

Developing a Successful English for Specific Purposes (ESP) Course for Japanese University Non-English Majors

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Abstract

In most Japanese universities non-English majors are required to study English in their first and second years. A class called Science English is also required for third year environmental resource majors in the author's mid-sized public university. The author developed a course and related material for the class; however, since the author's background is not science, self-study was conducted. During piloting of the material, learners' needs were discovered in surveys among students. Useful, topic-based science readings that are both accessible and interesting are included in the course as are memorable vocabulary exercises, pertinent role-plays, and designs that are related to the topic are presented after a creation phase. After the course material was available, a five-point Likert scale questionnaire containing ten items was used to gather 26 students' opinions of the course was completed; also obtained were students' reasons for answering as they did on the questionnaire. Results found that 50% of students strongly agreed that vocabulary keywords, comprehension, and cloze activities were useful and 46% strongly agreed that the topic readings were interesting and useful, while 42% agreed that the design projects were useful and challenging. Also offered in this paper are all Likert scale results.

Keywords: Content-based learning, English for specific purposes, environmental science English, English for non-English majors

1. Introduction

During undergraduate study, non-English majors in most Japanese universities are required to pass general English courses in their first two years of study. This requirement was established by many universities in 2016 after the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT) suggested a goal to improve English proficiency evaluation in high schools and universities. Students majoring in fields other

than English mainly study required English for two years, largely in four-skill, conversation-based classes aimed at increasing students' general communicative competency on a speaking and listening level. Even so, many students still leave university with under-developed English skills in specific areas, perhaps due to inadequate formulation of the ESP course. To counteract the problem of lower skills in English, well designed, more specific ESP programs must be created so that during the four years of university, students can focus on elevating ESP competency that can be used for their future employment and livelihoods for a long time to come.

In an article pinpointing the relationship between elements of the ESP teaching process, Nasr (2015) acknowledges the predominant relationship between teachers and subject matter. It is sometimes the case where an ESP student is more knowledgeable about a particular subject matter than a facilitator. It goes without saying that this may lead to problems managing successful ESP classes in several areas: generating viable blocks of useful information, teaching to the students' potentials, and the integration of scaffolding to balance the subject matter, the instructor, and the ESP learner; these three elements are crucial in any ESP course. Nasr used a questionnaire in his study to collect teachers' background data relating to teaching in a science curriculum at Jazan university, Saudi Arabia. Difficulties in teacher-student communication and problems with the texts were examined through research tools that were found to be basically split between teacher-based (teacher responses to questionnaire, class observations) and student-based (responses to a questionnaire). Results show that teachers found difficulty in teaching due to complex materials; some students were not satisfied with the performances of some ESP teachers due to students' strong interest in and drive to learn English. It was reported that a teacher was often tripped up through various parts of the subject text in one case and was unfamiliar with certain scientific information presented. Comprehending different branches of ESP, such as English for science, health, and medicine was obviously difficult for the teacher.

Gorska-Perecka (2013) found that the ESP teaching situation is a complicated process, engendered from a conceptualization that begins with planning, designing, and implementing an ESP course for ample opportunities to learn in a needs-based teaching-learning conception. The idea of TLA/KAL (teacher language awareness) and (knowledge about language) that allows teachers to adopt effective facilitation practices of teaching language is extremely important in ESP (Gorska-Perecka, 2013).

Many university-departmental majors have their own specific language, technology, and career needs in both English and other fields as put forth by Moritoshi (2008). In a study, Moritoshi examined methods where English teachers can positively motivate non-English major students. In the study several problems were found that could contribute to low learner motivation. Those were: perception of the lessons being incredibly difficult; perceived negative impressions of the native English teacher; and perceptions that the material was irrelevant. Specific background education may not be necessary to teach an introductory course in general English effectively, but some extra technical or scientific knowledge, self-study in a given field by the teacher, or other connected research may be necessary for the teacher to be able to create and facilitate a successful course with an ESP background.

To further examine research into ESP, the author created material for a course called Science English for Environmental Resource majors in the third year of study at a mid-size public Japanese university in Southwest Japan. This material was intended to rework the existing course into a more effective English course under an ESP paradigm. The course materials were tested during one year of Science English classes. Post-course, a 10-item questionnaire gathered information such as: usefulness of the topics, pertinence of keyword activities, interest of topic readings for students' knowledge, usefulness of discussion and role-plays, the design and explanation section, and usefulness of vocabulary writing as well as long writing exercises.

