

The Use of Open Educational Resources in Content-Based Instruction of English

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Abstract

This paper presents an approach to English teaching in which open educational resources on the Web are used. By using these, students in specialized fields gain content knowledge as well as enhance their English ability. Content-based instruction (CBI) is an effective method which combines language and content learning. To implement CBI on the Web, “COOLL (Collaborative Open Language Learning)” has been developed as an e-learning system to provide a variety of open English resources at Tsuda. COOLL allows not only faculty but also students to freely register materials and make a mutual use of them. In other words, this is truly a student-centered approach. In a reading and writing course at Tsuda College, sophomore math majors themselves searched for and chose their reading materials relating to math and registered them on COOLL. Peer reviewing of the materials and reading/writing activities followed. We can see that the use of open educational resources on the Web in a student-centered learning environment enables students to get involved, gain knowledge in their specialized field and develop their linguistic ability.

1 Introduction

Tsuda College has developed an e-learning system named COOLL (Collaborative Open Language Learning) in order to enhance content-based education of English. This paper reports a case of COOLL use for academic English teaching/learning. Our college is a small liberal arts college made up of departments of English, International and Cultural Studies, Mathematics, and Computer Sciences. In addition, students in specialized areas can select one from the two courses: Multicultural and International Cooperation Studies Course and Media Studies Course, in which the students are expected to gain knowledge in their own fields as well as develop English language skills: reading, writing, listening, and speaking. In order to achieve this goal, content-based instruction (CBI) is regarded as an effective method (Morely 1987; Krashen 1982, Widdowson 1982, De Escorcia 1984). Brinton, Snow, and Wesche (1989) argued that authentic reading materials in CBI requires students not only to understand information but to interpret and evaluate it as well, and that academic writing which follows listening and reading activities requires students to synthesize facts and ideas from multiple sources as preparation for writing. In CBI classrooms, motivation and interest arise partly from the appropriate matching of content knowledge the students acquire and increasing learning tasks (Grabe & Stoller, 1997). Moreover, students have opportunities to exercise choices and preferences in terms of specific content and learning activities (Grabe & Stoller, 1997). In other words, the CBI approach entails a student-centered classroom environment.

From the viewpoint of the CBI approach, the following conditions should be met when we prepare educational materials: 1) The content of the material is related to student’s specialized field; 2) Activities in various forms are offered with the use of the material concerned. COOLL has been developed to satisfy those conditions. One of characteristics of COOLL is to provide links to a variety of authentic materials from

overseas OpenCourseWare or free video sharing sites like YouTube. The educational resources on COOLL are categorized according to specialized areas so that students can find the suitable resource following their academic or research interests. Students can gain knowledge in specialized areas and develop English language skills by making use of open educational resources on the Web via COOLL. In addition, to provide a student-centered learning environment, students are also allowed to freely register resources on COOLL and make a mutual use of them.

COOLL stands for Collaborative Open Language Learning. The term collaborative includes collaboration of various elements. For example, when developing educational materials, both content specialists and EFL experts worked in collaboration to select materials and add subtitles in English or Japanese to support learning. Actually, two faculty members have been employed specifically to develop COOLL on this belief. Then the word “open” is also a key word for COOLL. The principle of “open” for developing COOLL means utilizing open source software and open content. The development of the Internet has allowed us to find a variety of written, video or sound sources freely on the Web. It could lead to change in English language learning styles. Now that students have easy access to authentic materials, they learn overseas cultures and languages going beyond the textbooks used in the classroom. The following sections describes a course for academic purposes, Reading and Writing II (for sophomore math majors), in detail.

2 The Course Outline

The required course was offered to 19 students with the aim of integrative developing of reading and writing skills along with vocabulary enrichment. In order to achieve this goal, a student-centered approach on the basis of CBI was taken. COOLL was used specifically to provide reading materials. Additional vocabulary learning was done through the use of Moodle. The final activity of writing a few paragraphs was done both as in-class activities and as homework assignment.

