
Development of Courseware for Effectively Teaching Vocabulary to EFL Students

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Outline

The purpose of this study was to develop a prototype of courseware to effectively teach vocabulary to English as a Foreign Language (EFL) students, and to evaluate the effects of the materials on them.

In our study, we attempted to develop courseware which used all the multimedia facilities of today's personal computers, as well as the most advanced theories of teaching vocabulary. Specifically, we put together all the necessary procedures proposed by the theories of learning--classical conditioning, operant learning and cognitive learning--to develop an effective system for teaching vocabulary. The technique of spaced practice was also introduced to increase the rate of retention.

After conducting the study described above, it was found that:

A. Learners could enhance their vocabulary knowledge so that they could easily access their personal lexicon and incorporate the information fluently in their communicative interactions outside the classroom.

B. Learners could retain 93.1percent of the words they learned for 11 weeks. Their average rate of forgetting was only 0.6 percent a week.

C. Learners actively participated in the process and developed positive attitudes toward learning their English vocabulary.

Introduction

Students, teachers, researchers and scholars of today all agree that vocabulary is one of the most important elements for successful acquisition of communicative proficiency in the study of a foreign language (Allen 5). Specifically, we have found that no scientifically designed system for

effectively teaching vocabulary is currently available (Stroller & Grabe 24; Schmitt 34). With this background in mind, we started to explore the possibility that a computer program providing lexical information about new words encountered in different contexts would facilitate vocabulary acquisition in a foreign language.

Purpose of the Study

Our research objectives were to develop and evaluate a prototype multimedia interactive system for effectively teaching vocabulary to Japanese students of English. By the use of such courseware, learners would:

- a. enhance their vocabulary knowledge so that they can access their personal lexicon and incorporate the information into their communicative skills outside the classroom.
- b. retain the target words and develop a viable lexicon.
- c. actively participate and develop positive attitudes toward learning English vocabulary.

Development of Courseware: Collection of the Teaching Materials

1) Selection of the Target Words

We selected our target vocabulary items from a pool of words we collected from multiple sources. The sources were a TV drama, a lecture and a movie that we thought college students might be interested in. From this collection of words, one hundred and forty were selected as possible target words for the teaching. The target words included the following: vote, referendum, incredibly, unanimous, insightful, offensive, tuition, suspend, reluctant, placidity, revenue, premium, instinct, maturity, defendant, apprehend, censor, revoke, objection, uphold, implication, context, eloquent, aggravate, tolerate, paralyze, errand.

We also presented the vocabulary in chunks or phrases, because learners can encode, retain, and retrieve chunks of information. If learners can retain the vocabulary, then they can use these linguistic components easily in oral communication. We developed the chunks from the original transcripts of the sources, for defining the vocabulary items.

The chunks defined include the following:

- a. The certain [authority] decides that
(the Japanese equivalent: *aru toukyoku ga kimeru*)
- b. make [provision] for the future
(the Japanese equivalent: *shourai ni sonaeru*)
- c. a written [constitution]
(the Japanese equivalent: *seibun kenpou*)

2) Categorical Grouping of the Target Words

We classified the 140 target words into 14 categories – 10 words within each semantic context. The resulting 14 categories were identified as follows:

- Set a) Political Terms
- Set b) Qualifiers and Intensifiers
- Set c) Expressions on Personality
- Set d) School Life
- Set e) Expressions of State of Mind
- Set f) Business and Economics Terms
- Set g) Psychological Terms and Expressions
- Set h) Legal Terms I
- Set i) Legal Terms II
- Set j) Debate and Discussion I
- Set k) Debate and Discussion II
- Set l) Debate and Discussion III
- Set m) Expressions of Emotions
- Set n) Random Collection of Words

3) Recording Target Words and Chunks

A native speaker of English audio-recorded the 140 target words and the 420 chunks (140 words and 3 chunks each). The speaker was instructed to say the stimuli clearly, using normal intonation patterns. The recordings were made in a soundproof unit. The instruments used for recording were a tape recorder (SONY Stereo CassetteCorder TC-D5M) and a microphone (SONY Condenser Microphone C-450).