In section two a general background of ESP can be found. Section three explains the course materials created for the class. Section four examines the survey conducted in the Science English course. Section five offers the survey results, while section six discusses the research. Section seven contains concluding remarks.

2. ESP Background

ESP has been used to teach English for agriculture, business, science, and technology since the 1960s. Characterized by Hutchinson and Waters (1987) as an approach rather than a methodology, ESP is based on the thought that job seekers learn ESP for definitive skill building or to attain specific career objectives; as such, teaching ESP does not entail any set method. Dudley-Evans and St. John (1998) divide the aspects of ESP teaching into two streams, one being *absolute characteristics*, in which tasks are created to meet special needs of the learner make use of the underpinning of the discipline. These are

also centered around the language of the discipline and its skills, discourse, and genres. The other stream is *variable characteristics*, where tasks are designed for, or related to, specific jobs. These tasks may require a unique method or approach of teaching other than standard English, are likely to be designed for and used by adult learners, and are created mainly for intermediate level and above learners who have some basic English knowledge.

The author determined that the elements of a successful ESP related Science English would include training in both specialized and general skills. Many Science English students must make slides and give presentations in English in their futures; in the PhD program students must write and publish articles in English for submission to international journals. Therefore, training in both top-down skills such as building top-down communicative competency skills needed in presentations and bottom-up skills, such as grammar and pronunciation, is necessary yet often overlooked. Of incredible importance too is vocabulary because in science, specific word uses, such as those referring to the erosion, alternative energy, or nuclear energy, for example are quite normal and often found. A workable ESP program in science should include other specialized aspects such as concentrated listening for understanding key ideas, writing to put forth one's own thinking, and forming answers to unique questions through critical thinking. Perceiving and forming scientific words by using prefixes and suffixes that are often found in academic science vocabulary are other useful aspects of grammatical training.

To adequately meet the needs of science students, and those studying Science English, ESP facilitators should take certain steps when formulating ESP Science English programs; these can be separated into three categories: 1) pre-program activities, 2) in-program activities, and 3) post-program activities (Dudley-Evans & St. John, 1998).

In pre-program activities, which are conceived by the institution and/or facilitator before ESP courses begin, student-need assessments should be considered and conducted. This allows program facilitators to understand the needs of the science students fully. This phase includes detailing other information including other required courses and the English background that supports these courses. In the next step of pre-program activities, course design is considered. In this phase, results of any pre-program survey data as well as results of the student-needs analysis are examined. Specific elements must be contemplated here. Those are: 1) Course intensity; 2) Assessment of students' abilities in

the field; and 3) Program length. Remaining factors (Dudley-Evans & St. John, 1998) that should be considered are sizes and meeting time of classes, although these factors may already be pre-set by the university or institution. Pre-program data from questionnaires can and should be incorporated into useful activities that help create a positive classroom atmosphere.

In-program activities entail carrying out all the elements of the course as set in the pre-program phase. Students should be actively involved during the program, an aspect that largely depends on teacher engagement. ESP teachers in science may come from varying backgrounds, but they should have at least some experience studying or teaching ESP in a variety of science subjects, such as biology or chemistry. Abundant time should be given to allow the students to undergo real situations during the course. In addition, students should have their progress checked and assessed throughout. This can be achieved through quizzes, reading & listening comprehension assessments, role-play activities, and discussions.

The post-program stage requires that a critical evaluation of the course be undertaken; a survey where the students are interviewed after program completion to check what the students felt was effective, what they learned, and how they think it may help them in their lives may work well here. Other activities completed post-program consist of on-the-job evaluations when students start working (Dudley-Evans & St. John, 1998), and internships in which students can obtain a first-hand look at the field, even though English is not always used in science careers in Japan.

