

イノベーション高等教育 —日本の理工系大学でのESPプログラムの設立と管理 の試み—

Innovation for Higher Education: Developing and Managing an ESP Program at a Japanese University of Science and Engineering

史 傑 SHI, Jie

● (国立大学法人) 電気通信大学情報理工研究科
Graduate School of Informatics and Engineering, The National University of Electro-Communications (UEC Tokyo)

Keywords

イノベーション, 高等教育, ESP (特定分野の英語), カリキュラムデザイン,
プログラム管理, ジャンルアプローチ

innovation, higher education, ESP, curriculum design, program management, genre approach

ABSTRACT

グローバル化の進展で高等教育はイノベーションを強く求められている。日本の理工系大学では、科学共通語の英語を学生が学術的・専門的に使いこなすようになる効果的な英語教育が早急に求められている。ESPは急速に広まり、高等英語教育に大きな構造変化をもたらした。しかし、ESPカリキュラムの開発・実施は難しいものである。本稿では、高等英語教育におけるイノベーションのケーススタディとして、東京のある大学の理工学部生を対象としたESPプログラムについて報告する。まず、教育に関連したイノベーションの基本概念と理論、およびESPの定義を説明する。次いで、ESPの歴史的発展、教育的アプローチとしてのESP、カリキュラムデザイン、プログラム管理について論じる。特に、ニーズの分析、方法論、教授法、ジャンル選択、評価、教材、教員配置について検討する。学部と大学院一貫のESPプログラムの構築等、今後の展望も述べる。

As globalization continues its advance around the world, the need for innovation in higher education is greater than ever. The traditional practices, ideologies, and infrastructure of higher education are being

challenged by the rapidly evolving global standards. With English being the world's current science lingua franca, Japanese universities of science and engineering are in urgent demand of a more efficient English education that is able to make students functional in English in academic and professional contexts. As the third dimension of an innovative approach to tertiary EFL education that includes EGP (English for General Purposes) and EGAP (English for General Academic Purposes), ESP is spreading rapidly and initializing substantial and structural changes in tertiary EFL English education. However, the development and implementation of innovative and methodologically-sound ESP curricula at Japanese universities will take both time and effort. This paper focuses on an ESP program for undergraduate students majoring in science and engineering at a Japanese university in Tokyo as a case study of innovation in English education at the tertiary level. First, definitions and theories of innovation relating to education and ESP are explained. Then, the development of ESP, ESP as an educational approach, curriculum design, and program management are discussed. Specific aspects of curriculum design, including Needs Analysis, methodology, pedagogy, genres, evaluation, teaching materials, and staffing are examined. The future development of the program, such as the construction of a coherent program that bridges undergraduate and graduate school ESP programs, is also discussed.

1. Globalization, Innovation and Higher Education

1.1 Globalization and Higher Education

Globalization has become a familiar term to most nations nowadays. However, the deepest notions or the gravity of it are still just unveiling as globalization progresses into various aspects of societies. The massiveness of its scale in terms of its transnational influences has never been experienced by humanity before. "Globalization is a process that encompasses the causes, course, and consequences of transnational and transcultural integration of human and non-human activities" (Al-Rodhan & Stoudmann, 2006, p. 5). Globalization, as observed by Morrison, integrates and transforms relentlessly different economies, societies and cultures into a borderless worldwide communications and supply network... "not all of which is pleasant" (Morrison, 2010, p. 32).

Globalization's impact on higher education is tremendously profound along with its influences on economic, political and other aspects of societies that are otherwise structured by the cultures of each country or region. Higher education is expected

to produce more prolific and tangible evidence of successes and achievements in both education and research that societies need to match up with the speed of globalization. Higher educational institutions are pushing for reforms and changes to meet the challenges and expectations from the policymakers, industries, students, etc. (Orange, 2002, p. ix). "Curricular reforms, technological advances, and the globalization of social and intellectual perspectives are propelling innovative approaches and strategic reform in all aspects of the higher educational system" (Hoffman & Spangehl, 2012, p. xiii). The effectiveness of the so-called one-size-fits-all systems developed essentially for mass education is being increasingly questioned and challenged. However, higher education changes are hard to achieve essentially due to the complexity derived from its massive systems, long history and interwoven theoretical frameworks. At multiple levels of the structure of higher education, innovations are needed for provoking new thoughts and practices.

