Three Types of CALL Courseware Developed for Teaching Vocabulary to EFL Students

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Abstract

The purpose of our study was to develop and compare the functions of three types of courseware to teach vocabulary to EFL college students. They were 1) translation and test type, 2) drill and practice type, and 3) cognitive and spaced practice type. The function of the third type was found to be far superior to those of the other two types, and after 11 weeks of study, the subjects had retained 93 percent of 140 words that were introduced. They reported that they learned the new words so effectively that they could now read newspapers and understand BBC news.

1. INTRODUCTION

Paribakht and Wesche (1997: 174) state, "The long-neglected issue of vocabulary acquisition is currently receiving attention in second language pedagogy and research - reflecting the importance always accorded it by learners." However, they continue to say, "But it is still far from clear how learners acquire or how it can best be taught." In fact, many teachers and researchers know that there are many difficult problems that remain unsolved in the area of effective EFL or ESL vocabulary teaching and learning.

For example, Krashen (1989: 450) states that vocabulary learning is at best boring and at worst painful. While, Brown and Perry (1991: 655) argue that students learning English for higher education face a formidable task, extrapolating that an ESL student learning academic English would have to learn an average of more than 3,000 words per year. Acquiring the amount of necessary vocabulary for successful communication takes a great deal of time (Nation, 1990: 12), especially when words are learned incidentally, by reading books or listening to others speaking (Huckin and Haynes, 1993: 295).

To complicate matters, some words learned after long and tedious study are quickly forgotten (Kamioka, 1982; Meara, 1989). Some methods which were reported to have been developed for effective teaching of vocabulary are used only for teaching a specific category of words (Ellis, 1995: 12). Further, it is said that many of the words learned and remembered cannot be used in practical communication: in speaking, listening, reading, or writing (Nagy, 1988: 4; Schmitt, 1995: 34).

We began our study in an attempt to develop a vocabulary teaching system, which might solve, or at least, alleviate some of the problems mentioned here.

2. PURPOSE OF THE STUDY

The purpose of our study was to develop and compare the functions of three types of courseware to be used in a CALL system to teach vocabulary effectively to EFL. The final goal of our research was to develop courseware for learning vocabulary with the following characteristics:

1) Vocabulary learning tasks that are enjoyable,

2) Vocabulary learning tasks that are effective,

3) Vocabulary learning tasks that promote learning of a large number of words,

4) Vocabulary learning tasks that are not limited to certain lexicon,

5) Vocabulary learning tasks that yield high retention rates over long periods of time, and

6) Vocabulary learning tasks that promote the learning of words that can be used in practical communication.

Our first priority in this project was the development of a teaching system, which helps students learn communicative vocabulary effectively and not merely to demonstrate an innovative use of computers. The use of computers in and of themselves, does not necessarily stimulate improvement of a students' foreign language proficiency, however effective use of computers may lead to such improvement.

3. RESEARCH DESIGN

3.1. Development of courseware

In order to develop a vocabulary teaching system featuring the characteristics stated above, we decided to introduce a personal computer as a means of instruction. We felt that the use of a personal computer might resolve some of the challenges presented in vocabulary study and acquisition. Vocabulary learning using a personal computer might turn tedious, arduous study into an enjoyable task not unlike the entertainment found in video games.   Schreck & Schreck (1991: 472) suggest this possibility:

> Viewed as a new resource to help promote, enhance, and facilitate learning, the computer has fostered high expectations of more effective, more relevant, more motivating, and more innovative new learning experiences.

On the other hand, we were fully aware of the fact that the state of vocabulary teaching could not instantly be improved by simply introducing personal computers to an English class. Levy (1997: 5) affirms that, "a number of CALL projects have not been driven directly by theory", such as instructional design, language teaching, or knowledge of the applicability of the technology. Thus, we decided to take a systems approach in introducing personal computers to our class, by using a three-step process for developing vocabulary teaching courseware. We considered this to be both practical and acceptable.

In our first experimental study, the personal computer was used with a traditional method of drill and practice (The drill and practice courseware: VC-1). In the second study, game-like activities

were incorporated in addition to the drill and practice (The task-based courseware: VC-2). In the third study, we developed the vocabulary teaching tasks further, introducing activities suggested by theories of learning or information science (The multimedia courseware: VC-3). The structure of the courseware developed at each of the three steps is presented below.

