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Supplementing an English Phonetics Course with On-line Independent Study

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Abstract

This paper reports on the addition of an on-line independent study component to an English Phonetics course taught at a Japanese university. First, it describes the English Phonetics course and the rationale for adding an on-line module. It explains the construction and implementation of the module which was created through Moodle, a freeware CMS. Contrary to expectations, a t-test found that on-line interactive quizzes did not significantly improve student understanding of phonetics principles as measured by an end-of term exam. The paper ends with suggestions for improving the on-line component of the English Phonetics course.

Keywords: Phonetics, English phonetics, Computer-based learning; CMS; Moodle

In this paper, I report on the addition of an on-line independent study component to a pre-existing English Phonetics course. First, I describe the course and the on-line module. Next, I examine whether on-line interactive quizzes will improve student understanding of phonetics principles as measured by an end-of term exam. Finally, I make suggestions for improving the on-line component of the course.

Description of course

English Phonetics is a first-year elective course of the Department of English Language and Culture in the Faculty of Humanities at this university. It is offered in spring and fall semester to students in the day program, and in fall semester to students in the night program.

The first aim of the course is to teach basic, practical concepts in English phonetics that will help students improve their English pronunciation. The course is taught in lecture format, supported by PowerPoint presentations. The unpublished textbook, *Easy English Phonetics*, was written explicitly for this course and includes Japanese-language support. This aspect of the course is evaluated through an end-of-term exam.

The second aim of this course is to evaluate students' pronunciation and to provide each student with individualized training. The textbook includes a CD that contains listening exercises, pronunciation exercises, and pronunciation tests for twelve minimal pairs that commonly cause problems for Japanese students. At the beginning of the semester, students submit a recorded speech sample. After checking this, the instructor gives each student an individual list of which minimal pairs he or she must practice and re-submit. Students submit these cassette or mp3 recordings twice during the semester.

Rationale for an on-line component

At its elementary stages, classical phonetics can be quite difficult for many students. One reason may be that phonetics is characterized not by grand, sweeping ideas, but by accumulated details. Some of this information forms a hierarchical structure, in which concepts build on

each other. For example, *consonants* and *vowels* lead fairly naturally to the concept of *syllables*. However, much of the information has an interlocking structure. For example, the concepts of *linking*, *weak forms*, *co-articulation*, and *rhythm* are interrelated. It is only after all of these concepts are understood that each one really makes sense. Students have to live with a certain amount of ambiguity until all of the ideas have been taught; in addition, students who fail to grasp one concept may misinterpret the others.

Another reason that phonetics is difficult is the large amount of unfamiliar terminology with which students must become familiar. This is not because the terms are in English; students are no more familiar with 柏擦音 than they are with *affricate*.

Finally, for students who have trouble distinguishing the sounds of English, becoming comfortable with the International Phonetic Alphabet (IPA) requires considerable practice and discipline. Because this course teaches the fourteen vowels of West Coast American English, students need to be able to recognize the symbols for fifteen vowel sounds (including stressed [ʌ] and reduced [ə]), and for 24 consonant sounds. All students have seen IPA in their dictionaries, but most have only a vague idea of what these symbols really mean.

To help students meet these challenges, I decided to add a computer-based component to the 2006 fall semester course. Mastering these details requires repetition and individual study, but even “drill and kill” can be made more enjoyable through computer-based learning. This rather retrogressive type of on-line learning could be accomplished through any course management system (CMS) system that provides immediate feedback to the students and that sends the grade to the instructor.

I had added web-based content to this course several years ago

using a regular homepage¹ and practice modules made using University of Victoria's software, HotPotatoes². However, that was a one-way system in which students did not feel required to do the practices and I was not able to monitor them. Using a CMS would allow me to make the independent study an integral part of the course. For this project, I used *Moodle*³, a free, open-source CMS. Setting up the site was not exceptionally difficult, but was very labor-intensive.

The online independent study site

The online independent study materials were organized into five sections: background; consonant sounds; vowel sounds; sounds in words, and sounds in connected speech. (See Figure 1 for the front page.) Each section is set up to become visible to students when the related textbook chapters are taught. There are two types of study materials: quizzes and flashcards.

