

Designing the Courses for Technical Communication in English at Tokyo Polytechnic University^{*}

Hiroshi TANABE^{*}

Abstract

Tokyo Polytechnic University started the introduction courses for technical communication in English replacing its two of the regular courses of English VII and English VIII for the second year students. The major aim of the introduction of the courses is to guide students to become able to read and write in English in their specific fields. The syllabi were written according to the idea of notional and functional syllabi to realize the specific goal of the technical reading and writing in English by providing basic vocabulary and structures to fulfill the needs for understanding and production. In this paper the philosophy of the syllabi and the contents are presented as well as the problems that were found after the first semester of the courses in 2014 according to the questionnaire replied by the students who took the course.

Introduction

Tokyo Polytechnic University started the courses for technical communication in English replacing its two of the regular courses of English VII and English VIII for the second year students. The major aim of the introduction of the courses is to guide students to become able to read and write in English in their specific fields. Tokyo Polytechnic University has two faculties and this study is about the faculty of engineering which has five departments such as Department of Media and Image Technology, Department of Life Science and Sustainable Chemistry, Department of Architecture, Department of Applied Computer Science and Department of Electronics and Mechatronics. The courses for Technical Communication in English should be common to all the second year students from all the departments. The teaching contents should be basic for all the students from the different departments.

The syllabi were written according to the idea of notional and functional syllabi to realize the specific goals of the technical reading and writing in English by providing basic vocabulary and structures to fulfill the needs for understanding and production. The presentation about philosophy of the syllabi, procedure, and materials is the main purpose of this paper. In the introduction of the courses, during the preparation stage, there were managerial problems in many aspects. One of the problem was to find qualified lecturers. The second one was to find materials which fulfilled the specific requirements from the five different departments.

^{*} Associate Professor, General Education and Research Center, Tokyo Polytechnic University
Received Sept. 17, 2014

Goals of the courses

The major aim of the introduction of the courses is to guide students to become able to read and write in English in their specific fields as future scientists and technicians.

Conditions for the courses

To prepare the courses the coordinator had to work under the two conditions: the conditions in terms of educational circumstances of the department and the managerial conditions. The departmental conditions under which the coordinator had to work were that the courses for Technical Communication in English should be common to all the second year students from all the departments. The teaching contents should be basic for all the students from the different departments. The managerial condition was mainly about time and human resources. The establishment of the course was decided by the board members of the university and the courses should be prepared in about twelve months and the syllabi in about three or four months. To this decision, the first question arose, which was who were the qualified teachers of the courses. English teaching professionals or specialists in the content fields? To this problem both of the two groups of teachers were chosen. One from the field of applied linguistics and another from special fields in science.

Trial lessons

To write syllabi, the appropriateness of the level and the choice of the materials and the interest of the students had to be tested and trial lessons were given. Two classes on different levels, one was International Communication Literacy for graduates students and another was English Seminar IA for undergraduate students, were chosen and two levels of the materials² "Kougyou Eiken 4 kyu Taisaku" and "Kougyou Eiken 3 kyu Taisaku" were used to assess the appropriate level of the materials and to see the students' attitude toward the materials.

The number of the subjects were small. 2 students in International Communication Literacy and 16 students in English Seminar IA attended two times of the classes for these ESP classes, one for the 4th grade level of the materials and one for the 3rd level of the materials picked up from the textbooks above. The medium of communication in both of the classes was English and no word of Japanese was spoken including the directions given during the classes as was in the ordinary times.

Results of the trial lessons

The graduate students showed absorbed interest in the contents and were very active guessing and answering questions. They frequently asked hints to answer the questions in the materials. After the first class, the students were asked if they would like to continue another trial

lesson and both of them took a very positive attitude toward the offer. They chose the special contents rather than the usual contents. There were differences in the level of the graduate students. One was more than 80% correct answering questions in the materials and another was more than 65% correct and if they would continue studying the contents they both could pass the official Examination for Technical English.