3.2. Structure of the courseware

3.2.1. The drill and practice courseware: VC-1

The features of this courseware can be summarized as a simple, three-step drill and practice, text-only single-medium type, within the context of information processing activities on the part of the learners. The following are the steps of learning activity to be done with VC-1.

Step 1   A simple sentence, which contains at least one target word, appears on the screen.

Step 2   Three words, including the target word, together with the Japanese equivalents appear on the screen.

Step 3   A simple sentence with three blanks appears on the screen.
The learner's job is to fill in the three blanks with the appropriate words.
The correct words appear in the blanks when the return key is pressed.

3.2.2. The task-based courseware: VC-2

VC-1 was expanded to create VC-2. First, the target words were classified by topic into several groups. The words in each group were studied as a unit. Then, a chunk, or contextualized phrase containing the target word (See 3.3.4), and a simple sentence were given in order to give a short-and-easy-to-remember context for each target word. However, the task that the learners seemed to enjoy the most was that of typing in the spelling of each word. They spent more time on this task than any other task.   This might have been enjoyable because instant feedback as to the correctness of an answer was given to the learner.

The six steps of learning activity to be done with VC-2 are as follows:

Step 1   A list of 11 to 12 target words (with the Japanese equivalents) is presented on the screen.

Step 2   The target words are presented in chunks, together with the Japanese equivalents of the chunks.

Step 3   The target words are presented in sentences, together with the Japanese equivalents of the sentences.

Step 4   The learner types the spelling of each of the target words after the Japanese equivalent is presented. The computer checks, and gives feedback immediately after he or she types the answer. The learner can also check the correct spellings without typing them.

Step 5   The learner tries to retrieve the meanings of the target words presented on the screen. The learner can check the Japanese equivalent by pressing the return key.

Step 6   Target words are presented in chunks for the learner to review how the words can be used.

3.2.3. The multimedia courseware: VC-3

VC-3 consisted of an expansion of VC-2 to 12 steps. Students were given opportunities to manipulate information with regard to many different aspects of a word, in a variety of ways. Although, the tasks in VC-3 were relatively simple to do, they were introduced in logical sequence in keeping with established activities considered effective in 'theories of learning', 'systems science', 'information science', and also in a technique called 'spaced practice' (See 3.8). Spaced practice is the practice of studying various skills in short intervals interspersed with study sessions on other topics (Anderson, 1980).

With VC-3, the students were given ample opportunity to process information about the target words in terms of their visual and acoustic properties (Steps 1, 2, 3, 5, 10, and 11). Such tasks, in turn, may have helped the learners' processing of information on a deeper semantic level by relating the target words to their existing cognitive structures. Other tasks should have helped the students to directly process information on the semantic level.

The following detailed series of steps are the learning activities to be done with VC-3.

Subjects were instructed to study one set of words through the 12 steps in this order. However, they were allowed to repeat any or all the steps within the time allotted.

Stage 1   Giving motivation for the study

Step 1   A picture which is considered to be the most appropriate for the meanings of the group of 10 words grouped to be taught in one session is presented on the screen. The pronunciation of all the words are presented one after another while viewing the picture on the screen.

Stage 2   Presentation of the target words

Step 2   Words (spellings and Japanese equivalents) in one session are presented in a table. The learner confirms the pronunciation of each word by choosing the word and pressing the space bar.

Step 3   Each target word is presented in the context of three chunks. Learners can hear the pronunciation by pressing the space bar. The meaning of the chunk is presented on the screen approximately two seconds after the pronunciation. The reason for this delay is not to overload the learner's perceptive effort and activity, and also to allow the learner to think actively about the meaning of the chunk before it is given.

Step 4   The definition or meaning of each word, as described in monolingual dictionaries, is given on the screen. Descriptions of the definitions are divided into two groups of five and presented in two frames so that the learners are not overwhelmed by too much information in one frame.

Stage 3   Tasks for learning

Step 5   Learners retrieve the target words from the definitions that are presented on the screen. Learners can confirm the spelling of the target word by pressing the return key. The pronunciation is also presented two seconds later.

Step 6   Learners retrieve the meaning for each target word presented on the screen and can confirm the Japanese equivalent by pressing the return key.

Step 7   Learners retrieve the spelling for each Japanese equivalent presented and can confirm the spelling by pressing the return key.