3 Reading Activity

In reading activity, the students were required to read extensively in the mathematic field. COOLL was employed in the activity in order to collect reading resources on mathematics on the Web. After specifically deciding what materials were to be read, detailed reading activity was done in the classroom.

3.1 The Use of COOLL

In the first step of the course, the students were asked to list mathematical topics of their interest. Table 1 shows the topics they listed. Next, they voted to choose top six most popular topics, and then searched for the resources relating to the topics on the Web. They were registered on COOLL. The registered materials were classified under the title: “Reading & Writing II.” Thus, any resources registered will be classified into academic categories or topics, and users can collectively see resources relating to their specialized field. In registering resources on COOLL, users are required to describe the outline of the material. Therefore, the math majors needed to read the materials carefully and determine whether they are appropriate for their course. Once they decided to register some material, they had to write a brief explanation of it. This task required the students to skim and scan reading passages online and get the gist of them and put it into English. Eventually, 30 resources were registered as reading materials on COOLL in total (Figure 1).

Table 1 The Topic Listed by Sophomore Math Majors

Leonhard Euler, Pythagoras, Georg Friedrich Bernhard Riemann, Évariste Galois, Jean Baptiste Joseph Fourier, Richard Taylor, Johann Carl Friedrich Gauss, Pierre de Fermat, Albert Einstein, Srinivasa Aiyangar Ramanujan, John Napier, Cayley-Hamilton, Newton, Archimedes, Niels Henrik Abel, Western TV drama “Numbers”, 岡 潔, 小平邦彦, 高木定治, etc.

The screenshot displays a list of source materials for four mathematical figures. Each entry includes a small portrait icon, a brief description in Japanese, the title '素材元' (Source Material), and a URL.

- Archimedes:** 数学者アルキメデスの成果や生涯について書かれています。特にBiography(伝記)の部分は興味深いです。
素材元: <http://www.crystalinks.com/archimedes.html>
- Laplace:** ラプラスについて書いてあるページです。
素材元: <http://www-groups.dcs.st-and.ac.uk/~history/Mathematicians/Lapla...>
- Karl Weierstrass:** ワイエルシュトラスについて書いてあるページです。
素材元: http://es.wikipedia.org/wiki/Karl_Weierstrass
- Albert Einstein:** アインシュタインのオフィシャルウェブサイトです。

Figure 1 Source Materials Registered by Sophomore Math Majors

The screenshot shows a peer review interface for a resource titled 'フーリエ' (Fourier). It includes a description, a URL, and a detailed review section with star ratings and comments.

フーリエの人物像について。
素材元: <http://www.nndb.com/people/558/000087297/>

編集 | レビュー | 凍結 | アクセス禁止 | 削除 | 学内限定 | 違反報告

カテゴリ: 津田塾大学 数学
科目・トピック: Reading & Writing II
タグ: タグの編集

レビュー (1) [【一覧】](#)

英語 ★★★★★ (5.0) フーリエの生涯を知ることが出来て...
興味 ★★★★★ (5.0)
内容 ★★★★★ (3.0)

英語
0 (易しい) ~ 5 (難しい)
興味
0 (つまらない) ~ 5 (面白い)
内容
0 (初心者向き) ~ 5 (専門家向き)

