

Short Research Article

Teaching Engineering English in the Chinese Context

Yuxiu Hu^{1*} & Keiko Koda²

¹ Center for Language Education, Southern University of Science and Technology, China

² Department of Modern Languages, Carnegie Mellon University, USA

* Yuxiu Hu, 1088 Xueyuan Avenue, 518055, Shenzhen, China

Received: February 7, 2020 Accepted: February 12, 2020 Online Published: February 24, 2020

doi:10.22158/selt.v8n1p79

URL: <http://dx.doi.org/10.22158/selt.v8n1p79>

Abstract

The study describes a content-based course designed for engineering students in a non-English speaking country, shares the experience in developing the course, presents the challenges encountered when teaching the course, and provides solutions to some challenges.

Keywords

Content-based, English for Engineering, problem-solving, reading to learn, assessment-driven

1. Introduction

In China where English is spoken as a foreign language, at universities of science and engineering, it is very common to see college students, especially engineering students, lack confidence in communicating in English for both professional and unprofessional purposes. However, in this age of globalization, a good grasp of English skills for engineering students whose native language is not English has become as important as their command of professional knowledge. Therefore, what could language instructors do to meet the challenge of developing English courses that reflect the requirements of globalization? And how can content-based teaching develop its own methodology to enhance second language acquisition at university level? How could a content-based approach be translated into the practice of language teaching in the Chinese context?

This study will attempt to answer these questions by presenting a course designed for engineering students, and present the development of an English course in Higher Education, science and engineering Universities in particular.

2. The Theoretical Base & The Course

Content-based approaches have been applied into practice in different ways to gear to different needs (Koda & Yamashita, 2019). Though there exist variations among models of content-based instruction

(CBI), it is assumed in CBI, regardless of which model we are talking about, that (a) the learning content contributes to the learning of language, (b) language mastery gives learners easier access to content, and (c) learning language in classroom environments with coherent content motivates students (Koda & Yamashita, 2019). Research has shown that content-based approaches increase student motivation, student engagement in more cognitively demanding lessons, and student preparedness for more authentic uses of the L2 (Fitzsimmons-Doolan, Grabe, & Stoller, 2017). Under this theoretical base, the course to be reported was designed and classified as a content-based one with a greater emphasis on language learning.

The course *English for Engineering* is one of the elective courses provided by the Center for Language Education (CLE) at Southern University of Science and Technology (SUSTech). This course takes place every week with 2 credits, making a total of 32 hours of teaching and learning in class. This course assumed a background in Engineering, and students taking this course should have finished their first year study of required English and have a good command of the English language. Class interaction was in the form of lectures, individual and group work involving evaluating STEM articles and reports, critiquing and synthesizing technical articles and reports, oral presentations, discussions and problem solving. The teaching and learning materials were based primarily on one selected textbook, *Cambridge English for Engineering*, supplemented by additional resources, including textbooks, videos, audios and relevant web-based materials / activities created by the instructor.

3. Data Collection and Analysis

Both quantitative and qualitative data were collected through a survey questionnaire and interview responses. With a purpose of probing into the effectiveness of the content-based teaching and problem-solving practice, apart from the observation of the instructor, a questionnaire was implemented with an interview coming after it. Three questions were used to guide the design of the questionnaire.

1. What is the reason for the low enrolment of the course?
2. Is the content-based approach effective in enhancing language learning?
3. Is problem-solving in real circumstances helpful in promoting language learning?

In an attempt to further compare the effectiveness of different teaching & learning methods used in the course, the same group of students were asked to select the methods that they thought had promoted their participation. A follow up interview was conducted among the students of the course in order to know the reasons for their preferences.

4. Results

Tables 1 and 2 show the results on the effectiveness from the perspective of students. 75% of the students think that the content-based teaching method can enhance their learning interest, and promote in-class participation. All the students confirmed the positive effectiveness of problem solving in real circumstances on interest enhancement and participation promotion.

Table 1. Effectiveness of the Content-based Teaching Method?

Choice	Number	Percentage
Can enhance learning interest, promote in-class participation	6	75%
Similar to humanity topics	1	12.5%
Prefer traditional humanity topics	1	12.5%
No. of participants	8	

Table 2. Effectiveness of Problem Solving in Real Circumstances?

Choice	Number	Percentage
Can enhance learning interest, promote in-class participation	8	100%
Not very helpful	0	0%
No. of participants	8	

In regard to the effectiveness of different teaching & learning methods, as shown in Table 3, 87.5% of the students selected the Discussions with the teacher & classmates. In the follow up interview, the students admitted that they selected it mainly because of the discussions with the teacher. Chinese students still highly rely on the teacher in class. They still hold the view that the teacher has the only authority from which they can learn rather than their classmates. More than half of the students agreed that the content of technology and engineering was interesting and more engaging. Half of the students thought problem-solving was helpful in promoting their participation.

Table 3. Which Teaching & Learning Methods Promoted Your Participation?

Choice	Number	Percentage
Group discussion & sharing	3	37.5%
Poster presentation	3	37.5%
Discussions with the teacher & classmates	7	87.5%
Videos used in class	3	37.5%
Content of technology and engineering	5	62.5%
Problem-solving in real circumstances	4	50%
No. of participants	8	

5. Discussions—Challenges and Suggestions

The first challenge that the course faced is the low enrolment. Among all the elective courses opened in the same semester, four elective courses suffered from low enrolment of less than 12 students.