Step 8   Learners write all the target words and chunks in their notebooks twice.

Step 9   The context of the target words is presented in English sentences in conjunction with their Japanese equivalents. A blank in parentheses is provided for the target word. If the learner presses the space bar, the target word appears in the blank. Six frames are used for this activity, presenting five chunks in each frame. The chunks for each target word are arranged so that they appear in different frames.

Stage 4   Confirmation and review work

Step 10   The same as Step 2 described above.

Step 11   The same as Step 1 described above.

Step 12   Learners are requested to generate and write one sentence for each target word in their notebooks.

3.3. Materials

3.3.1. Number of Words taught

   VC-1 and VC-2: 89 business related words

   VC-3: 140 words selected from a TV sitcom, a college-level lecture, and a movie

3.3.2. Screening of target words

   Possible target words were collected from the sources such as a TV sitcom, a college lecture, and a movie. Then, from this list, words, which were commonly known to appear in junior high school and senior high school textbooks, were deleted.   Words, which were considered a possible part of the experimental subjects' vocabulary, were also deleted. A remaining 140 words were retained as possible target words for teaching.

3.3.3. Examples of target words

   VC-1 and VC-2: abreast, commemoration, deduction, itinerary, altitude, etc.

   VC-3: confiscate, prudent, vulgarity, shrewd, premium, violate, impede, etc.

3.3.4. Collection of chunks

   The chunks were extracted from the transcriptions of the resource materials (TV sitcom, college lecture, and TV movie). However, it was difficult to find three interesting chunks for each of the target words. Therefore, we also used *Oxford Advanced Learner's Dictionary* and The COBUILD on CD-ROM for creating chunks.

   Some examples of chunks used in VC-2 to show the learners the context of the target words are listed below. The words in parentheses are the target words.

(annual)	to finish the annual report
(petition)	a petition has been filed

   Some examples of chunks used in VC-3 to show the learners the context of the target words are listed below. Each target word was presented in the context of three chunks.

(provocative)	They are provocative.
	his provocative words
	He is just being provocative.
(violate)	violate the students' right
	They violated my privacy.
	violate the peace

3.3.5. Grouping of target words

   The courseware and the computer programs for VC-3 were developed so that 10 words could be most effectively taught as a set in one session, therefore, a total of 140 words in 14 sets. Sets were established by topic for 13 word groups, however, 10 remaining words could not be thematically grouped, and, therefore, were placed in a miscellaneous category.

3.4. Instrumentation

   VC-1 and VC-2: 17 sets of personal computers (NEC PC-9801 DS)

VC-3: 17 sets of personal computers (NEC PC-9821 Ce2)

3.5. Time Spent for Teaching

VC-1 and VC-2: 4 weeks, 200 minutes in total

VC-3: 8 weeks, 500 minutes in total

3.6. Number of Teaching Sessions

VC-1 and VC-2: 4 sessions (50 minutes each. The subjects were allowed to stop
studying when they were convinced that they had learned all the words.)

VC-3: 8 sessions (70 minutes each. The subjects were given an achievement test
after each of the sessions.)

3.7. Experimental Subjects

Three groups of 34 Japanese college students in total participated in this experimental study.

VC-1: 17 students of Chiba University who were majoring in TESOL
(mostly juniors and seniors)

VC-2: the same group of 17 students as the first group

VC-3: 17 students of Chiba University who were majoring in TESOL
(mostly juniors and seniors)

3.8. Teaching Schedule

In the VC-3 learning activity, one session was comprised of 12 steps, divided into 4 stages. A total of 140 target words were taught over 14 sessions. In order to teach 140 words in the 14 sessions through the principle of spaced practice, the following schedule was designed.

The first week   (80 minutes)
Explanation on the use of the learning system
The study of the first study session

The second week   (80 minutes)
Achievement test on the first study session
A review of the first study session
The study of the second and third study sessions

The eighth week   (80 minutes)
Achievement test on the twelfth and thirteenth study sessions
A review of the first through thirteenth study sessions
The study of the fourteenth study session

A table, which shows the complete schedule of teaching for 8 weeks, is presented below.