Methods for Teaching Words

1) Setting Stages of Courseware

The subjects learned the target words of a set in the following four successive stages: I) Motivate the learners; II) Present the target words; III) Complete the tasks for learning; and IV) Confirm and review tasks.

2) Setting 'Steps' for Teaching the Words

The learning activities are divided further into 12 progressive steps. First the subjects studied one set of words through the 12-step program in this sequence. They could then repeat any or all the steps within the specified time period.

Stage I. Motivate the learners

Step 1: A picture which represents the category of the ten words is presented. The subjects hear the pronunciation of the target words sequentially while viewing the picture.

"[W]e put together all the necessary procedures proposed by the theories of learning--classical conditioning, operant learning and cognitive learning--to develop an effective system for teaching vocabulary."

Stage II. Present the target words

Step 2:

The target words for a given session are presented in one frame. The printed English word or the spelling of the target word and the Japanese equivalent are presented. The learner confirms the English pronunciation of each word by choosing the word and pressing the space bar. An example is 'referendum' (the Japanese equivalent: *kokumin touhyou*)

Step 3:

Each target word is presented in the context of three chunks. Learners hear the English pronunciation of the chunk by pressing the space bar. The meaning of the chunk is presented approximately two seconds after the pronunciation. This delay does not overload the learner's ability to process information. During this time, the learner can actively think about the meaning.

Step 4:

The definition or meaning of each word described in a monolingual dictionary is presented. The 10 target words are divided into two groups of five and are presented in two frames so that the learners are not given too much information at one time.

Stage III. Complete the tasks for learning

Step 5:

Learners retrieve the words from the definitions in the target language. They confirm the spelling of the target word by pressing Return. The pronunciation is presented two seconds later.

Step 6:

Learners retrieve the Japanese meaning for each target word presented and confirm their answers by pressing Return.

Step 7:

Learners retrieve the English spelling for each Japanese equivalent and confirm their answers by pressing Return.

Step 8:

Learners write all the target words and chunks in their personal notebooks twice.

Step 9:

The contexts of the target words are presented in chunks in conjunction with the Japanese translation.

A blank line or gap in parentheses is provided as a cue for placement of a target word. The learner confirms his or her answer by pressing the space bar. Six frames are used for this step. Five chunks are presented in each of the six frames for a total of 30 chunks. The three chunks for any one target word are presented in different frames.

Stage IV. Confirm and review tasks

Step 10:

The same as Step 2 described above.

Step 11:

The same as Step 1 described above.

Step 12:

Learners generate and write one sentence for each target word in their personal notebooks.

3) Giving Information on the Knowledge of Results

An achievement test on the words they learned in the previous week was conducted every week before the review. The achievement test lasted approximately five minutes. The subjects were immediately given their results.

4) Designing the Teaching Schedule

One set consisted of a group of 10 words. Thus, 140 target words were taught in 14 sets. To teach these words incorporating the principle of spaced learning, the following schedule was designed. Basically, subjects took an achievement test on the words they learned in the previous week, then they reviewed the two sets and studied two new sets of words in 80 minutes.

Week	Achievement Test	Review	Study
1			Sets a, b
2	Sets a, b	Sets a, b	Sets c, d
3	Sets c, d	Sets c, d	Sets e, f
4	Sets e, f	Sets e, f	Sets g, h
5	Sets g, h	Sets g, h	Sets i, j
6	Sets i, j	Sets i, j	Sets k, l
7	Sets k, l	Sets k, l	Sets m, n
8	Sets m, n	Sets m, n	

Table 1. Vocabulary Teaching Schedule

Experimental Design

In this study, we used personal computers to teach vocabulary. With personal computers we could control the presentation of audio and visual images in conjunction with the written form of Japanese and English words. Also, we could objectively control the variables and observe the effectiveness of the courseware.