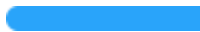






Compared to the other elective courses, these four courses seem less test-oriented or test-useful to Chinese students.

Table 4. Elective Courses

Course Name	Enrollment No.
<i>Scientific Writing</i>	7
<i>English for Engineering</i>	8
<i>Critical Thinking and English Debate</i>	9
<i>21st Century Movies</i>	11
<i>Scientific Translation</i>	13
<i>IELTS</i>	17
<i>English Pronunciation</i>	19
<i>Communication Skills</i>	19
<i>TOEFL Preparation</i>	19

Another questionnaire was conducted among 107 students who did not take *English for Engineering*.

Table 5. Why Didn't You Select the Course?

Choice	No.	Percentage
Do not know what this course is about.	74	 69.16%
Do not know which category this course belongs to.	18	 16.82%
Can learn English in Engineering courses rather than this language course.	7	 6.54%
Do not think it is helpful in my English learning	6	 5.61%
Worry about the homework load	21	 19.63%
Do not have enough credits for it	27	 25.23%
Others :	16	 14.95%
No. of participants	107	

The other reasons are listed below:

- Feel like the other courses are more interesting
- Not good at English, do not like English
- I'm a year one student
- Feel like a difficult course
- Do not know it is your course
- Have no time
- Do not know the existence of this course
- Have never heard of this course

In order to increase the number of enrolment, firstly, the course needs to be advertised, so let students know what this course is about. Secondly, nowadays world requires more applied talents who can handle problems with English in real circumstances rather than simply in tests. English teachers need to find ways to promote this new concept of English.

The second challenge is insufficient information support, which is quite common among all content-based courses. Both students and the instructor need content information support, mainly specialized vocabulary support in the problem-solving tasks. Sylven (2004) shows that “out-of-school reading behavior correlated more strongly with vocabulary scores than being in a content language integrated learning class”, and language and content integration could be grounded in the concept of *reading to learn* as illustrated in Koda and Yamashita (2019), so one solution that could work is to integrate *reading to learn* into the content-based approach. To increase both content and vocabulary support, more content materials about concrete problem solving should be assigned for the students to read before the class, and in class assessment tasks designed in alignment with *reading to learn* categories should be conducted based on the content materials. By doing so, the implementation of the content-based approach into language classrooms would be more guided and better supported.

The last but not the least challenge is the vague sense of accomplishment from the students. They had shown definite positive feedbacks on the effectiveness of the course, at the same time, very surprisingly but consistently, they were not clear what they have achieved. For example, after taking a pronunciation course, they know rules on English pronunciation, but after taking this English for engineering course, it seems to them that they didn't learn anything as concrete as the skills they can learn in the other language courses. The suggestion to meet this challenge is to design an assessment driven curriculum for the content-based course. With the development of Applied Linguistics, the role of assessment in motivating and driving learning and retaining learning outcomes has been noticed and positively discussed in the literature (McLachlan, 2006; Larsen et al., 2008; Kromann et al., 2009). The key issue here is what to assess and how to assess in order to retain the learning outcomes, and thereby, help students achieve a high sense of accomplishment, which is highly worth addressing in future work.

6. Conclusion

This study has made a brief description of an Engineering English course in China, and shares the perspectives of a content-based curriculum development in the Chinese context, finally it presents the challenges when teaching the course and provides suggestions on meeting the challenges.

With the experience in teaching both traditional course and engineering content based course, and based on the results of this study, it is safe to conclude that content-based curriculum does promote better engagement, but its effectiveness can be further promoted by integrating *reading to learn* and assessment-driven curriculum design.

It is my hope that this study could inform the practices of teachers, curriculum and course designers,

individuals who are working in context-based instruction settings, ESP, and those who are working on globalization in higher education.

Funding

This work was supported by the teaching reform funding of Southern University of Science and Technology under Grant JG201612.

References

- Fitzsimmons-Doolan, S., Grabe, W., & Stoller, F. L. (2017). Research Support for Content-based Instruction. In M. A. Snow & D. M. Brinton (Eds.), *The Content-based Classroom: New Perspectives on Integrating Language and Content* (2nd ed., pp. 21-35). Ann Arbor, MI: University of Michigan Press.
- Koda, K., & Yamashita, J. (Eds.). (2019). *Reading to learn in a Foreign Language: An Integrated Approach to Foreign Language Instruction and Assessment*. Routledge. New York.
- Kromann, C. B., Jensen, M. L., & Ringsted, C. (2009). The effect of testing on skills learning. *Medical Education*, 43, 21-27. <https://doi.org/10.1111/j.1365-2923.2008.03245.x>
- Larsen, D. P., Butler, A. C., & Roediger, H. L. III. (2008). Test-enhanced Learning in Medical Education. *Medical Education*, 42, 959-966. <https://doi.org/10.1111/j.1365-2923.2008.03124.x>
- McLachlan, J. C. (2006). The Relationship Between Assessment and Learning. *Medical Education*, 40, 716-717. <https://doi.org/10.1111/j.1365-2929.2006.02518.x>
- Sylvén, L. K. (2004). *Teaching in English or English teaching? On the effects of content and language integrated learning on Swedish learners' incidental vocabulary acquisition* (Unpublished doctoral dissertation). Goteborg University, Goteborg, Sweden.