Week	Achievement test	Review	Study
1			set 1
2	set 1	set 1	**sets 2, 3**
3	**sets 2, 3**	**sets 2, 3**	sets 4, 5
4	sets 4, 5	sets 4, 5	sets 6, 7
5	sets 6, 7	sets 6, 7	sets 8, 9
6	sets 8, 9	sets 8, 9	sets 10, 11
7	sets 10, 11	sets 10, 11	sets 12, 13
8	sets 12, 13	sets 1 ~ 13	set 14

3.9. Methods of evaluation

We administered a pretest and two posttests to observe the effects of using each of the three sets of courseware. Four types of tests were employed: a) Recognition test (multiple choice type), b) Identification test, c) Definition test (multiple choice type), d) Gap-filling test (multiple choice type).

Two types of questionnaires were also prepared to elicit the learners' impression of using the courseware. The first questionnaire employed free-response questions; the second consisted of response-selection questions. The questionnaires were administered two weeks after the teaching was completed. The sample test items are listed below:

3.9.1. Sample test items used for VC-1 and VC-2

The following are the examples of the test items used for VC-1 and VC-2.

1) Recall a word, which matches each of the following definitions quoted from an English dictionary.
    (1) Plan for, or record of, a journey   [   ]
    (2) relating to or concerned with the post   [   ]

2) Read the following words and give the Japanese equivalent for each English word.
    (1) petition   [   ]
    (2) purchase   [   ]

3) Read the following Japanese words and give the English equivalent for each Japanese word.
    (1)   [   ]
    (2)   [   ]

4) Choose one word from the 22 words listed below to fill each of the blanks in the following sentences.
    (1) The man wearing [   ] jacket is waving his hand.
    (2) The plane began to lose [   ].

        | altitude, appropriate, brokerage, plaid, commemoration, etc |

3.9.2. Sample test items used for VC-3

The following are the examples of the test items used for VC-3.

1) Recognition test

Words recorded on an audiotape are presented and the learners choose the best
Japanese equivalent for each word presented from the 4 alternative choices listed.

(1) [   ]   [   ]   [   ]   [   ]
(2) [   ]   [   ]   [   ]   [   ]

2) Identification test

Words recorded on an audiotape are presented and the learners recall and
write down the best Japanese equivalent for each word presented.

(1) confiscate   [   ]
(2) tuition   [   ]

3) Definition test

Definitions quoted from an English dictionary are presented. The learners
choose an appropriate word for each of the definitions from 4 alternative
choices presented.

(1) The act of measuring and recording the details of something
[ ] contact   [ ] survey   [ ] profit   [ ] discretion
(2) To declare something to be wrong or untruthful
[ ] contradict [ ] expel   [ ] uphold   [ ] impede

4) Gap-filling test

Sentences, each with one blank space, are presented. The learners choose
one word from the 4 words listed below each sentence to fill the blank.

(1) The government [   ] the use of chemical weapons.
    confiscated   banned   jeopardized   attributed
(2) Discover the hidden [   ] in each child.
    outcome   validity   branch   potential

4. RESULTS AND DISCUSSION

4.1. Results

4.1.1. Test Scores

The results of experimentally teaching vocabulary by using VC-1, VC-2, and VC-3 are summarized and presented in Tables 1, 2, and 3.   The data of Tables 2 and 3 are also presented in Figures 1 and 2 respectively.

The data collected by questionnaires are presented following the presentation of the data in Tables and Figures.

After the subjects learned 89 words in 4 sessions, the results of the immediate posttest between VC-1 and VC-2, which was given after an intervening task, were compared. The difference of 92% (VC-2) and 79% (VC-1) was statistically significant (Table 1).

Table 1.   The rate of immediate recall as observed after

each of the three study sessions respectively

	1	2	3	Mean
VC-1	71 (%)	86	81	79
VC-2	92	92	91	92
t-test	2.887 *	0.828	2.150 *	

* p < .05

However, when we compared the results of the delayed (5 weeks) posttest between VC-2 and VC-1, the difference of 34% and 33% (Table 2 and Figure 2) was not statistically significant. It was interesting to find that the VC-2 group spent slightly less time than the VC-1 group to learn the same number of words, although there were more steps to go through in VC-2 than in VC-1.

The VC-3 subjects learned 140 words in 8 sessions. They spent an average of 3.6 minutes per word, which was 1.8 times more than the time the subjects spent with VC-1 and VC-2. However, the retention rate for the VC-3 students was considerably better. After one week of study, the students were able to recognize and recall 98 percent of the target words. And, in an unannounced delayed posttest administered 11 weeks after the study sessions were over, the retention rate remained as high as 93 percent (Table 2 and Figure 1).