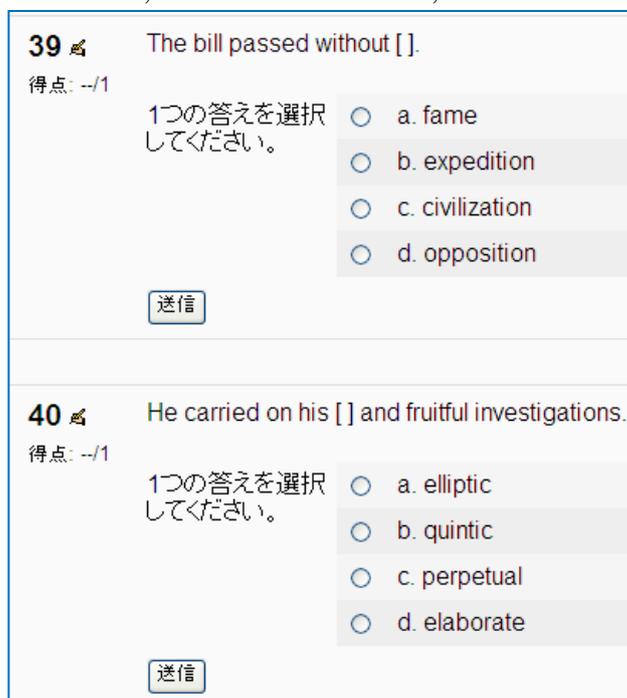
Figure 2 Peer Review

The next step was to peer review the materials which their classmates had selected. Each resource can be evaluated by users according to difficulty of English, degree of interest, and degree of expertise. In the course, the students peer-reviewed and evaluated the resources registered by their classmates (Figure 2). This activity aimed at integration of reading and writing skills for meaningful purposes of actually evaluating authentic passages.

The third step was to select reading materials for class with consideration to peer review. Seven passages were chosen as reading materials for class: Euler, Pythagoras, Fourier, Gauss, Abel, Indian mathematics, and Amicable Numbers. Peer review is useful because students end up reading various resources for purposeful production. Moreover, they can expand their knowledge by reading about the same topic relevant to their specialized area of study. Consequently, through a peer review activity, the students can foster their interests of the content, gain new knowledge in their specialized field, learn new English expressions, and develop their reading skills.

3.2 Vocabulary Learning

Once the materials were decided, the class read them with the teacher in the classroom and used the materials for enriching vocabulary. Their vocabulary sizes were measured before and after their reading activity in order to measure how well the students learned the words presented in the materials. A vocabulary-size test which relies on self-report was used to estimate the students' vocabulary sizes. The test format adopted was the pencil-and-paper checklist where a graded sample of words covered various frequency levels. The students were required to put a tick next to each word that they knew or had seen before and can express at least one meaning of it (Appendix 1). It was assumed that most students would respond in an honest manner. As for the words presented in the list, all the words appeared in the reading materials for class were divided into four levels of word frequency: the 1000 word level, the 2000 word level, the academic words, and off-list words on the basis of



Tom Cobb's vocabulary profile (2001). The classification is mostly based on Laufer and Nation's Lexical Frequency Profile (1999). However, there were some words which were not suitable for the level when considering textbooks used in Japanese schools. Therefore, JACET List of 8000 Basic Words compiled by EFL experts in Japan (JACET, 2003) was also used as reference. Each vocabulary level on the checklist was indicated as Step 1, Step 2 and so on. Words were presented in the form of word family, and the students checked each stage of the words step by step.

Then the students were asked to work on the vocabulary exercises on

Figure 3 Examples of Vocabulary Quiz on Moodle

Moodle, a free open source Learning Management System, on a self-supporting basis. The vocabulary exercise was made up of 10 questions per each level, i.e. 40 questions in total (Figure 3). The questions were randomly presented so that they can be taken repeatedly while the students read the passages.

At the end of the course, the students ticked the same vocabulary checklist again. The results show that the students made progress after the reading activities, i.e. increase of vocabulary size between the pre- and pro-tests. Figure 4 shows the results of the percentage of “Yes” responses to the words of the two checklists.