1.2 Innovation and Higher Education

Everett M. Rogers, the world-renowned researcher of innovation theories, defines innovation as "an

idea, practice, or object that is perceived as new by an individual or other unit of adoption” (Rogers, 2003, p. 12). By this definition, the novelty of an idea is not necessarily agreed by other participating parties of a practice (if it is put into practice). If an individual perceives the idea to be novel, it becomes an innovation (Rogers, 2003, p. 12). This is a particularly influential definition in the field of innovation theories and has set the foundation for decades of research and educational practices to come.

Turning new ideas into true innovations in higher education, however, is both challenging and time-consuming. Being criticized to be lagging behind reforms, “Higher education resorted to the relative safety of proposing theoretical models and modes of practice, assessing their effectiveness in the real-world use, and documenting or credentialing these processes as a business partnership models” (Hoffman & Spangehl, 2012, p. 70). Individualized innovations are in need to diversify reforms in multi-faceted organizations as universities. In addition, the success of individual innovations is closely related to the process of how the ideas are communicated and adopted in a social system. Rogers defines the process as “diffusion of innovation” (Rogers, 2003, p. 5), which, in the context of universities, involves faculties of all disciplines, administrators, policymakers, students, etc. to collaborate in order to carry out the innovative ideas for better education.

English language education, particularly ESL (English as a Second Language) and EFL (English for Foreign Language), has developed and diversified significantly in the past two decades along with the movement of globalization. Language theories, learning theories, curriculum design, teaching methodology and pedagogy are among the most active areas of research. As the English language has emerged to be the main international language for academic and scientific communication, it becomes a common concern for researchers and educators. In the context of EFL, researchers and students often find it difficult

to apply the English knowledge that they have learned in English classes to academic works such as research presentations and research papers. The lack of opportunities to use English for real-life communication worsens the situation. Many EFL learners resort to self-study, which tremendously hinders the diffusion of their research outcome globally. Faced with this undesirable situation, English educators have taken decades to co-construct a more direct and effective approach, ESP.

2. ESP: Definition and Developments

2.1 What is ESP?

ESP stands for English for Specific Purposes and is primarily concerned with learning (Hutchinson & Waters, 1987, p. 2). It is defined by Paltridge and Starfield (2013) as “the teaching and learning of English as a second or foreign language where the goal of the learners is to use English in a particular domain” (p. 2).

It differs from English for General Purposes (EGP) which is sometimes described as “English for No Obvious Reason” (Swales, 1988). In ESP, “the purpose for learning the language is paramount and relates directly to what the learner needs to do in their vocation or job (Harding, 2007). In some ways, ESP is built on the premise that language learners have their individualized purposes for learning regardless of what the course or program goals are set to be. Hence, ESP can also be explained to be an approach to create language instruction to meet those specific needs of the learners. It is important to note that ESP is an approach to teaching and not a specific teaching methodology by itself per se simply because it tries to adopt the same underlying methodology and pedagogy of the disciplines of the learners in ESP instruction (Dudley-Evans & John, 1998, p. 4). This approach distinguishes itself from general English education in the fact that it focuses on both learning purposes and vocational needs.

ESP, when focused on even more specific disciplines and purposes, can be divided into many narrower or more specific areas, e.g. EST (English for Science and

Technology), EAP (English for Academic Purposes), EMP (English for Medical Purposes), etc. Though the acronyms and approaches to course design may be different, the fundamental principles and ideology of education are the same (Master & Brinton, 1998, p. vii). Research in the various types of ESP areas around the world, fortunately, is communicated rather effectively and provides theoretical and systematic frameworks and platforms for classroom-based instruction or pedagogy (Belcher, Johns, & Paltridge, 2011, p. 2; Deutch, 2009, p. 47).