There were slight differences in the results of answering the questions in the materials and the students' attitudes in the undergraduate students in English Seminar IA. About the 1/3 of the students showed the same attitude in the same quality in answering questions, 1/3 of the students tried but could not answer very well, and the rest of the students gave up after about 30 minutes. To raise the attention of the inactivated students hints were given frequently by the lecturer and gradually the situation was improved, which might mean when the inactivated students did have enough knowledge about the contents and vocabulary in the specific field the contents should be supplemented in some ways. They denied the level of the English grammar was too high to understand³.

To conclude, the attitudes of the students seemed depending on the basic knowledge about the contents in the specific fields and their vocabulary. The level of English might matter but the simplicity of the sentences in the materials are the same or higher than the ones used in the regular English classes where the more common contents were taught. For example, the sentences in "Kougyou Eiken 4 kyu Taisaku" and "Kougyou Eiken 3 kyu Taisaku" consisted roughly about from 4 or 5 words to 15 words but in "Manwatching"⁴ which was one example used in the regular English classes consisted of roughly about 15 word to 40 words. In "Kougyou Eiken 3 kyu Taisaku" there were a few readings which consisted of longer sentences but were within 20 words, half as long as the sentences in the textbooks used in regular English classes. In writing the syllabi for the Technical Communication in English, these results were considered to maintain and achieve the goals of the courses, "to guide students to become able to read and write in English in their specific fields."

Philosophy of teaching

Approach

The syllabi were written according to the idea of notional and functional syllabi to realize the specific goal of the technical reading and writing in English by providing basic vocabulary and structures to fulfill the needs for understanding and production. The vocabulary, grammar and the structure of the sentences and the mode used had to be taught for the understanding and producing the specific goals of contents required in each specific situations.

Procedure

For example, when a student is in need of reporting the results of an experiment, they

might need to know how to use past tense in the passive voice. For another example of the understanding of a sentence like:

'Aluminum foil would reflect the microwaves.'¹

- A. The meaning of aluminum.
- B. Identifying the specific meaning of a word with many meanings.
e.g. Identifying an appropriate meaning of "reflect" in the context among many meanings.
- C. The use of "the" as the definite article.
- D. The meaning of the plural "s" of "microwaves." In the field of science, the meaning of plural "s" sometimes has more importance than the one used in a general meaning.
- E. The use of an auxiliary verb "would."
- F. The sentence structure of Subject + Auxiliary verb + Transitive verb + Object.
- G. The scientific knowledge about the meanings of the content.
- H. The motivation for understanding the sentence as a future scientist.
- I. As the final goal, mastering the reading process, writing process, and presentation skills, *etc.* as a scientist.

Motivation

Students would be motivated by the experiences of the practical use of English as future engineers or scientists based on the knowledge learned in the basic courses of the required general English courses. They would enjoy the application of the prior knowledge of English to their special fields. They would learn the professionalism through the enjoyment of the understanding the readings in their fields and in the series of repetitive experience of success they would raise self-confidence as international specialists.

To establish the courses, raising many aspects of students' motivation were considered as the most important factors for success by providing:

- A. clear images for goals of
 - 1. specified vocabulary as a learning goal
 - 2. specified grammar and sentence structures
- B. the feeling of achievement by providing readings for scientists
- C. the motivating circles of biological, cognitive, and learned factors of human motivation.⁴ To achieve this, necessary grammar and vocabulary would be provided as pre-reading items. With the series of the successful learning, they would acquire good self-images and confidence.⁵

Mastering the contents and skills

The appropriate level of reading would be provided based on the learned grammar and

vocabulary. Then the contents of the reading would be summarized and presented for discussion. This style and contents of the courses could be more effective when it was linked with the other courses

Syllabus of the course

To fulfill the condition of the commonality, the teaching contents had to be basic and cover all the requirements from each specific field.