3. Course Textbook

The author's university requires that third year Environmental Resource majors also study a special course called Science English in addition to general English courses. Science is not the author's background, so to create adequate materials, a large amount of self-study was conducted, and students' needs were discussed with students themselves and educational colleagues. The students are knowledgeable of science topics in Japanese, but their English skills sometimes lack. For this reason, the author focused on topics familiar to students that include recycling, alternative energy, and pollution. Similar material and course methodology was created by the author and used in an English course during the years 2003 to 2013 among majors of technology at a different university; this material became a base for the newer material. The author saw an increase in motivation and a

higher interest level from the previous students, so the author modified the material and methodology for use in this Science English course. When designing the material for Science English, which later became a course textbook, the author formulated the material from the viewpoint of a science class of non-English majors containing some students who may be interested in English, while others may not be. Upon creating this material with an ESP slant, several important questions arose: 1) What kind of science related topics, learned through English, would be both interesting and beneficial to Science English students? 2) How are students able to practice the four skills of English while focusing on scientific material? 3) What are the best ways in which new vocabulary be most effectively internalized? 4) How can students maintain an interest in the material and yet practice presenting their own ideas, opinions, and suggestions?

The material first contains a keyword activity which asks students to understand vocabulary related to the topic that they may know and to relate the meanings with partners. This is followed by a topic reading passage which is then followed by comprehension questions and then by a vocabulary cloze activity, containing the same keywords as in the introductory activity. After this, students listen to a mock radio show with a host and an interviewee who discuss important matters related to the topic; students here fill out a mind-maps with words gleaned from the listening. In the next part, students can take part in certain other activities such as role-plays, discussions, and agree-disagree activities that require students communicate with each other using the topic content as background. Next, the students undertake a design and explanation activity in which they design an element, process, or item related to the topic, and draw their designs in the textbook after brainstorming and practicing presentation elements. They next write an explanation in English in their own words. After this, students present in small groups or in front of the entire class in English. Finally, partners assess and comment on students' designs. The next activity contains a keyword sentence writing activity where students write sentences using the keywords from the unit. The final activity in each unit contains a paragraph writing, where students relate their thoughts or opinions regarding the topic they have just studied.

4. Study Methodology and Materials

The material was formulated into a textbook and used in class for almost one year, for piloting and examining the new material. Revisions are continually made during discus-

sions with other professors and after a questionnaire which was administered to students recently after using the new material for approximately ten months. Many students in the Environmental Resource department enter graduate school where they must make slides and sometimes conduct presentations in English. PhD students must write two papers in English and have them published in international journals in addition to presenting in English. Due to these facts, the author felt that perhaps the students would see the material as beneficial for their futures, and therefore, the aim of this study was to determine how impactful the textbook is to vocabulary learning and longer writing as related to the course content.

The study was conducted in the Science English class that contained 26 Environmental Resource majors in a mid-size public university in Southwestern Japan during the period of November 5-12, 2021, where the author collected the textbooks that contained vocabulary, keyword sentences, and long writing exercises by the students for the purpose of checking and scoring these items. Before collecting textbooks, on November 5th, the students were given a ten-item, five-point Likert questionnaire on their feelings regarding some aspects of the textbook. The questionnaire items were: 1) The textbook in its entirety was useful; 2) The illustrations are pertinent; 3) The vocabulary keyword activities are useful; 4) The topic readings were interesting and useful; 5) The listening and mind maps were important and useful; 6) The discussion and role-play activities are important and useful; 7) The 'design it' project point and brainstorming sections are useful; 8) The 'design it' design and explanation sections are useful; 9) The keyword sentence writing section helped me internalize vocabulary; 10) The topic writing section helped me write for fluency. Answers were recorded using a 5-point scale thusly: 5) Strongly agree; 4) Agree, 3) Neither agree nor disagree; 2) Disagree; 1) Strongly disagree.

5. Results

The next section offers results of the Likert-style questionnaire and a post-examination of the scoring the items in the textbook.

