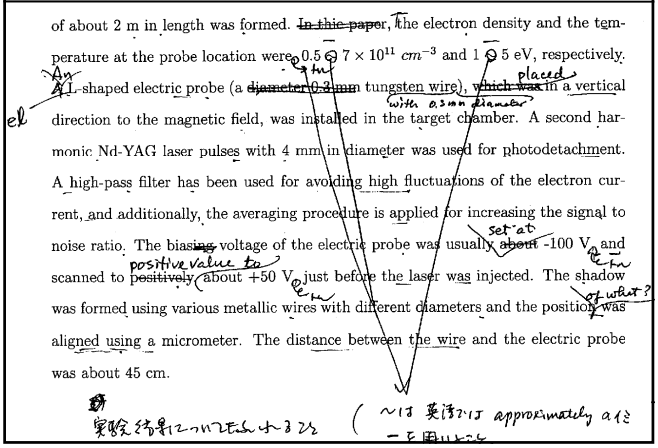
(1) 2 page report
(in A4 size paper)
Character size: 12 point
Single column
Double space

(2) Contents:
Title, Name, Student ID No., Affiliation, Address, Abstract, Introduction

Grade Evaluation Points

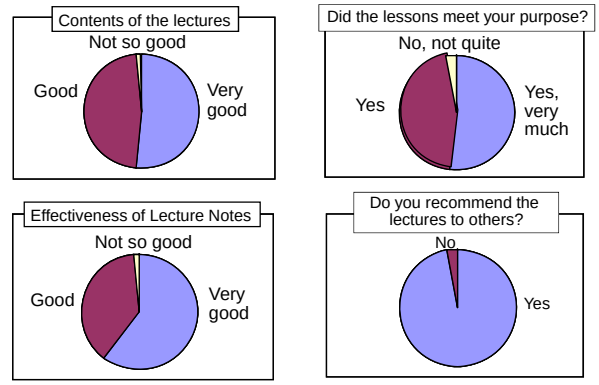
・English-writing style for technical papers
・Paper-format style

Sample of Corrected Papers



of about 2 m in length was formed. ~~In this paper~~, the electron density and the temperature at the probe location were 0.5 ~ 7 × 10^{11} cm^{-3} and 1 ~ 5 eV, respectively. An L-shaped electric probe (a ~~diameter 0.3 mm~~ tungsten wire), ~~which was~~ in a vertical direction to the magnetic field, was installed in the target chamber. A second harmonic Nd-YAG laser pulses with 4 mm in diameter was used for photodetachment. A high-pass filter has been used for avoiding high fluctuations of the electron current, and additionally, the averaging procedure is applied for increasing the signal to noise ratio. The biasing voltage of the electric probe was usually about -100 V, and scanned to ~~positively~~ about +50 V just before the laser was injected. The shadow was formed using various metallic wires with different diameters and the position was aligned using a micrometer. The distance between the wire and the electric probe was about 45 cm.

Student Evaluation Results on Lectures (Spring, 2007)



2007 Spring Semester (Attendance: 87, Answers: 78, collection rate: 89%)

Feedback from the Students on Lectures（Spring, 2007）

- **Lecture notes are well organized with full of important information.** They should be useful when I prepare presentation materials and perform presentations.
- **Lectures were very useful**. I was looking for this kind of lecture for international communications since joining the doctor's course in the graduate school.
- I found the lecture materials for presentation very useful when I prepared for international conferences.
- It was a full of contents and was very useful.
- I was overwhelmed by the professor's enthusiasm.

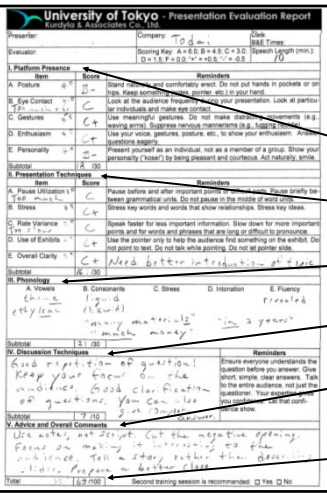
B: Practice Sessions on Technical Presentation (seven weeks)

(1) Presentation (30 min. / person)
- Ten-minute presentation on the same topic TWICE
- Comments from the audience (fellow students) on good points and bad points of the presentation
- Native instructor's guidance on presentation performance, gestures, pronunciation, and slides
- Instructors write down these points in the presentation evaluation report and give a copy to the presenter.