Syllabi of Technical Communication in English

English VII (Technical Communication in English I) ⁶

Course	English VII (Technical Communication in English I)		
Unit	1	Required	
Grade	2	1st Semester	
Course contents	Students will learn basic contents and skills for technical communication by learning sentences with grammar and vocabulary used in technical English.		
Goals	Understanding and using nouns, plural forms, compound words, numbers and figures		
	Expressing weights and measures, units, time, formulas, <i>etc.</i>		
	Understanding articles in specialized fields, summarizing and presenting the contents in English		
syllabus	1) nouns, numbers and figures		
	2) single and plural forms of words frequently used in science		
	3) compound words、 counting numbers		
	4) counting objects、 reading articles in specialized fields		
	5) cardinal numbers, ordinal numbers, multiplicative numbers		
	6) cardinal numbers		
	7) ordinal numbers, multiplicative numbers		
	8) basic sentence structures、 sentences with be-verbs		
	9) verbs		
	10) sentences with a subject a verb and an object、 reading articles in specialized fields		
	11) units for weights and measures		
	12) time		

	13) numbers and formulas in mathematics
	14) various kinds of formulas
	15) review and a test
Course requirements	Attend the guidance for the course.
	Prepare dictionaries.
	Check vocabulary before each sessions.
	Review and practice the contents for the complete mastery.
Evaluation	1) tests
	2) reports
	3) contribution to the class
Textbook	Yoji Shirakawa. (2013) <i>Kougyou Eiken 4 kyu Taisaku "Test for Technical English Grade 4"</i> .Japan Society for Teaching Communication.
Notes	Reading articles are appointed by the instructors.

English VIII (Technical Communication in English II) ⁷

Course	English VII (Technical Communication in English II)		
Unit	1	Required	
Grade	2	2nd Semester	
Course contents	In Technical Communication in English II, students will develop basic contents and skills for technical communication learned in Technical Communication in English I by learning sentences with higher level of grammar and vocabulary used in technical English and develop receptive and productive skills as specialists.		
Goals	Learning tense frequently used in the field of science and describing phenomena in specialized fields in English		
	Using appropriate auxiliary verbs in many contexts		
	Understanding the present perfect tense and reading articles on science		
	Describing position, movement, shape, comparison, and standard		
	Reading articles on science and summarize ones in English		
syllabus	1) Describing processes, and results		
	2) Expressions with auxiliary verbs		
	3) Expressions with the present perfect tense		
	4) locations and directions		

	5) movements, states, reading articles on science
	6) shapes and figures
	7) conjunctions
	8) adding information
	9) comparison, order
	10) weights and measures
	11) the passive voice, the subjunctive mood, reading articles on science
	12) expressing purposes, and reasons
	13) subjects and modifiers
	14) conversation about topics on science
	15) review and a test
Course requirements	Attend the guidance for the course.
	Prepare dictionaries.
	Check vocabulary before each sessions.
	Review and practice the contents for the complete mastery.
Evaluation	1) tests
	2) reports
	3) contribution to the class
Textbook	Yoji Shirakawa. (2013) <i>Kougyou Eiken 4 kyu Taisaku "Test for Technical English Grade 4"</i> .Japan Society for Teaching Communication.
Notes	Reading articles are appointed by the instructors.

Evaluation

The teachers should observe the reaction of the students in terms of their motivating factors and achievement to find appropriate ways of evaluation in the first few years. The syllabi presented here depended on the notional functional approach and learning contents but the mechanisms of learning had not been defined and depended on each teacher. The evaluation should depend on the teaching method as well as the learning contents. Thus, the evaluation should be made not only on the knowledge they acquired but also their performance in reports, presentation, *etc.*

Managerial Problems

In the introduction of the courses, during the preparation stage, English teachers were worried about the teaching and the level of the contents. We worried about teaching the technical contents and the vocabulary, which were not directly related to our specialties. As every teacher knew a teacher should provide additional information about the topics he or she deals with in the classroom to activate the students' knowledge of the world. If the teacher do not know the contents well, it might be very difficult to maintain the interests of the students in every second of the lecture. Another problem might have been that the English teachers had been teaching the basic knowledge and skills of English in the required English courses and we wondered if we could build up the contents based on their knowledge of grammar and vocabulary. To those problems, I had to research the teaching contents of Technical Communication in English, and when I did it, I noticed that the vocabulary was not too special in the level of the 'Test for Technical English Grade 4' as well as the contents. During the trial session, two of the part-time lecturers who were going to teach the class evaluated appropriateness of the level and the contents by checking the textbook, and all of them reached the agreement that the level and the contents fit the second year students of the Tokyo Polytechnic university and as was shown, the students who had trial lessons could show the positive attitude toward the lessons.