Seventeen students of Chiba University participated in this study and each student was assigned to a personal computer (NEC PC-9821 Ce2) loaded with the courseware developed in this study. Eight weeks were spent for the teaching, and total study time was 640 minutes.

Methods for Evaluating the Results of Teaching

A pre-test and two post-tests were administered. The pre-test was administered one week before the teaching. The post-tests were administered twice. The first was given one week after the teaching was completed (Post-test 1). The second was administered two weeks after the first post-test (Post-test 2). All the tests were composed of four types of tests, and each of the four tests was composed of 35 test items (target words). It took approximately one hour to administer the four tests, including a ten minute break between each test. Three of the four tests utilized multiple-choice formats with four alternatives to the target response. The distractors were chosen to minimize random guessing. The four types of tests were as follows:

- a. Identification test (10 minutes): The subjects selected the Japanese equivalent meaning of the target word from four possible alternatives after listening to the target word in isolation.
- b. Recognition test (10 minutes): The subjects wrote the Japanese equivalent of the target word after listening to the target word in isolation.
- c. Definition test (5 minutes): The subjects selected the English word from four possible alternatives after viewing the English definition. The subjects were familiar with the words used in the definition.
- d. Completion test (5 minutes): The subjects completed a sentence by filling in a gap or blank space with one of four word alternatives.

Two types of questionnaires were prepared to elicit the subjects' impression of using the courseware to learn the target words. The first consisted of free-response questions; the second consisted of response-selection questions. The questionnaires were administered two weeks after the experimental teaching was completed or one week

after Post-test 1.

The following three statistics were chosen: 1) a t-test to test the significance of the difference in the mean scores of the rate of retention; 2) an analysis of variance for one way classification in a completely randomized design to test the significance in the differences among the scores obtained in the four tests; 3) X^2 (the formula used in computing X^2 incorporating Yete's correction for continuity) to test the significance in the difference of frequency of responses.

The Effects of Teaching Vocabulary Assessing the Knowledge of Words

To assess the students' knowledge of words, four types of test described above were administered. The Pre-test and Post-test 2 scores of improvement are shown in Figure 1. The mean scores for the Post-test 2 were all above 93 percent. The scores of improvement, the differences between the Pre-test and Post-test 2 were statistically significant at the .01 level of confidence.