2.2 The roles of ESP practitioners and the challenges of teaching ESP

ESP practitioners definitely face a lot of challenges and play multiple roles at their jobs. They are no longer in the comfortable zones of conventional EFL teaching. Harding summarizes that the ESP practitioners have “five key roles” (Swales, 1988):

- Teacher or language consultant
- Course designer and materials provider
- Researcher-not just gathering material, but also understanding the nature of the material of the ESP specialism
- Collaborator-working with subject teachers and subject teaching
- Evaluator-constantly evaluating the materials and the course design, as well as setting assessment tests and achievement tests.

These five roles are more complex than the conventional ones of the EFL programs that focuses on EGP and EAP. The academic background of EFL teachers tends to be in social sciences or humanities, e.g. language education and linguistics. However, teachers of ESP programs, as explained above, must conscientiously conduct research on the needs of students, fields of research, professors and administrators and develop curricula and syllabi to meet those needs. To design courses that incorporate the content areas of students’ majors and disciplines is even more challenging. Science and engineering

subjects and research are both diverse and specialized. Requiring ESP teachers to develop suitable teaching materials makes it even harder for the teachers, which is one of the factors that contribute to the lack of participation from many EFL teachers. In most cases of ESP practitioners having little or no background of the disciplines of the students, the ESP practitioners have to maintain a high level of motivation and learn on their own or team up with the faculty members from the disciplines of the students. Both choices demand the teachers to devote themselves to learning across disciplines and dealing with unfamiliar subject content of specific courses. Parkinson (2013) and Orr (2002, p. 2) both note that ESP practitioners must work outside of their own specialized disciplines and become “multi-functional”, exploring unfamiliar language varieties such as scientific English, and learning about various disciplinary cultures. Moreover, the ESP practitioners need to draw references or insights from the different fields within language research and education and integrate them into their teaching and research.

3. ESP as Innovation: A case study of an EST program

ESP is truly a good illustration for diffusion of innovation in higher education in Japan. Historically, Japanese universities have long-established academic systems beliefs in education that form the so-called “high walls” in Japanese. To climb over such walls, the researchers and teachers alike much work jointly and patiently in their endeavor to make innovations happen.

ESP is an area that has been misunderstood by the general English language educators in Japan. As Noguchi states, many people assume that ESP is only for science and technology, ESP is more difficult than EGP, ESP only teaches technical terms, to name a few (Terauchi, Yamauchi, Noguchi, & Sasajima, 2010, p. 5). With more research on ESP being published in Japan, the specific problems that are unique to Japanese learners can be better addressed (Anthony,

2010). Hence, ESP in Japanese universities has come a long way till now. Currently, there are many universities in Japan that offer ESP programs. The following universities offer well-established EST programs: Waseda University (Faculty of Letters, Arts and Sciences), Tokai University, University of Tokyo, Shibaura Institute of Technology, and University of Electro-Communications (UEC Tokyo) among others.

In this paper, the ESP program of UEC Tokyo (University of Electro-Communications), a national university in Japan, is reported as a case study. This program named “the Undergraduate Technical English” is currently being managed by the author of this paper, who is also the primary curriculum developer of the two main courses of the program, i.e. “Basic Technical English (BTE)” and “Intermediate Technical English (ITE)”. The “Technical English” program is currently one of the biggest cross-disciplinary ESP programs at Japanese universities.

The new undergraduate ESP program of UEC Tokyo was first implemented in 2012. Due to the limitation of words, this paper only presents the data of ITE of the Fall semester of 2012. An overview of ITE 2012 is as follows:

Table 1
General Information of ITE of 2012

| | |
|---|---|
| Course type | Compulsory course of the Practicum Category |
| Academic Year | 3 rd year of undergraduate studies |
| Course titles and semester | ITE: Fall Semester |
| Number of classes per week and number weeks per semester | 1 class (90 min) per week 15-16 weeks per semester |
| Departments of students | All 4 departments of science and engineering of UEC Tokyo (http://www.uec.ac.jp/eng/) |
| Total number of students | 682 |
| Total number of classes | 24 |
| Average number of students per class | 25-30 |
| Management | Undergraduate Technical English Management Committee (Headed by SHI, Jie) |

3.1 Needs Analysis

In order to create the curriculum of the undergraduate Technical English program, a full-faculty needs survey designed by the author of this paper was conducted through the management committee, i.e. the Undergraduate Technical English Management Committee in August, 2012. The survey aimed to investigate field-dependent needs for the English language, the EST genres, and the academic skills as perceived by the science and engineering faculty members.