Results & Discussion

A questionnaire with the items were given to 31 students in one class and 33 in another class. Those two groups of students took the classes almost in the same condition.

1. Do you think the course for Technical Communication in English is necessary for you?

	Class 1	Class2	Total	(%)
I don't need it at all.	1	0	1	1.6
I don't need it.	0	1	1	1.6
I don't know.	11	13	24	37.5
I need it.	19	15	34	53.1
I strongly need it.	1	3	4	6.3

More than 50% of the students answered they thought they need the course for technical communication in English, which means the lest of the students might not have understood the importance of the English skills in the field of science or they thought their skills were not enough for the levels in the course.

2. The level of the class.

	Class 1	Class2	Total	(%)
--	---------	--------	-------	-----

Too difficult	4	1	5	7.5
difficult	11	11	22	32.8
appropriate	18	18	36	53.7
easy	0	4	4	6.0
too easy	0	0	0	0.0

To the question asked in the previous section, the answers in the questionnaire item No.2 would give the hint to guess the reason why about 40% of the students did not think the course for technical communication in English was necessary for them. The level of the class was too high for about the half of the students. About 50 % of the students answered the level of the class was appropriate but about 45% of them answered the class was too difficult.

3. The level of the textbooks

	Class 1	Class2	Total	(%)
Too difficult	3	3	6	9.4
difficult	11	11	22	34.4
appropriate	18	15	33	51.6
easy	0	3	3	4.7
too easy	0	0	0	0.0

The level of the textbooks were too high for about 44% of the students. That might explain the part of the problem that they did not think the course was necessary for them.

4. The level of the contents of the topics on the scientific field

	Class 1	Class2	Total	(%)
Too difficult	2	1	3	6.4
difficult	11	3	14	29.8
appropriate	16	10	26	55.3
easy	0	4	4	8.5
too easy	0	0	0	0.0

Then, how about the level of the contents of the topics on the scientific field? The attendants were from different majors in the scientific field. The contents were from variety of resources in the general science. About 36% of the students answered the level of the contents were too high for them. This might have come from the inadequate comprehension of science in general and the specific subjects of science taught in the lectures in their own departments or taught in the other departments. This might

suggest the not only English but also the scientific contents dealt with in the class had the basic problem to solve to make the course fit the needs in those levels of the students.

5. The contents and the topics on the scientific field

	Class 1	Class2	Total	(%)
not interesting at all	1	1	2	3.4
not interesting	5	3	8	15.1
so so	15	18	33	62.3
interesting	7	10	17	32.1
very interesting	2	1	3	5.3

The item No.5 was asked to examine the motivational level of the students by asking their preference for the course contents and the topics on the field of science. As they were science major students the negative answer from 18.5% of the students seemed to have a problem. Only 37.4% answered they thought the contents were interesting and 62.3% of the students did not feel excitement in the contents and topics. This might raise at least three questions: Were the contents from general science were not enough for them to be interested in? ; Were the levels of the contents and topics too difficult for about a half of the students who answered so for the previous questionnaire items?; Were their English skills good enough to understand the contents? ; Or the mixture of some or all of the problems stated here?

6. What do you think the problems to understand the course contents are?

	Class 1	Class2	Total	(%) Total/64
words	17	22	39	60.9
idioms	15	18	33	51.6
grammar	18	21	39	60.9
structuring words to make sentences	14	19	33	51.6
basic sentence structures	12	14	26	40.6
Japanese to understand the textbook	3	8	11	17.2
knowledge on the specific field of science	12	24	36	56.3

To clarify the problem of their interest in the course, their apprehension of the necessary skills of English to understand the course contents were examined. More than 50% of the students answered they had problems in words, idioms, grammar, structuring words to make sentences and knowledge on the specific field of science. This might explain the previous problem, why they were not interested in the course. They felt they did not have enough knowledge of English and the contents from the field of science.