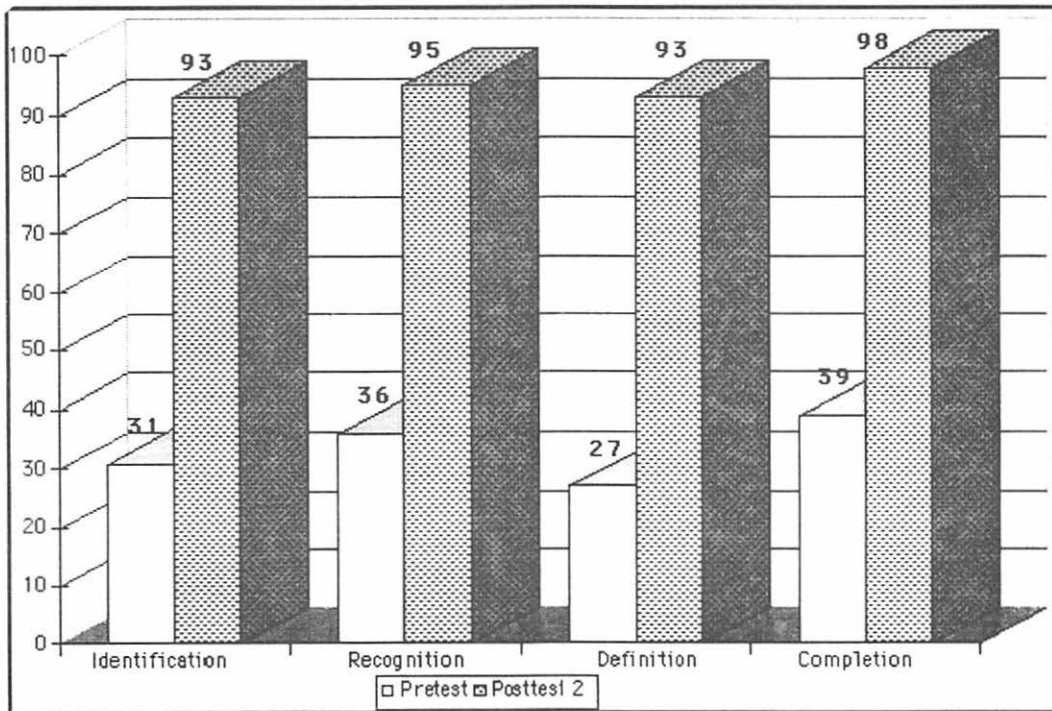


Figure 1.

Mean Scores (/100) of Pre-test and Post-test 2

Examining the Retention Rate

To examine the retention rate, we compared the scores of improvement by calculating the number of weeks which the respective sets of words were taught prior to

administering each test. The data for long-term retention were obtained by calculating the mean scores of the two post-tests administered at respective weeks after their initial presentation. See Table 2 for the scores. As an index to the retention after one week, the mean score 97.7 percent, was obtained from the mean score of the achievement tests.

Elapsed Time [weeks]	Post-test 1		Post-test 2		Mean
	Retention Rate	[week taught]	Retention Rate	[week taught]	
1	–		–		97.7
2	96.8	[8th]	–		96.8
3	98.9	[7th]	–		98.9
4	99.0	[6th]	98.9	[8th]	99.0
5	98.9	[5th]	94.7	[7th]	96.8
6	99.0	[4th]	97.1	[6th]	98.1
7	98.9	[3rd]	94.0	[5th]	96.5
8	97.1	[2nd]	93.8	[4th]	95.5
9	96.8	[1st]	94.2	[3rd]	95.5
10	–		92.5	[2nd]	92.5
11	–		93.1	[1st]	93.1

*No data are available

Table 2. Data of Long-term Retention

Observing Opinions

In response-selection questions, 88 percent of the subjects said, "It was fun to study," and all of the 17 subjects expressed their desire to study more words with this courseware. In free-response questions, some reported being able to read English newspapers, and others to understand television programs such as the BBC Economic News better.

Implications of the Results

A teaching method needs to incorporate both a large vocabulary and a means for facilitating the students' ability to retain the target words. Adult learners typically have limited time to study a foreign language. Therefore, it is critical that students retain the vocabulary they learn. We believe we have met these criteria with our courseware by incorporating such propositions as the following from learning theories, and by using an interactive multimedia system approach:

- a. We have integrated theories of learning such

system.

b. The procedure of spaced practice was also incorporated into the teaching system to attain a better retention rate.

c. The multimedia facilities of a personal computer were used to exchange critical information interactively and effectively. Using this courseware the learners could study vocabulary at their own pace.

Conclusions

It is significant that we succeeded in developing courseware that students responded to favorably. The most striking result of the present study was that the subjects retained 93 percent of the words for 11 weeks. After learning 140 words, the average rate of forgetting per week was only 0.61 percent.

The four tests we used to evaluate the results of the subjects' learning were varied and incorporated multiple communicative usage. We can include three more points to support our conclusion. The first is the high correlation (in all of the comparisons $r > .70$, and $t > 5.141^*$, $p < .01$) of the scores of completion test and the scores of MLA tests (listening, speaking, reading, writing and total score) found by Caulfield and Smith (43-58). Our completion test is similar to his cloze test. The second point is that significant improvement in the actual scores was obtained in listening tests after teaching vocabulary in our preliminary study. Lastly, the remarks by the subjects described above show that they could successfully learn vocabulary for practical use. We believe this work incorporates strategies for Japanese EFL learners to develop English communicative skills. ♦

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