Table 2.   Retention rates observed after teaching

with VC-1, VC-2, and VC-3 respectively

Courseware	Elapsed time (weeks)											
	0	1	2	3	4	5	6	7	8	9	10	11
VC-1	79	-	-	30	32	33	-	-	-	-	-	-
VC-2	92	61	-	41	40	34	-	-	-	-	-	-
VC-3	-	98	97	99	99	97	98	97	96	96	93	93

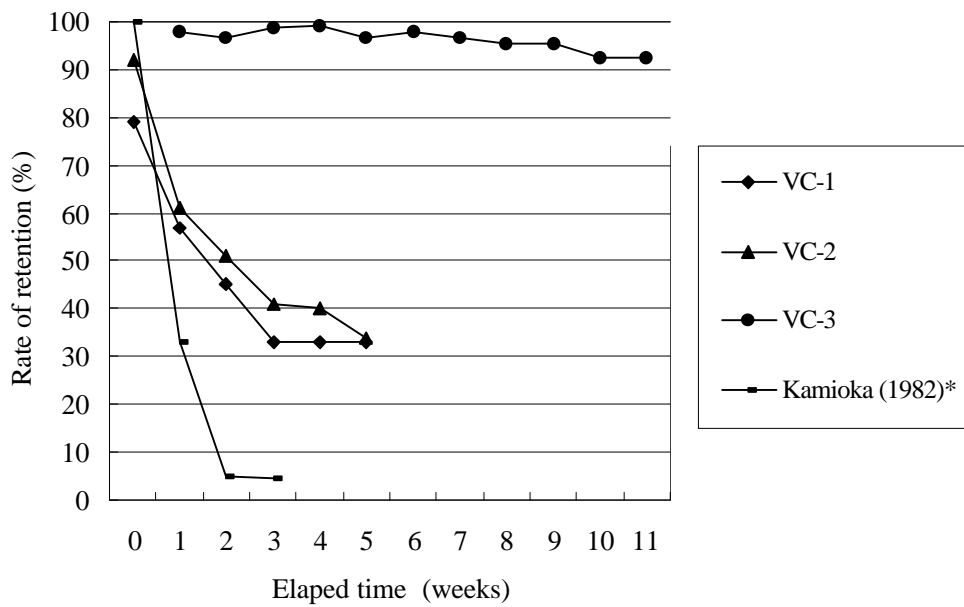Note: - No data collected

Figure 1.   Retention rates observed after teaching with VC-1, VC-2, and VC-3
* The data from Kamioka (1982) are added for reference.

In order to examine whether the words learned with VC-3 could be used in practical communication, we administered a battery of 4 tests (Table 3) developed locally. The data in Table 3 and Figure 2 show that the learners were able to score higher than 85% on all 4 of the tests, and only a slight variance could be seen among the scores on the 4 tests. The raw scores of the uncorrected proportion of the multiple choice tests were corrected to obtain the data shown in Table 3, based on a table developed by Guilford (1954: 421) for deleting the portion of the score attributable to chance success.

Table 3.   Retention rates (VC-3: 10 & 11 weeks) as observed
respectively by 4 types of vocabulary tests

Test	Elapsed time (weeks)		Mean
	10	11	
Recognition test [*]	99 (%)	100	99.5
Identification test	93	88	90.5
Definition test [*]	85	88	88.0
Gap-filling test [*]	95	94	94.5

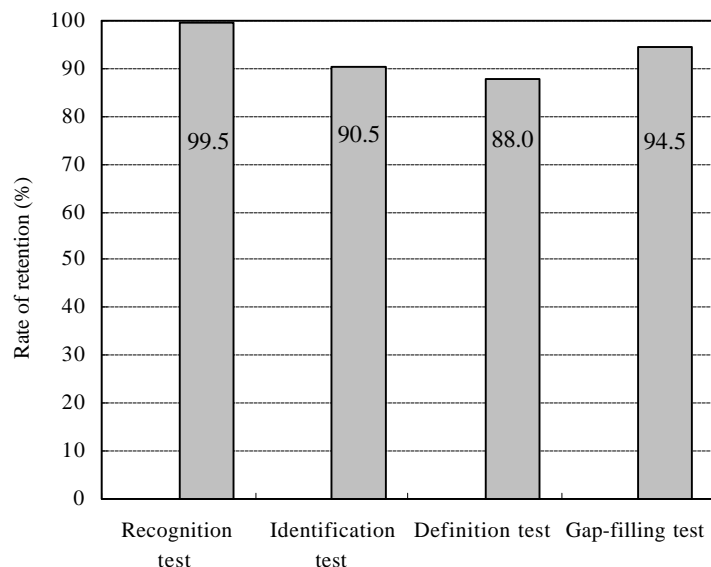[*] multiple choice test (4 alternative choices)