Quizzes (See Table 1) tested many of the concepts in phonetics that were presented in class. They opened when the material was taught

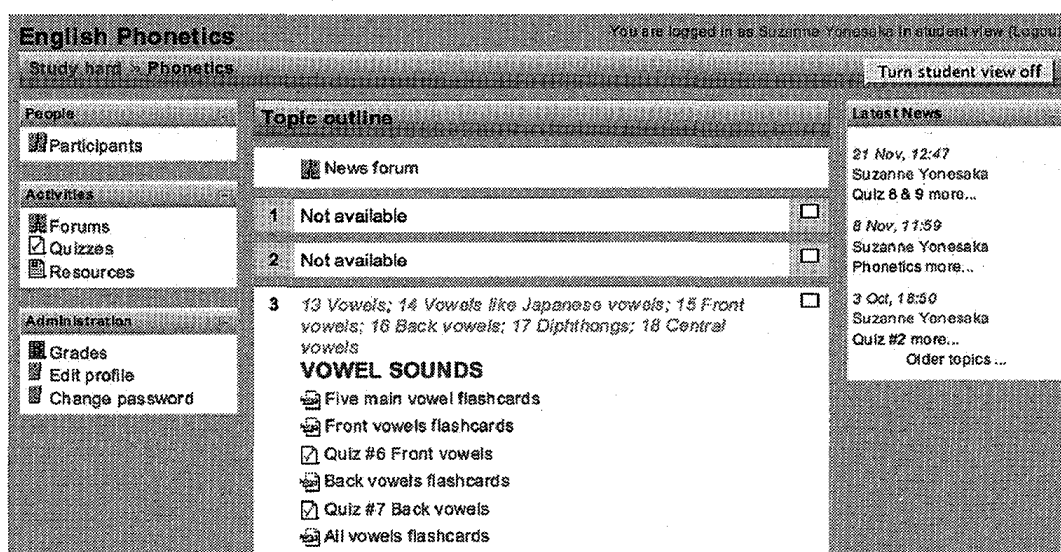


Figure 1. Front page of the site

Table 1. Textbook chapters and on-line quiz modules

Textbook chapter	Section	Quiz #	Type	Items	Attempts allowed
1. To the student					
2. Making speech sounds		1	Matching	10	3
3. What is phonetics	Background	2	Matching	6	3
4. Spelling and IPA					
5. Vowels and consonants					
6. Stops					
7. Fricatives					
8. Affricates	Consonant Sounds	3	Multiple choice	24	3
9. Nasals					
10. Approximants					
11. Place of articulation					
12. Voicing		4	Multiple choice	10	2
		5	Multiple choice	24	3
13. Vowels					
14. Vowels like Japanese					
15. Front vowels	Vowel Sounds	6	Fill-in-the blank	10	3
16. Back vowels		7	Multiple choice	5	3
17. Diphthongs					
18. Central vowels					
19. Phonemes	Sounds in Words	8	Multiple choice	10	3
20. Syllables					
21. Word stress					
22. Sentence stress					
23. Linking					
24. Co-articulation	Sounds in Connected Speech	10	T-F	7	2
25. Intonation					
26. National accents					
27. Regional accents					
28. Other accents					

and closed approximately three weeks later, giving students adequate time to access them. After completing each quiz, the student sees his or her score. The purpose of these quizzes was not to test students, but to get them to review and check their understanding of the material taught in class. Depending on the style and length of the quiz, students could take each quiz 2 or 3 times, with the highest score being counted. I had intended to set time limits on the quizzes, but it is not clear whether this function worked properly. Regardless of the number of items, each quiz had the same weight of ten points. (See Figure 2 for an

The image shows a screenshot of a quiz interface with two questions. Each question is numbered and includes a 'Marks: 1' indicator. The questions are about the phonetic classification of the words 'JELLY' and 'SHY'. Each question has a 'Choose one answer.' prompt and five radio button options: a. stop, b. fricative, c. affricate, d. nasal, and e. approximant.

1 The word JELLY begins with what kind of sound?
Marks: 1
Choose one answer.
☐ a. stop
☐ b. fricative
☐ c. affricate
☐ d. nasal
☐ e. approximant

2 The word SHY begins with what kind of sound?
Marks: 1
Choose one answer.
☐ a. stop
☐ b. fricative
☐ c. affricate
☐ d. nasal
☐ e. approximant

Figure 2. Example of multiple-choice quiz item.

example of a typical multiple-choice question.)

In addition, for practice in reading IPA, I created nine sets of “flashcards” which students were not required to use. The site also includes an extra resource section containing links to web pages such as the University of Iowa’s exquisite Flash animated phonetic library⁴.

The biggest technical problem in setting up the site was how to incorporate IPA. Fearing that it might be difficult to get students to enable their browsers to view quizzes made using the Unicode-based Doulos SIL font package⁵, I decided to use small screenshots saved as image files for all IPA words on the website. (See Figure 3 for an example of a quiz item using IPA image files.) For the flashcards, I put screenshots of IPA words and their English readings into i-Photo albums, then exported them as QuickTime movies.