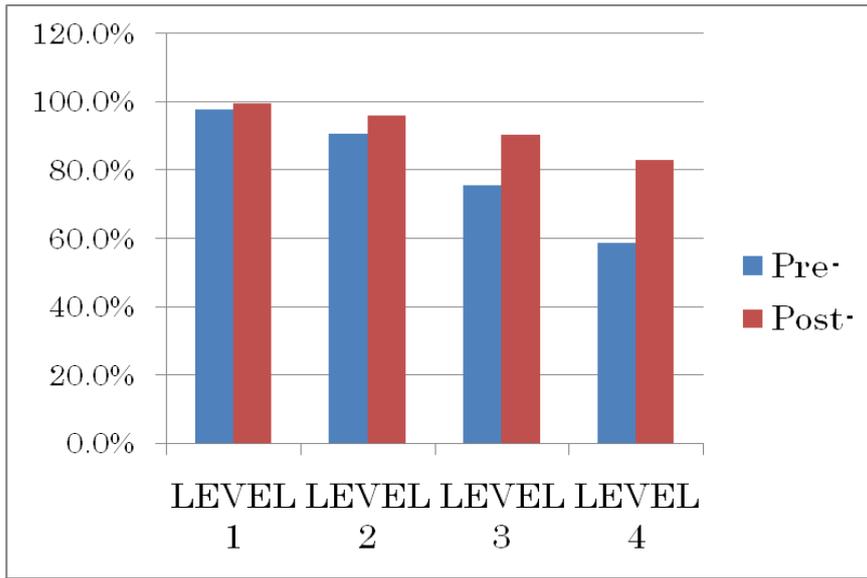


Figure 4 Comparison of the Students’ Vocabulary Size

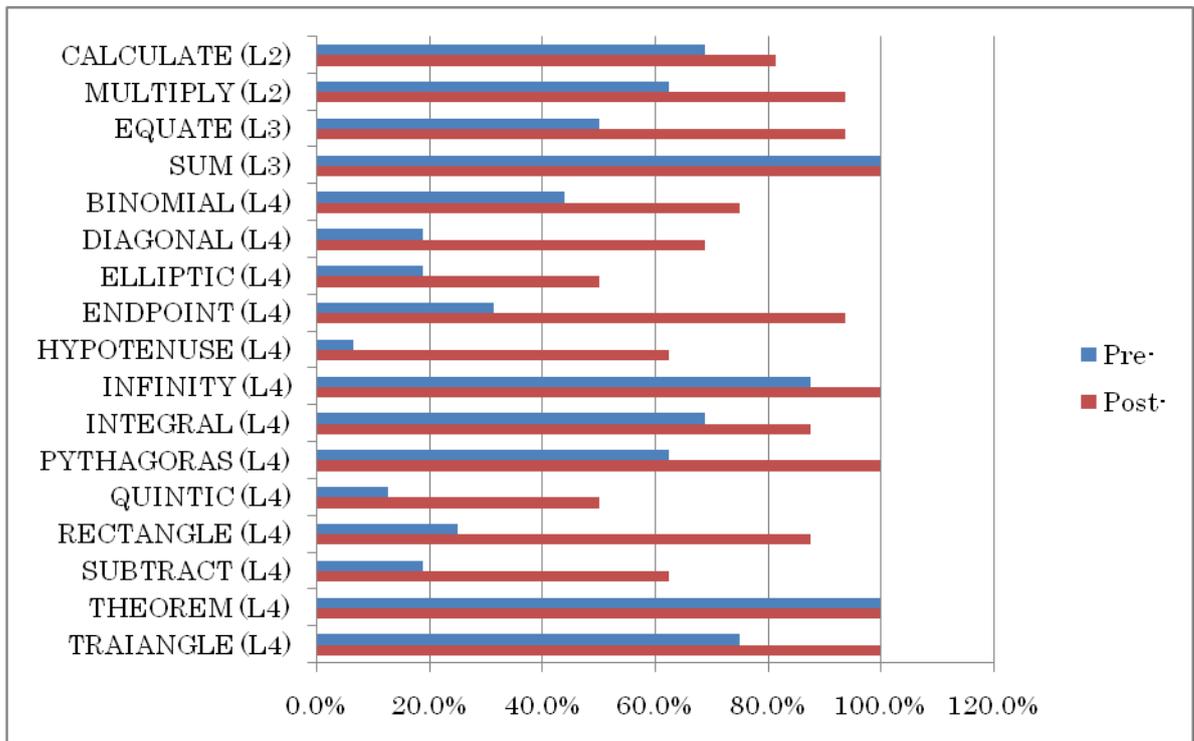


Figure 5 The Rate of “Yes” Responses to Words Relating to Mathematics

Table 2 The Averages of the Rate of “Yes” Responses & the Rate of Increase

	Pre-	Post-	Rate of Increase
The Whole Words	80.8%	92.2%	11.5%
Technical Terms	50.0%	82.7%	32.7%

Figure 4 shows that at each level, the number of “Yes” responses rose steadily during the course. In addition, the number of “Yes” responses decreased in proportion to word frequency. The results of the first checklist show that the percentage of “Yes” responses to the words for level 3 was 75.7%, while that for level 4 was 58.7%. In other words, the results indicate that words for level 4 were the most unfamiliar to the students but learned most through the lesson. Conversely, the rate of increase between the two checklists for more frequent words was smaller. We could assume that the students were serious about vocabulary learning during the course.