Below is the summary of the top ranked answers to the selected questions on the survey:

- 1 **The most problematic aspects of English for Japanese students in your department or in UEC:**
 - a listening comprehension
 - b logic and reasoning
 - c reading
 - d socializing with foreigners
- 2 **The types of research activities involving English students are expected/required to do in research labs during the 4th year of study:**
 - a Reading papers/articles in journals of the relevant research fields

- b Summarizing papers/articles in journals of the relevant research fields
- 3 The “ideal” English skills UEC students should possess at the point of entering research labs for graduation research:**
 - a Reading papers/articles in journals of the relevant research fields
 - b Summarizing papers/articles in journals of the relevant research fields
 - c Making oral reports on students’ own research
 - d Presenting (in English or in Japanese) papers/articles in journals of the relevant research fields from the point of view of the authors (This activity also involves preparations such as making presentation materials or ppt files.)
 - e Writing abstracts
 - f Communicating with international students in the labs
- 4 The types of reading materials in English that should be covered in the courses:**
 - a Textbooks
 - b Proceedings
 - c Journal papers/articles
 - d Introductory readings of research fields (e.g. “Engineering Tomorrow” by IEEE)
 - e Popular-science magazine articles (e.g. Science American, Discover)
 - f Technical manuals
- 5 The kinds of writing in English that should be covered in the courses:**
 - a Abstract
 - b Summary
 - c Descriptions of experiments/research
 - d Presentation documents of various kinds
- 6 The kinds of oral presentations or activities that should be covered in the courses:**
 - a Oral reports on reading materials
 - b Oral reports on writings, e.g. peer sharing/feedback
 - c Poster presentation (e.g. lab introduction, research introduction, conference presentation)
- 7 The desirable student assessment methods for the**

two courses:

- a By achievement tests that are course-dependent and program-generated
- b By tasks and/or assignments, e.g. presentations, writing assignments, reading tests/tasks
- c By commercial tests, e.g. TOEIC, TOEFL

3.2 Syllabus Design

In order to create the most suitable syllabi for the two Technical English courses, a lot of investigation on the types of syllabuses was conducted by the course designer and the program manager, SHI Jie, author of this paper.

In the field of ESL and EFL, the most familiar types of syllabuses for EGP tend to include the following (Brown, 1995, pp. 6-14; Richards, 1990, p. 152):

- Structural
- Functional
- Notional
- Topical
- Situational
- Skills
- Task- or Activity-based

However, syllabuses for EAP are organized differently due to the varied educational purposes and needs (Flowerdew & Peacock, 2001):

- Lexico-grammatical
- Functional-Notional
- Discourse-based
- Learning-based
- Genre-based
- Content-based

In practice, EFL practitioners often mix and match the above-mentioned syllabuses to develop the most suitable ones for their own courses and students. Therefore, it can be said that there is always another type of syllabus that can be added to any classifications, that is “the combined/mixed/integrated type.” The syllabuses for BTE and ITE courses of the case study are of the last type, integrating genre-based and skills-

based syllabuses. Genre-based aspect of the syllabus aims at introducing the various types of academic and EST texts while the skills aspect trains students to perform the academic skills in hands-on tasks, both of which are essential for Japanese university students.

3.3 Main Genres and academic language skills of ITE

After the choice of the syllabus type was finalized, the curriculum developer must select the appropriate course content. In this respect, the practice of ESP course developers varies. In some ESP courses, course content is selected leaning more toward EAP and can be describe as EGAP (English for General Academic Purposes), covering genres more broadly academic, while others may be narrower, covering genres that are only specially needed for some disciplines (Basturkmen, 2006, p. 26; Mayo, 2000, pp. 26-27). The undergraduate Technical English program of UEC Tokyo adopted the content of a mixture of both.