To begin, the Likert questionnaire was analyzed, using the questions outlined above. Some of the results show that 11 students (42%) of students agreed that the textbook in entirety is useful, while 38% strongly agreed; 13 students (50%) strongly agreed that the vocabulary keywords, comprehension and cloze were helpful; 12 students (46%) strongly agreed that the topic readings were interesting and useful, while 10 (38%)

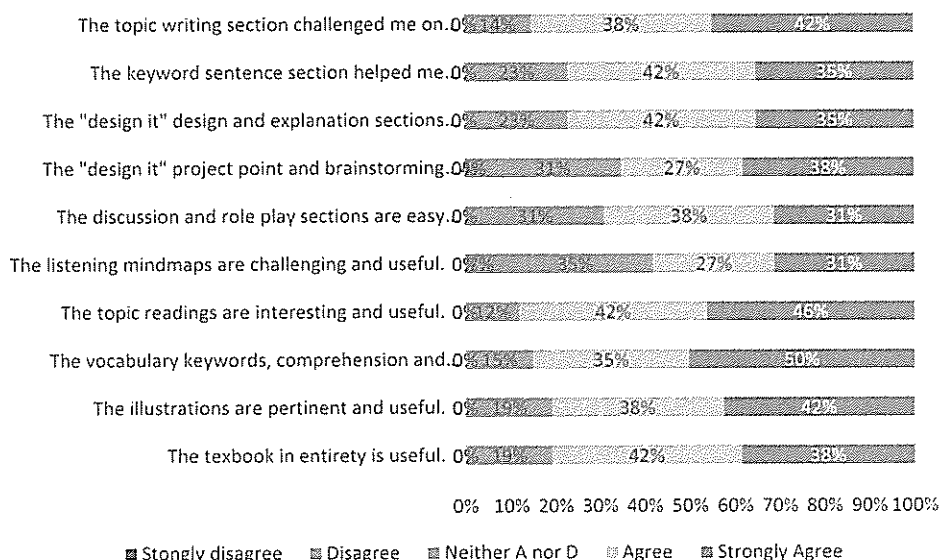
strongly agreed that the ‘design it’ project point and brainstorming sections were useful. Of the total, 11 students respectively (42%) agreed that the ‘design it’ explanation was useful, and the keyword sentence section helped students internalize vocabulary (Table 1).

Table 1. Likert-Style Questionnaire Results

Item	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
The textbook in entirety is useful.	0	0	5	11	10
The illustrations are pertinent and useful.	0	0	5	10	11
The vocabulary keywords, comprehension and cloze were helpful.	0	0	4	9	13
The topic readings are interesting and useful.	0	0	3	11	12
The listening mind maps are challenging and useful.	0	2	9	7	8
The discussion and role play sections are easy and useful.	0	0	8	10	8
The "design it" project point and brainstorming sections were useful.	0	1	8	7	10
The "design it" design and explanation sections were useful	0	0	6	11	9
The keyword sentence section helped me internalize vocabulary.	0	0	6	11	9
The topic writing section challenged me on writing for fluency.	0	0	4	10	11

Source: Compiled from textbook study, 2021.

Figure 1. Likert-Style Questionnaire Responses



Source: Compiled from textbook study data, 2021.

Next, items from the students' textbooks were examined and scored thusly: first, the vocabulary keyword sentence writing activities were scored in a straightforward fashion; that is, the total score of correct answers was derived out of a total score of 50. Following this, the vocabulary cloze activities were also checked and scored out of a total score of 50. Finally, the long writing was also checked and scored out of a total score of 50. In addition, the total number of words in each long writing were counted and tabulated, and the total number of sentences were also counted and tabulated.

Table 2 offers the scores of textbook items in addition to the total number of words and total number of sentences in the students' paragraph writing. The data show that the mean keyword score was around 35, while the standard deviation was 9.4 (useful to show the dispersion of data values), the median was 35, and mode was 40. Median and mode values are useful to show whether the data is around the central line. The students' mean vocabulary score was 41, and the SD was 8.6, while the median was 40 and mode 50. In addition, the mean long writing score was 39, the SD was 9.2, the median was 42 and the mode was also 42. The total number of words in the long writing were 72, while the SD was 36, the median value was 67.5, and the mode was 74. The mean number of sentences written was 5.1, the SD 3, and the median was 5, and the mode was 6.

Table 2. Scores and Totals of Textbook Items

Item Measure	Keyword Score/50	Vocabulary Score/50	Writing Score/50	Total num- ber of words	Total num- ber of sen- tences
Mean	34.8	40.8	39.4	72	5.1
Std. Dev.	9.4	8.6	9.2	36	3
Median	35	40	42	67.5	5
Mode	40	50	42	74	6

Source: Compiled from textbook study data, 2021.