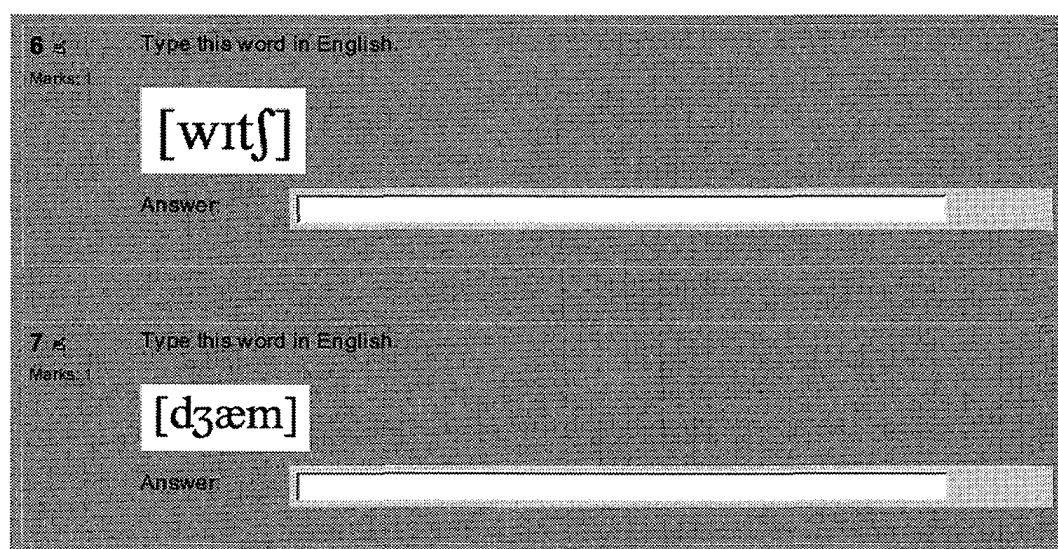


Figure 3. Example of quiz item using screenshots of IPA.

Using the site

Registering students

In fall semester of the 2006 academic year, 82 students were registered for the two sections of English Phonetics (not counting “no-shows”). Registering them for the online component was a two-step process: signing up for the CMS, and then “enrolling” in the English Phonetics on-line component.

During orientation on the first day of class, I gave students a handout with clear instructions and screenshots explaining how to sign up for the CMS and how to “enroll” in the on-line component. This class is not conducted in a computer classroom, so I told students to sign up using any Internet-enabled computer at school or at home, and that if they didn’t understand, I would help them sign up using the computer in my own office. After I explained that signing up is similar to signing up for a Yahoo account, most students understood.

Because of technical problems, students were not able to automatically enroll in the course after signing up for the CMS. Instead, I

enrolled them myself by hand, a somewhat time-consuming process. About 15% of the students forgot or became confused about their own log-in names or passwords, so I made myself constantly available until most students had settled in. I found some stereotypical gender differences in how students reacted to computer-related problems. Female students tended to help each other in small groups, coming to my office right away for help, whereas male students tended to try to solve difficulties alone for a longer time before seeking advice.

Confirming that students can access the course

During the first week, I gave a short non-credit homework assignment: to answer an on-line survey consisting of only one question, "What do you think about this website?" The real purpose of the assignment was to confirm that students were able to access the website properly. (At that point, 10 students thought the website was "easy"; 23 were "not sure yet"; and 31 thought it was "confusing").

Quiz results

During the fall semester, most of the students took almost all of the quizzes the maximum number of times (See Table 2.), and their scores improved with each attempt.

Table 2. Student participation in on-line quizzes

Quiz #	1	2	3	4	5	6	7	8	9	10
Ss who made attempts	71	66	73	71	71	76	76	71	71	63
(% of total Ss)	(87%)	(80%)	(89%)	(87%)	(87%)	(93%)	(93%)	(87%)	(87%)	(77%)
Total # of attempts	122	159	135	116	112	145	149	158	160	112

Research Questions

The purpose of the on-line component was to provide students with an opportunity to review important ideas in phonetics and to become familiar with IPA. Do on-line interactive quizzes improve student understanding of phonetics principles as measured by an end-of term exam? Do students who score higher in the on-line quizzes score higher in the final exam?

Question 1: Do students in a course section that incorporates the on-line materials perform better on the final exam than do students in a course section that is taught without the on-line materials?

Subjects

To create comparable groups, only first-year day students were included in this analysis.

- (1) Regular group: 40 first-year Ss (day program) enrolled in English Phonetics during the spring semester of 2006 (before the creation of the on-line component) who attempted the end-of-term exam.
- (2) Computer-based learning (CBL) group: 51 first-year Ss (day program) enrolled in English Phonetics during the fall semester of 2006 who attempted both the on-line interactive quizzes and the end-of-term exam.