The main genres of types of texts and academic skills that are incorporated in ITE course syllabuses are as follows:

The main genres of ITE:

- Impromptu Speech
- Journal article
- Conference proceeding
- Oral report
- Abstract
- Poster presentation
- PPT presentation

The main academic skills of ITE:

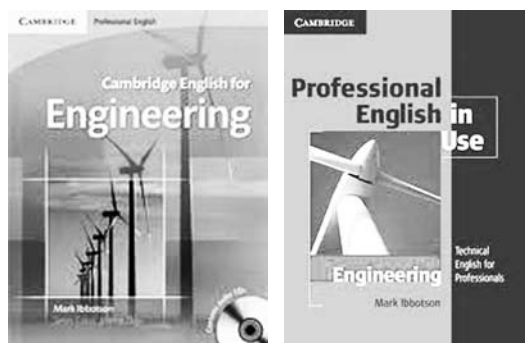
- A. Critical thinking and reading skills
 - Comprehension of academic articles
 - Summarizing
 - Reaction to academic articles
 - Evaluating research
 - Discussion
 - General vocabulary and technical terms acquisition

- Characteristics of scientific English
- B. Presentations & oral communication competencies
 - Delivery methods
 - Expression of opinions and other argument skills (e.g. persuasion, logic)
 - Explanation of research ideas
 - Q&A
 - Communicating with international students and/or researchers in lab in English
 - Pronunciation and intonation: clarity and naturalness
 - C. Academic and social writing
 - Abstract writing
 - Presentation slides making
 - Poster making
 - Referencing and citing sources

3.4 Teaching Materials

There are four types of teaching materials used ITE:

- Textbooks of science English: Professional series of Cambridge University Press



- Real-life conference proceedings, research articles and journal papers, preferably published by the science faculty of UEC Tokyo
- Student-generated scientific English materials, typically prepared for various talks and project such as presentations and writings
- Teacher-generated teaching materials

3.5 Assessment and Grading

The Undergraduate Technical English was designed

to be a semi-programmed ESP program. The main genres and skills listed above were the compulsory components of the courses and must be covered in all the classes along with the textbooks and the designated unites in them.

In the course of ITE, students were assessed by their achievements in the various aspects of the syllabus as shown below:

Table 2
Program-wide Grading scale for all ITE classes

| Tasks | Percentages |
|-----------------------------------|-------------|
| Homework | 20% |
| Participation & Attitude in class | 20% |
| PWT-R* | 10% |
| Oral Reports | 10% |
| Poster Presentation | 20% |
| Writing Assignments | 20% |

*PWT-R = Program-Wide-Test of Reading

PWT-R was the only standardized program-wide test for all 24 classes among the aspects in the grading scale. The rest of the grading was done by the teachers of the classes, not controlled by the program manager. PWT-R was a test consisted of 30 multiple-choice questions designed to measure students' achievement in scientific language proficiency based on the required textbooks. The program required the teachers not to pre-teach any vocabulary or texts from the textbooks for this test because this test was designed to test students' self-study competencies. Due to the fact that ITE is a currently running course and needs to keep confidence of the test. The content of the test is omitted in this paper.

The procedure of the PWT-R is shown in the following flow chart:

Table 3 and Figure 2 below show the statistics of the students' results in ITE's PWT-R.

Table 3
PWT-R Percentages of ITE 2012

| | |
|--------------------|--------|
| Maximum | 10.00% |
| Minimum | 2.7% |
| Average | 7.9% |
| Standard deviation | 1.42 |

3.6 ITE End-of-Course Survey 2012

At the end of each semester, UEC Tokyo conducts a university-wide standardized end-of-course survey to all courses and lab experiment courses of the semester. All of the ITE classes followed this regulation but also asked students to answer six more questions devised by the program. The six questions were included in the supplementary section of the mandatory university survey as follows:

- Q11. How much have you improved in terms of IMPROMPTU SPEECH in science English?
- Q12. How much have you improved in terms of READING & DISCUSSION in science English?
- Q13. How much have you improved in terms of ORAL REPORT ON ACADEMIC PAPERS in science English?
- Q14. How much have you improved in terms of ABSTRACT WRITING in science English?
- Q15. How much have you improved in terms of POSTER PRESENTATION in science English?
- Q16. What do you think about teachers' using English ONLY (or MAINLY in English) in class?