(2) Grade evaluation
- Based on the scores in the presentation evaluation report
- Improvement points and average points

Presentation Practice Sessions (10 students/class)

Sample of Presentation Evaluation Report

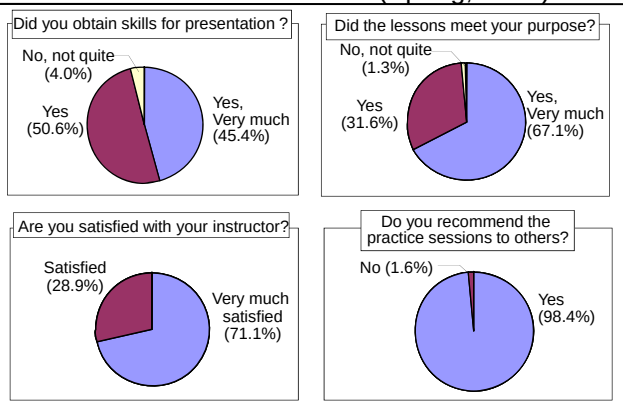

University of Tokyo - Presentation Evaluation Report
Kuriyama & Associates Co., Ltd.

Evaluation Points:
- Platform Presence (30 points)
- Presentation Techniques (30 points)
- Phonology (30 points)
- Discussion Techniques (10 points)
- Advice and Overall Comments
- Total score (xx/100)

Native Speaker Instructors' Advice (66 students): Platform Presence & Presentation Techniques

	Platform presence & Presentation techniques	First Presentation	Second Presentation
1	Talk to audience. Do not talk to screen. Focus on the audience, not to screen.	39	20
2	Tell a "story." Don't simply describe slides. Try to tell story rather than simply describe slides.	29	10
3	Clarify the purpose of work. Need better introduction (opening).	16	2
4	Need to point more effectively. No need to point at words or video.	14	13
5	Don't read slides. Try not to read so much.	13	11
6	Stop talking while pointing.	17	10
7	Make eye contact.	7	5
8	Good clarification	6	9
9	Nice pointing	1	3
10	Nice opening	0	15
11	Good storytelling	0	2

Student Evaluation Results on Practice Sessions (Spring, 2007)



2007 Spring Semester (Attendance: 87, Answers: 78, collection rate: 89%)

Feedback from the Students on Practice Sessions (Spring, 2007)

- Thank you very much. I learned a lot in the practice session. **Making the presentation twice helped me a lot** because my presentation improved very much.
- **Making the second presentations after corrections is very effective in improving presentation skills.**
- It was a very good practice to make real presentations.
- My instructor corrected my bad English pronunciations and postures during my presentation. They helped me a lot.
- **Listening to other presentations and participating in Q&A are effective** in learning how to make good presentations.
- This is the first time for me to have my presentation checked Therefore, it was very efficient. I'll recommend it to others.

Conclusions of Part 2

1. The combined course of lecture and practice sessions is found to be very effective in training students to make better technical presentations in English.
2. Many students have gained confidence in making technical presentations in English on their own research topics.
3. About 20% of incoming graduate students took lectures for credits and about 10% took presentation practice sessions for credits.
4. DVD videos were made of seven lectures and one set of practice sessions for students' self-study purpose.

Extension to Other Universities

1. 15-week course with 90 min / lecture (2 credits)
   Meiji University, School of Science and Technology
2. 4-day intensive course (2 credits)
   (8 lectures for writing and 7 lectures for presentation)
   Sophia University, School of Science and Technology
   Osaka City University, Graduate School of Engineering
3. 2-day intensive course (1 credit)
   (4 lectures for writing and 4 lectures for presentation)
   Univ. Tsukuba, Grad. School of Pure and Applied Sciences
   Tokyo Inst. of Tech., Interdisciplinary Graduate School of Science and Engineering
   Nagoya Inst. of Tech., Graduate School of Engineering
   Hokkaido Univ., Graduate School of Engineering
   Tohoku Univ., Graduate School of Engineering

References

1. Yoshimasa A. Ono and Kumiko Morimura, "Effective Methods for Teaching Technical Presentation in English to Japanese Engineering Students: Case Study at School of Eng., Univ. Tokyo," 2008 IPCC (2008 Intern'l Conf. of IEEE-PCS), (July, 2008, Montreal, Canada)
2. Yoshimasa A. Ono and Kumiko Morimura, "Developing English Communication Expertise for Engineering Graduate Students in the Global Age", Proceedings of IEEE PCS Japan, Annual Seminar 2008, (IEEE-PCSJ, Tokyo, 2009), pp.21-28 (2009).
3. Yoshimasa A. Ono, "Effective Methods for Training Japanese Industry Research Engineers to Write Proper Technical Papers in English," 2009 IPCC (2009 Intern'l Conf. of IEEE-PCS), (July, 2009, Honolulu, USA)