Figure 5 specifically shows the rate of “Yes” responses to words relating to mathematics on the list. It is clear that the rate of “Yes” response to each word varies from one word to another. The average of the rate for technical terms was 50.0% in the first checklist and 82.8% in the second checklist, both of which were lower than those of “Yes” responses to the whole words, 80.8% and 92.2% respectively (Table 2). With regard to the technical terms such as “HYPOTENUSE,” “QUINTIC,” “RECTANGLE,” and “SUBTRACT,” the rates of “Yes” responses were very low in the first checklist, while there were several words such as “THEOREM” that all the majors had recognized in both of the checklists (Figure 5). The rate of increase in the technical terms between the two checklists was 32.7%, which was far larger than that of increase in the whole list of words, i.e. 11.5%. It is possible that the students somehow did a good job learning the technical terms during the course. Although we need further research for confirmation, it could be assumed that technical terms are easily absorbed by those who have background knowledge to accommodate them.

4. Writing Activity on the Basis of Reading

As the final stage of content-oriented teaching methods, writing activity was introduced. The students were expected to generate, develop, and organize their ideas on a given topic in the form of writing. It is supposed that students are exposed to language structures and vocabulary items directly relevant to the topic in the passages they had studied. Reading provides input for both content and appropriate means of expression (Hyland, 2003). The idea to give enough input through extensive reading in order to help students to produce better composition has often been supported by Krashen (1993), Hyland (2003) and others.

In the writing activity, the students were required to write an essay about a famous mathematician in about 500 words. The mathematicians to be taken up were Kiyoshi Oka, Kunihiro Kodaira, and Teiji Takagi, who were as a matter of fact listed by the students at the beginning of the course (Table 1). Since the class did not read about them, but they read about many lives of western mathematicians, writing about domestic mathematician was considered to be appropriate. The students were to choose and write about one of them. The reading materials they referred to were articles on Euler, Fourier, Abel, and Gauss. The passages had two distinctive styles on the basis of passage organization. Let us take a look

at writing pieces. Example A below arranged the mathematician's background in chronological order, but on the other hand, Example B mainly discussed the mathematician's achievements with a brief summary. The students followed one of the two styles or used a method of integration of them. Examples C and D are from the students' writing on Kiyoshi Oka. In Example C, the organization of the passage is based on the style of chronicle, and the passage started with the mathematician's birth year. In Example D, the passage is organized on the basis of the integrated style, which opens with the summary of the person's achievements. These examples clearly show that the students' writing has been influenced by the structural styles of the reading materials. However, as for vocabulary, it is difficult to recognize the effect of the reading materials. With regard to expressions, there were some expressions in the reading materials which were used in the students' writing: "*S is the greatest mathematician.*" These examples suggest authentic reading materials had good influences on the students' composing skills.

Example C Chronicle Style:

Niels Henrik Abel was born on August 5, 1802 in Frindoe, Norway. His father was a vicar in the village of Gjerstad. His father was active politically and was part of the movement that led to Norway's separation from Denmark in 1814. (An online article on Niels Henik Abel (Freeman, 2006))

Example B Style with Focused on Achievements

Leonhard Euler (1707-1783) was arguably the greatest mathematician of the eighteenth century (His closest competitor for that title is Lagrange) and one of the most prolific of all time; his publication list of 886 papers and books may be exceeded only by Paul Erdős. Euler's complete works fill about 90 volumes. Remarkably, much of this output dates from the last two decades of his life, when he was totally blind. (An online article on Leonhard Euler (Hoffman, 2003))