Figure 2.   Mean rates of 10 and 11-week retention rates as observed
respectively by 4 types of vocabulary tests

4.1.2. Questionnaires

After the VC-1 and VC-2 study sessions were completed, we conducted the follow-up questionnaires and asked which of the courseware the subjects would prefer to use. It was revealed that all of the them preferred the VC-2 system. They were further asked why they preferred VC-2 to VC-1, and the typical responses were as follows:

I do not want to have VC-1 because:

I felt sleepy while I was studying with it.

It was not easy to learn vocabulary with it. On the other hand

it was easy to forget the words which I learned with it

after a hard work.

I want to have VC-2 because:

I could learn words from a variety of points of view.

I think we can use words in the chunks we learned.

We can remember chunks better than longer sentences.

These data imply that there may be a difference in learners' affective response to the VC-1 and VC-2 systems, although this was not evident in the quantitative data of Table 2. The learners responded to the following response-selection questions after studying with VC-3:

	Yes	No
Did you enjoy the vocabulary learning?	88 (%)	12
Do you want to learn more words with VC-3?	100	0

Two of the typical responses to the free-response questions are presented below.

> While I was learning new words with VC-3, I was tempted to read an English newspaper which I had never thought I could. I was so happy when I found that I could understand the main article on the first page.

> When I was listening to Economic News on BBC, I found surprisingly many words we learned in class. I thought I could understand the news much better than before.

4.2. Discussion

As stated in the introduction of our paper, the purpose of our research was to develop vocabulary teaching courseware which had the following characteristics:

1) Vocabulary learning tasks that are enjoyable,

2) Vocabulary learning tasks that are effective,

3) Vocabulary learning tasks that promote learning of a large number of words,

4) Vocabulary learning tasks that are not limited to certain lexicon,

5) Vocabulary learning tasks that yield high retention rates over long periods of time, and

6) Vocabulary learning tasks that promote the learning of words, that can be used in practical communication.

It was clear from the results of the questionnaires, conducted after the subjects studied with VC-3, that the experimental subjects enjoyed learning vocabulary, and also they were motivated to study longer and to study more words with it. The learners spent 1.8 times more time, or 3.6 minutes, in learning a word with VC-3 than the time needed to study with VC-1 or VC-2. However, this 3.6 minutes is 90 percent of the time needed to learn vocabulary by incidental learning, which is reported to be 4.0 minutes (Krashen, 1989: 449). Furthermore, incidental learning has many drawbacks and limitations: i.e., students don't know enough vocabulary to read well (Coady, 1993: 7). Hence, it may be said that the learners studied vocabulary effectively with VC-3.

Most of the experiments on vocabulary instruction teach fewer than 30 or 40 words (Kamioka, 1982; Koga, 1990; Ellis, Tanaka, & Yamazaki, 1994; Knight, 1994; Aizawa, 1996), compared to this study, which teaches 140 words with VC-3 in 500 minutes. A follow-up study further showed that 3 sets of VC-3 could be used to teach 374 words and idioms, one set in 8 sessions, over a period of 4 months. A broad selection of words can be taught via VC-3. Word knowledge is not limited by methodology as it is in keyword method or in incidental learning. The target words were selected from a college-level lecture, a TV sitcom, and a movie and students acquired most, if not all of the

target words.

The data presented in Table 2 and Figure 1 show that the retention of words learned with VC-3 were fairly high, in keeping with the fifth characteristic listed in our proposed process of vocabulary teaching and learning (Vocabulary learning tasks yield high retention rates over long periods of time). The data presented in Table 3 and in Figure 2 are the basis to support the idea that vocabulary learned with VC-3 system is likely to be retained over long periods of time. In addition, they also suggest that the VC-3 system as vocabulary teaching courseware may help learners improve, not only their vocabulary knowledge, but also their overall English proficiency.