Instrument

The instrument is a 75-item final examination consisting of multiple-choice and matching questions in marksheet format. The exam is written in English, and a bilingual terminology list of 36 specialized vocabulary items provides language support. The question

Table 3. Mean scores for final exam by group

Group	N	Mean	s.d.
Regular	40	42.48	6.579
CBL	51	39.45	7.156

Table 4. Significant differences between the two groups' final exam scores

t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
2.072	89	.041	3.02	1.459

(p < 0.05)

sheet was collected at the end of the exam, along with the OCR cards. 10 items on the test involved listening discrimination, which was not practiced on-line. These have been eliminated, for a total of 65 items covering all theoretical areas of phonetics taught in the course.

Method

Data was calculated for each group. For the scores on the final exam (65 items only), the CBL group scored slightly lower than the Regular group. In addition, there was a wider deviation among their scores. (See Table 3.)

An independent samples t-test (equal variances) found that there was a significant difference between the final exam scores (65 items) of the Regular and CBL groups. (See Table 4.)

Question 2: Do students who achieve higher marks on-line materials perform better on the final exam than students who do not? In other words, is there a correlation between on-line scores and exam scores?

Subjects

Subjects were 51 first-year students (day program) enrolled in English Phonetics during the fall semester of 2006 who attempted both the on-line interactive quizzes and the end-of-term exam.

Method

The scores of the on-line quizzes were not normally distributed, but were clustered at the high end (as hoped!) with many students getting the same score. Therefore, Kendall's tau (2-tailed) was calculated for the mean scores of the on-line quizzes and the mean scores for the end-of-term exam. There was a correlation of .274 ($p < 0.01$).

Results

The results seem to indicate that the on-line course has not helped student understanding of key concepts; in fact, CBL students scored slightly lower than students who did not have access to on-line learning. Yet, there is an average but significant correlation between the scores on the quizzes and the final exam. Several factors could account for these results.

First, although the final exam counted for the same percentage of the final grade for both course sections, students in the CBL group may have underestimated its importance. Because they spent time doing quizzes on-line, they may have felt less obligated to study for the final exam. In future, with the addition of the on-line component, the final exam could carry less weight in terms of evaluation.

Second, there may be some dissonance between the on-line quizzes and rest of the course content. As with the introduction of any new materials, the quizzes need on-going evaluation for accuracy, meaningfulness, and coherence with the rest of the coursework.

Finally, and most importantly, because the CMS environment was new, both students and instructor were pressured in new ways. The students had to deal with new technology in addition to new concepts. Maintaining the in-line module required considerable effort and attention from the instructor. However, though any CMS is always labor-intensive at the beginning, the cost-benefit ratio improves with time.

Discussion

These results show clear ways to improve on the implementation of the CMS. First, as suggested above, evaluation criteria should be shifted. The length and the weight of the final exam should be greatly reduced, and more weight should be added to the CMS component. There should also be more overlap between the items in the CMS quiz item bank and the items on the final exam. In addition, an item analysis of the CMS quiz items should be conducted using Moodle's "item analysis" feature.

Second, to make the CMS content fit the lesson content better, a crucial element needs to be added: sound. Adding audio files will be an interesting challenge, not so much in terms of recording, but in terms of guaranteeing that students can hear the files, especially students who can access the CMS only at the university computer labs.

Finally, about 20% of the students needed more initial support. I had expected that most students would be able to sign up for and use the CMS on their own with the aid of a handout; in fact, this was true. However, more support could be provided by holding the first class meeting in a computer lab, during which time students "enroll" and are guided through some simple on-line activities.

A hidden agenda in adding the on-line module was to demonstrate

to students that computer literacy is a requirement in today's upper education. The following anecdote suggests that the agenda was successful. At the beginning of the course, a mature student in the course contacted me many times daily with worries about passwords, logging in, and so forth. When she came to my office for help, I realized that she had no computer skills or even typing skills, but I continued to help her when needed, and she succeeded in completing all of the on-line work. In fact, on the last day of class, she showed the other students her brand-new i-pod, into which she had downloaded all of the CD listening and pronunciation exercises!

Even though the results of the present study were not as expected, I feel that the addition of an on-line independent study component is worthwhile. By having students review the theoretical aspects of the English Phonetics course through on-line quizzes, I was able to spend more class time putting the theory into practice through pronunciation exercises and games. I will continue to experiment in search of the most effective way to incorporate an on-line independent study component into this English Phonetics course.

¹ http://www.jin.hokkai-s-u.ac.jp/~suzanne/phonetics/phon_indp_stdy.html

² <http://hotpot.uvic.ca>

³ <http://moodle.org>

⁴ <http://www.uiowa.edu/~acadtech/phonetics/>

⁵ http://scripts.sil.org/cms/scripts/page.php?site_id=nrsi&item_id=DoulosSILfont