In order to more concretely check the impact of vocabulary and keyword sentence writing scores on longer paragraph writing, the keyword scores, the vocabulary scores, and the writing scores were examined in pairs and a Pearson's R correlation test was performed. Table 3 illustrates the results of the Pearson's R correlation test.

Table 3. Pearson's R Correlation Test Results

Item	Pearson's R Correlation Coefficient
Keyword score/vocabulary score	-0.04
Vocabulary score/writing score	0.08
Keyword score/writing score	0.40

Source: Calculated from textbook study data, 2021.

Here, it can be seen that the keyword score in correlation test with the vocabulary score illustrated that there was a negative correlation at -0.04. In the correlation test of vocabulary score with the writing score, the resulting value was higher, moving towards a positive correlation at .08. The keyword sentence writing score in a correlation test with the long writing score, though not a perfect correlation, was still positive at 0.40.

6. Discussion

In Table 1, containing the total number of students for each Likert scale items, many students answered ranging between *strongly agree* and *agree* for most questions. However, some students answered *neither agree nor disagree* for several items. In "the listening mind maps are challenging and useful," 9 students (35%), which is the highest value, neither agreed nor disagreed. This is telling because through pre-material investigation, the author felt that this method was a good way to help students internalize vocabulary.

Mind maps are activities are not always 100% right or wrong, so it is possible that the students weren't sure what to do. This fact can be solidified by the fact that 2 students (7%) even disagreed with the item. Interestingly, 13 students (50%) strongly agreed that the vocabulary keywords, comprehension, and cloze activities were helpful, and 12 students (46%) strongly agreed that the topic readings were interesting and useful. Of the total, 11 students (42%) strongly agreed that the topic writings challenged them on writing for fluency.

Results show that there was a negative correlation (-0.04) between the vocabulary score and the keyword sentence writing score. This could indicate that the vocabulary study does not help in the longer sentence writing tasks, perhaps because both tasks are one word or short sentence-based, and are not written in longer, more fluid contexts. Conversely, there is a somewhat positive correlation (0.08) between the vocabulary score and the longer writing score, which could indicate the vocabulary cloze task could assist students in writing longer paragraphs in context as they are using the vocabulary words they have just internalized. A more significant correlation can be found in students' keyword sentence writing scores and the longer writing scores (.40). This positive correlation could indicate that the keyword sentence writing task could assist in the students' writing longer paragraphs as they are both longer forms, and the students are again writing using vocabulary words they have just internalized.

It must be stated in writing the longer paragraphs, students were encouraged to use the keywords of the lesson, although the number they must use remains their choice. While some students try to get away with using shorter sentences resulting in shorter paragraphs, they almost always must naturally use at least three to four keywords as the longer writings are reflective of the topic they have just studied, and therefore the vocabulary words are used in the paragraph contextually from memory. The average number of words was 72, and the average number of sentences were 5. While these were not incredibly plentiful, the author still sees them as good, as the students are not English majors and have many other things to do as third years. The mean writing score was 39/50, and could be higher, but as an average, this value is still acceptable.

7. Conclusion

The process of creating the textbook was useful and interesting after the topic units were developed. Spending time and energy to study science elements to create useful, benefi-

cial, and interesting materials leading to a textbook was an educational experience. The students who used the textbook for almost one year gave thoughtful and useful answers in the Likert questionnaire and appeared to gain a lot from the vocabulary study and longer writing. The students felt that the text did offer some good practice that helped them internalize vocabulary and gain speaking, writing, and presentation practice. Many students felt that the design and explanation practice would be beneficial in their futures.

All in all, the students were able to increase their ESP English skill abilities in such activities as vocabulary comprehension, cloze, and keyword sentence writing, paragraph writing, and designing and presenting projects in English. Through increasing these skills, the author found that students' motivation in writing and presenting in English has also increased. Students in any major, therefore, can continue to aim to rise their own potentials.

The author was happy to find that the material helped students in studying and learning English for science, and perhaps students may find use for their newly acquired skills in their futures. Should students require English skill in the future, they have experience from which to draw for writing and presenting their ideas in English. In this way, the author feels that the materials creation, and the development of an ESP course, was successful.

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