5. CONCLUSION

After comparing the significantly different results of teaching vocabulary using three vocabulary teaching CALL systems, VC-1, VC-2, and VC-3, we concluded that, 1) the use of a computer itself was not a solution to the improvement of teaching and learning vocabulary, 2) manipulation of a text, or only learning the spelling and the meaning (Japanese equivalents) of words, was not effective for learning vocabulary, and, 3) presenting information via multimedia enhanced vocabulary learning, provided it did not overload the learners' information processing capacities for each task.

The seemingly effective results of using VC-3 for teaching English vocabulary to Japanese speaking college students led us to conclude that, 1) a number of the propositions of theories of learning stated previously, if systematically combined, could be used for increasing efficiency in learning or teaching vocabulary, 2) many kinds of words, and also a large number of words, could be learned effectively by using multimedia facilities in the courseware, and, 3) spaced practice helped considerably to improve the retention of effectively learned vocabulary.

6. ACKNOWLEGEMENT

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8. QUESTIONS AND ANSWERS

The following questions were posed at the time of presentation at WorldCALL'98.

Q-1. How do you assess the retention rate of VC-3?

A-1. We used four types of vocabulary tests locally developed at our university: 1) Recognition test, 2) Identification test, 3) Definition test, and 4) Gap-filling test. (See 3.9.2.) These tests were administered twice, one week and three weeks after the students' study of all the words was completed. Each of the four tests covered thirty-five words, and all the target words appeared once in one of the four tests. However, all the words were not taught on the same day.   For example, ten words were studied nine weeks before the first posttest, and then they were studied eleven weeks before the second posttest.   Twenty words were studied eight weeks before the first posttest, and they were learned ten weeks before the second posttest.   Thus, by calculating the percentage of correct answers for each word taught at a specific week, we obtained the retention scores presented here.

Q-2. How can you motivate the students to spend such a lot of time to study the 140 words?

A-2. There were two reasons. One was that the learners knew the importance of studying words for successful learning of a foreign language. The other was that, although the tasks in VC-3 were individually all extremely simple, they were able to study words much more effectively by going through a series of tasks or a system of tasks as instructed. In fact, the effect was very apparent and this may have motivated them to continue to study.

Q-3. The three sessions were done in their own time?   Are they done in class, or are they done on their own free time?

A-3. The three sessions were done in regular class settings.

Q-4. What was the amount of time for VC-3 versus the other two treatments: VC-1 and VC-2?

A-4. The amount of time spent on average to study one word with VC-3 was 1.8 times longer than that with VC-1 or VC-2.

Q-5. It's not surprising that if you spend twice as much in learning something you retain it better.

A-5. Please remember that little can be obtained without some investment. What can be invested for the improvement of communicative skills will be, for example, longer learning time, better teaching materials, innovative tasks to help learners learn effectively, useful advice or clues, etc. We believe

all of these are needed for the real improvement of foreign language teaching, and we have done so. It is true that learners had to spend longer time in learning a set of words. However, we think they gained a lot more than just stronger retention as it can be seen in the data of the Tables and Figures, or the responses obtained in the questionnaires. What is important, and to be kept in mind, is the notion of cost-performance ratio.

Q-6. You've shown that after 11 weeks, they retained 93 percent of the words. Does this mean that after 11 weeks they would be able to correctly pronounce the words and correctly use them in context?

A-6. We have not tested the quality of pronunciation by any test forms. However, as Fairbanks showed, back in 1966 (p.6), in his model of speech production, we believe closed-circuit feedback based on auditory perception is extremely significant for good pronunciation or speaking ability. Hence we believe the learners who have studied with VC-3 have potential to perceive words accurately through the audio channel and greatly improve their skills as good speakers of English.

Further, one of the four vocabulary tests we employed was a gap-filling test. This test is said to give an effective measure of a foreign language proficiency (Stubbs & Tucker, 1974). If this notion is accepted, learners should have improved their potential to properly use the words they learned in context.

Q-7. What do all the words come from? Why were they interested in those words?

A-7. The target words to be taught with VC-3 were collected from a TV sitcom, a movie, and a college level lecture. The materials were taken from the language activities which interested the learners.

Bibliographical information

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