Notes:

- 1 = Too challenging/Could not follow at all;
- 2 = Somewhat challenging/Could not understand most of the time;
- 3 = Understood around half;
- 4 = Understood almost all;
- 5 = No major problems/Just right to learn English.

The results of the six additional questions are shown in Figure 3. On a scale of 1 to 5, most students seemed

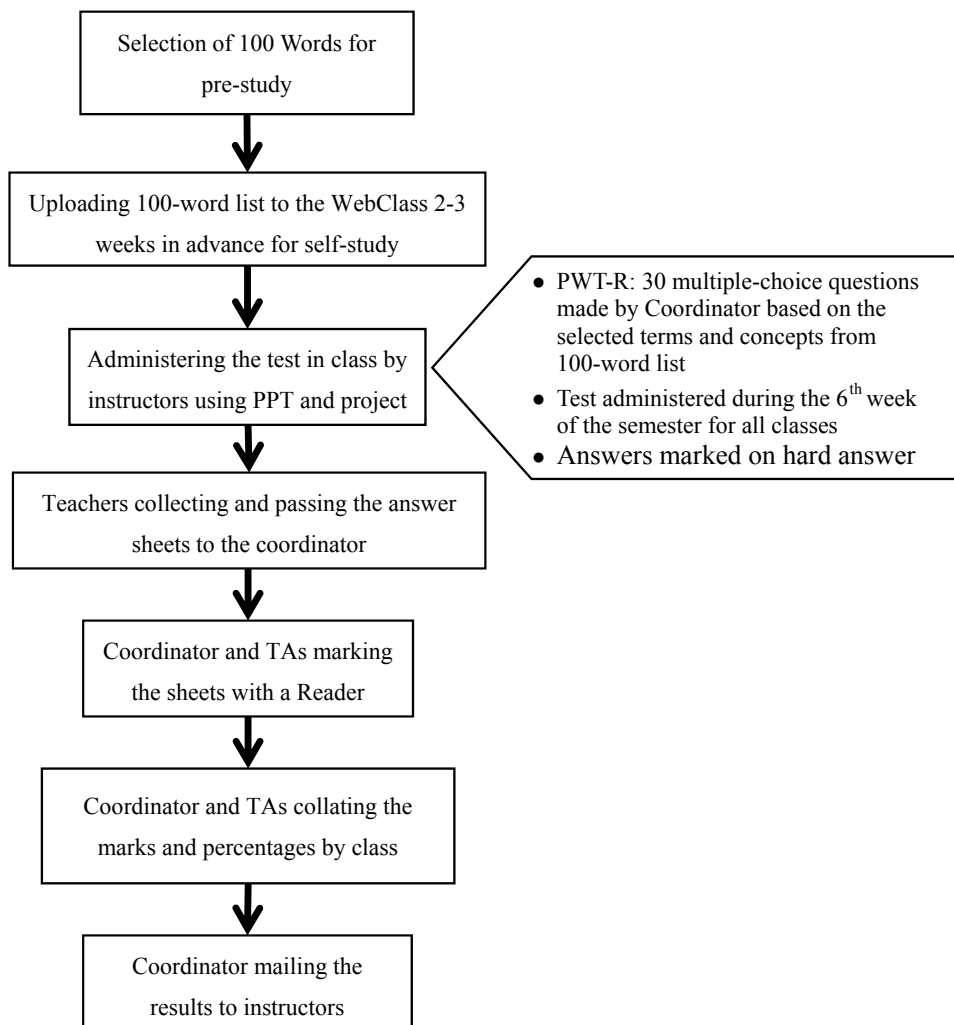


Figure 1. Process of PWT-R of ITE 2012

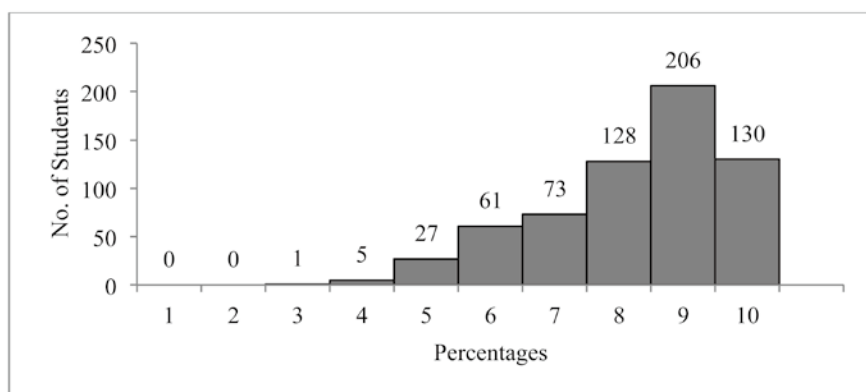


Figure 2. Distribution of the percentages of PWT-T, ITE 2012

to be satisfied with their achievements. Though the number of the students who marked 4 and 5 is small, it is significant due to the fact that ITE is a new course running for the first time. The Management Committee and the instructors considered that results to be satisfactory as far as students' self-evaluation was concerned. This summary of students' perspectives later contributed to the revision of the curriculum for the following academic year.

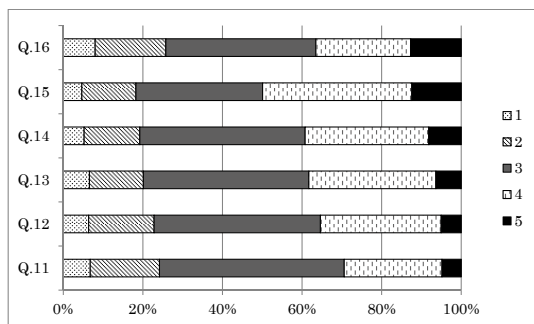


Figure 1. Summary of students' answers to the additional 6 questions

3.7 Teaching staff

All instructors of the BTE and ITE classes were adjunct teachers who were recruited only for this program. The basic criteria for the position included having had educational or teaching background in science and engineering, teaching experiences at university level, a master's degree or above in sciences or English education, and minimum level of oral Japanese language. Twelve adjunct teachers were selected from the applicants that were four times as many the positions, which could be interpreted as the improvement of the understanding of ESP, less fear toward ESP, or the number of English teachers with science and engineering qualifications was increasing.

During the academic semesters, the Coordinator and the science faculty members visited all the classes 4-6 times to observe the teaching and students performance. Feedback from all observers was collated and used for professional development activities and curricular

improvement.

4. Conclusion

Higher education reforms are happening at various levels globally and in need for innovation. However, it is challenging and a long process to implement workable innovative ideas at universities simply (but not only) because universities have complex systems of long history and cultural identities to defend. English language education in higher institutions in Japan is facing the expectation from the society to equip the students with the necessary English competencies that enable them to become better academic and professional communicators and to become active researchers or engineers on the world stage. The traditional language programs that focus on EGP are considered to be ineffective to meet this demand. More and more universities that have science and engineering disciplines are turning to ESP as a practical and direct approach to teaching the kind of English that is needed by the students, researchers, and science faculty. ESP, as an innovative approach to English education at universities, is a challenging idea to realize in reality at multiple levels. The new and extensive undergraduate EST program of UEC Tokyo, i.e. the Undergraduate Technical English Program, is a case study that demonstrates the process of the implementation of an innovative idea. The achievements of the students and the feedback from the science and engineering faculty both indicate the success of this program though this is only the second year of the commencement of the program. The significance of this case study lies in not only the achievement of ESP education for students also the efficient implementation and management of the innovation supported by both English and science faculties. Future developments of this ESP program include improvements in program evaluation, professional development for the teachers, and building the link between the undergraduate ESP program with the graduate school ESP curriculum.