7. The progress of the lecture

	Class 1	Class2	Total	(%)
Too fast	1	0	1	2.00
fast	9	8	17	27.9
appropriate	17	23	40	67.2
slow	1	2	3	4.9
too slow	0	0	0	0.0

The item No.7 was asked to separate the factor of the teaching technique of the lecturer from the teaching contents and levels of the contents. About 28% of the students answered the progress of the lecture was too fast. Though this answer should be reflected in each class but as more than 70% answered it appropriate the comprehension of the contents and topics had a lot more problems than the way how the lecturer taught.

8. The general impression of the class

	Class 1	Class2	Total	(%)
very good	5	5	10	19.6
good	10	16	26	51.0
bad	1	2	3	5.9
too bad	1	1	2	3.9
so so	1	9	10	19.6

About 70 % of the students answered the general impression of the class was good. About 20% of them thought it was soso. That means the class was not too bad for the students and the lecturer had the chance to continue the class and improve the level of the instruction.

9. Comments about the item No.8

All the students who wrote the comments for this item wrote about the control of the progress and the review of the previous contents. The only one negative answer was given with a comment that said the student could not understand the class at all. He chose the most negative evaluation in each item. That might support the idea comprehension of the class contents and topics was the most important variables for their motivation and learning.

10. Would you like to challenge the "Test of Technical Communication in English?"

	Class 1	Class2	Total	(%) Total/64
Grade 4	14	10	24	37.5

Grade 3	6	9	15	23.4
Grade pre-2	1	4	5	7.8
Grade 2	0	1	1	1.6
Grade 1	0	1	1	1.6

This question was asked to examine the motivational level of the students who took the first semester of the class. Many of the students thought they would try the tests in every level.

Conclusion

In the introduction of the ESP courses at Tokyo Polytechnic University, the evaluation of the contents of the Technical Communication was made by referring to *Kougyou Eiken 4 kyu Taisaku "Test for Technical English Grade 4"* and trial lessons were given according to the contents of the textbook. The syllabi were written according to the idea of the notional-functional syllabus with motivational factors considered. That might hopefully be the scaffold for the development of the courses. After those preparations the course started in 2014. The students had good impression about the class but there were problems : How their descriptive knowledge about English improved ?; How the knowledge on their field of science could be enhanced? In the future study, the effects of the improvement of the results of the interrelation of those problems should be analyzed.

References

- [1] Ellis, R. (1985). *Understanding Second Language Acquisition*. Oxford University Press.
- [2] Franken, R. E. (1988) *Human Motivation*. Brooks/Cole Publishing Company.
- [3] Morris, D. (1977). *People Watching*. Random House
- [4] Richards, J.C. & Rodgers, T. S. (1986). *Approaches and Methods in Language Teaching: a description and analysis*. Cambridge University Press.
- [5] Shirakawa, Y (2013) *Kougyou Eiken 4 kyu Taisaku "Test for Technical English Grade 4"*. Japan Society for Teaching Communication.

Notes

1. This sentence is from "Kougyou Eiken 4 kyu Taisaku."
2. "Kougyou Eiken 4 kyu Taisaku" and "Kougyou Eiken 3 kyu Taisaku" were used to assess the appropriate level of the materials and to see the students' attitude toward the materials.
3. The length of the sentences presented in both of "Kougyou Eiken 4 kyu Taisaku" and "Kougyou Eiken 3 kyu Taisaku" were not so long, and basically simple compared with that of the regular English classes.
4. Franken (1988) presented "Components Approach" which explained human motivation consisted

of three major components of "biological", "cognitive" and "learned".

5. Ellis (1982) presented the importance of the successful self-image quoting Baily(1983).

6. The basic components and the order of the syllabi were from Yoji Shirakawa. (2013) *Kougyou Eiken 4 kyu Taisaku "Test for Technical English Grade 4"*.Japan Society for Teaching Communication.

7. The basic components and the order of the syllabi were from Yoji Shirakawa. (2013) *Kougyou Eiken 4 kyu Taisaku "Test for Technical English Grade 4"*.Japan Society for Teaching Communication.