Example C Opening Passage of the Students' Writing on the Basis of the Chronicle Style

In 1901, Oka Kiyoshi was born on April 19 in Osaka, Japan. His father was Kanji Sakamoto. When Oka was 12 years old, his father decided to take over Oka's family, so Oka Kiyoshi's family returned to Kimitoge in Wakayama where was his father's hometown. In 1922, Oka Kiyoshi entered the Imperial University of Kyoto. At first, he studied physics. But he changed his subject to study mathematics. He graduated in 1925 and that year, he was appointed as lecturer in the Faculty of Science at the Imperial University of Kyoto. This year, also he got married to Oyama Michi.
(An essay on Oka Kiyoshi by Major C)

Example D Opening Passage of Students' Writing with Integrated Style

Oka Kiyoshi was one of the greatest mathematicians in Japan. He left many brilliant achievements of theory of analytical function of several variables. Furthermore he has aspect side that is not only a mathematician but also an essayist.

He was born on April 19th, 1901 in Osaka. He spent boyhood in Wakayama. His family have been a village headman among many generations. In 1925, he graduated University of Kyoto and take office as a lecturer of there.... (An essay on Oka Kiyoshi by Major D)

5 Conclusion

The aim of Reading and Writing II was to enhance students' reading and writing skills in an integrated way along with enriching vocabulary. COOLL was employed mainly in order to provide authentic and relevant reading materials and get the students involved in the content and language learning. The advantage of COOLL is that it helps to create a student-centered environment which is a necessary condition for CBI of English. The sophomore math majors in the course searched for their reading resources from their specialized field on the Web, and registered them on COOLL. Then, the students were engaged in peer reviewing the reading resources which their classmates had selected. Peer reviewing was an authentic activity because the students were to read extensively and carefully the materials in order to write about them to communicate their ideas to their classmates. They also selected reading materials for the course for themselves. Furthermore, by vocabulary learning which is relevant to the reading materials, they seem to have expanded their vocabulary knowledge. From the results from the checklists which measured their vocabulary sizes between before and after the treatment, apparently they gained more in learning technical terms than commonly used words. As for the writing activity, good influences of authentic resources were recognized. Especially, in structural styles and expressions, the text from the reading resources had positive effects on the students' writing.

As we have seen so far, COOLL is an effective means to implement CBI of English in a student-centered environment. Students are exposed to authentic materials on the Web via COOLL both on and off campus. More importantly, the use of COOLL enables students to get involved and become more confident in their study. It is clear that authentic resources via COOLL enhance their interests in their specialized fields. We live in the world where online information gets more and more available and important. In the future, we hope to conduct classes where students can get more involved by making more positive uses of COOLL.

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Appendix 1

Part of Vocabulary-Size Test

Put a tick next to each word you know, i.e., you have seen the word before and can express at least one meaning of it.

ID _____

NAME _____

STEP 1

- 1 A
- 2 ABLE
- 3 ABOUT
- 4 ABOVE
- 5 ACCOUNT
- 6 ACROSS

- 342 WOULD
- 343 WRITE
- 344 YEAR
- 345 YOU
- 346 YOUNG
- 347 WORD

STEP 2

- 1 ABROAD
- 2 ANGLE
- 3 ATTEND
- 4 ATTENTION
- 5 AUNT
- 6 AUTUMN

- 63 TRACK
- 64 TRANSLATE
- 65 UNIVERSE
- 66 WEIGH
- 67 YELLOW
- 68 ZERO

STEP 3

- 1 ACADEMY
- 2 ACCOMPANY
- 3 ACHIEVE
- 4 ANALYSE
- 5 APPARENT
- 6 AREA

- 54 SUM
- 55 THEORY
- 56 TOPIC
- 57 TRADITION
- 58 VERSION
- 59 VIRTUAL

STEP 4

- 1 ABBEY
- 2 AFRICA
- 3 ALPHABET
- 4 ANIMATED
- 5 APPEAL
- 6 ASIA

- 78 THEOREM
- 79 THINKER
- 80 TOKEN
- 81 TRIANGLE
- 82 VICAR
- 83 VIDEO