References

- Al-Rodhan, N. R., & Stoudmann, G. (2006). *Definitions of Globalization: A Comprehensive Overview and a Proposed Definition* (p. 5). Retrieved from <http://www.sustainablehistory.com/articles/definitions-of-globalization.pdf>
- Anthony, L. (2010). *Presenting Research in Science and Engineering* (2nd ed.). Tokyo: DTP Publishing.
- Basturkmen, H. (2006). *Ideas and Options in English for Specific Purposes*. Oxon: Lawrence Erlbaum Associates, Inc.
- Belcher, D., Johns, A. M., & Paltridge, B. (2011). *New Directions in English for Specific Purposes Research*. Ann Arbor: The University of Michigan Press.
- Brown, J. D. (1995). *The Elements of Language Curriculum*. Boston, MA: Heinle & Heinle.
- Deutch, Y. (2009). *Theory and "Methodics" in English for Specific Purposes: The relevance of "methodics" to the instruction of English for Specific Purposes*. Saarbrücken: VDM Verlag Dr. Müller Aktiengesellschaft & Co. KG.
- Dudley-Evans, T., & John, M. J. S. (1998). *Developments in English for Specific Purposes: A multi-disciplinary approach*. Cambridge: Cambridge University Press.
- Flowerdew, J., & Peacock, M. (2001). Issues in EAP: A preliminary perspective. In J. Flowerdew & M. Peacock (Eds.), *Research perspectives on English for Academic Purposes* (pp. 177–194). Cambridge: Cambridge University Press.
- Harding, K. (2007). *English for Specific Purposes*. Oxford: Oxford University Press.
- Hoffman, A. M., & Spanghehl, S. D. (Eds.). (2012). *Innovations in Higher Education: Igniting the Spark for Success*. Lanham, Maryland: Rowman & Littlefield Publishers, Inc.
- Hutchinson, T., & Waters, A. (1987). *English for Specific Purposes: A learning-centred approach*. Cambridge: Cambridge University Press.
- Master, P., & Brinton, D. M. (Eds.). (1998). *New Ways in English for Specific Purposes*. Bloomington, IL: Teachers of English for Speakers of Other Languages, Inc.
- Mayo, M. D. P. G. (2000). *English for Specific Purposes: Discourse Analysis and Course Design*. Argitalpen Zerbitzua: University del Pais Vasco/Euskal Herriko Unibertsitatea.
- Morrison, D. C. (2010). Transnational crime: Globalization's shadowy stepchild. In *Great decisions: Foreign policy association* (2010th ed., pp. 31–42). New York: Foreign Policy Association.
- Orange, C. (2002). *The Quick Reference Guide to Educational Innovations: Practices, Programs, Policies, and Philosophies*. Thousand Oaks, CA: Corwin Press, Inc.
- Orr, T. (Ed.). (2002). *English for Specific Purposes: Case studies in TESOL practice*. Alexandria, VA: TESOL Press.
- Paltridge, B., & Starfield, S. (Eds.). (2013). *The Handbook of English for Specific Purposes*. West-Sussex: Wiley-Blackwell.
- Parkinson, J. (2013). English for Science and Technology. In B. Paltridge & S. Starfield (Eds.), *The Handbook of English for Specific Purposes* (pp. 155–173). West-Sussex: Wiley-Blackwell.
- Richards, J. C. (1990). *The Language Teaching Matrix*. Cambridge: Cambridge University Press.
- Rogers, E. M. (2003). *Diffusion of Innovations* (5th ed.). New York, NY: Free Press.
- Swales, J. M. (1988). *Episodes in ESP: A source and reference book on the development of English for Science and Technology*. New York, NY: Prentice-Hall.
- Terauchi, H., Yamauchi, H., Noguchi, J., & Sasajima, S. (Eds.). (2010). *ESP in the 21st Century: ESP theory and application today*. Tokyo: Taishukan Publishing Company.