The Effect of Computer Assisted Language Learning (CALL) on Vocabulary Learning

Ima Hd. Utami
(Dosen FISIP Universitas Brawijaya Malang)

ABSTRAK

Penelitian ini bertujuan untuk mengetahui efek teknologi komputer terhadap pembelajaran kosa kata Bahasa Ingrris. Untuk mengetahui apakah Pembelajaran Bahasa Berbantuan Komputer (PBBK) secara signifikan berpengaruh terhadap pembelajaran kosakata, sebuah eksperimen tindakan kelas dilaksanakan terhadap 2 (dua) kelompok pebelajar, kelompok eksperimen (kelas A), terdiri dari 22 orang, mempelajari kosakata secara mandiri dengan menggunakan metode PBBK melalui sebuah perangkat lunak yang dilengkapi dengan teks, gambar diam, dan video, sedangkan kelompok kontrol (kelas B), terdiri dari 20 orang, mempelajari kosakata secara konvensional melalui materi tertulis (non PBBK) di bawah arahan pengajar.

Untuk mengukur keefektifan metode PBBK, sebuah *pretest* dan *posttest* dilaksanakan pada awal dan akhir eksperimen kemudian nilai yang dicapai para peserta dianalisis dengan mempergunakan *t test for independent variable.* Hasil penelitian menunjukkan adanya perbedaan yang sangat signifikan antara kelas A yang belajar dengan metode PBBK dengan kelas B yang mempergunakan metode konvensional dengan nilai t = -4,447 (sig=0.00).

Kata-kata Kunci: *Vocabulary learning, vocabulary test, Computer Assisted Language Learning (CALL).*

INTRODUCTION

Since the initial introduction of computers into second/foreign language learning field in 1960s in Stanford University, a large number of CALL programs are developed by practitioners, and a large number of studies are conducted by language educators and researchers in world-wide. Among the positive viewers of CALL, have concurred that this technology holds great potential for language learning (Levy, 1997; Muyskens 1997; Pennington 1996; Warschauer, 1996; Warschauer & Healy, 1998 in Al-Seghayer, 2001). Those who concern in this domain have been narrowed to the investigation of the efficacy of computer in vocabulary acquisition. Many researchers investigate the efficacy of presenting information using multiple modalities, such as text, audio, still picture, dynamic video to facilitate vocabulary learning. This article reports data from a study aims to investigate whether a multimedia package using various modalities - text, picture, video – is effective to enhance vocabulary acquisition.

LITERATURE REVIEW

In this section, literature in three areas will be reviewed: vocabulary learning approach, vocabulary test, and vocabulary learning with CALL.

Vocabulary Learning

Vocabulary learning has been very problematic for second and foreign language learner. Without adequate vocabulary knowledge, learners will meet difficulties comprehending language input. Hulstijn (1992) and Hulstijn, Hollander & Greidanus (1996) distinguish between intentional vocabulary learning (direct approach) and incidental vocabulary learning (indirect approach). In direct approach, learners undertake any learning activity with the specific intention of gaining new word knowledge, for example: through the list of vocabulary and its meaning. On the other hand, in indirect approach, learners gain new word knowledge from normal everyday experiences with oral and written language rather than focusing solely on memorizing list of word.

Which approach is more effective? Some researches indicate that indirect approach is more natural and gain better result since authentic material is generally not produced with the intention of illustrating to the learners the meaning of certain word but rather to convey information. However, this approach seems to be more effective for native speakers and higher intermediate to advance second language learners. De Boot et al, 1997; Nagy & Herman, 1986 (in Groot, 2000:62); Koren (1991) claim that in case of foreign language acquisition, indirect approach is hard to stimulate since too many new words on the text make students quickly despair and are discouraged as to achieve adequate comprehension as readers should be familiar with 95% of text at any level. Recent studies tend to suggest a combination of direct and indirect approaches for better result, for example reading plus explicit vocabulary instruction or reading plus vocabulary glossing (Paribach and Wesche. 1997 in Korren, 1992; The National Reading Panel, 2000). However, some researchers assume that the presence of glosses, dictionary, or other forms of deep elaboration of unknown words, lead learners to indirect vocabulary learning (Hulstijn, Hollander, and Greidanus (1996); Hulstijn (1992); Jones (2003) in Jones (2004)

Vocabulary Test

Recognition and recall tests are often used to examine students' vocabulary knowledge but they are quite different and demand separate processing strategies. Recognition test usually involves multiple choice activities whereby learners select or guess the correct response from alternatives given. Such tests may strengthen any existing memory traces. Recall test, on the other hand, demands the production of response from memory. It is more difficult than recognition test because learners must search for the correct response within their mental representation of the newly experienced information. (Cariana & Lee, 2001; Jonassen & Tessmer, 1995; Glover, 1989; Mc Daniel & Mason, 1985 cited in Jones 2004)

CALL & Vocabulary Learning

Baker, et al. (1995) describe three features make computer-assisted interventions attractive for increasing the word knowledge. First, they require less direct teacher time. Second, they have the potential to individualize instruction and facilitate the alignment of instructional technique and vocabulary goals. Third, they have the potential to systematic review, including scaffolding, and integration across academic areas.

Chun and Plass (1996) examined the effectiveness of multimedia application offering various types of annotations (picture, text, and video) on vocabulary acquisition. The result showed that words with visual annotations were remembered better than words annotated with text alone. The rationale is that because words are coded dually in two modes to construct referential connection between two forms of mental representation, the verbal and visual.

Lyman-Hager and Davis (1996) examined the effect of multimedia gloss on vocabulary learning. Two conditions were used on their study: computerized reading and non-computerized reading. The results showed that the group who used computer program to read the text significantly outperformed the group who used the gloss reading in the print form because computerized gloss is more appealing and predominant than traditional glossing in the printed material. Furthermore, its capacity permits us to store more extensive glossing than a printed format does.

Kost, Foss, and Lenzini (1999 in Al-Seghayer 2001) examined the effects of pictorial and textual gloss. The participants were asked to read a text under the three conditions: textual gloss alone, pictorial gloss alone, and text combined with pictures. The results indicated that the combination of text and picture was the most potential mode to enhance vocabulary acquisition. The theoretical explanation for this result is that processing information requires different degree of cognitive effort. The two different representations allow plotting of the picture into one mental model and thereby provide a "stronger bond" than the plotting of the words.

Al-Seghayer (2001) examined the effectiveness of multimedia annotation under three conditions: printed text definition alone, printed text definition coupled with still picture, and printed text definition coupled with video clip. The results indicated that printed text coupled with video gained the best result. A reason that may explain these results was: video better helps learners build image, curiosity increases concentration, and video's combination of modalities facilitate recall.

RESEARCH METHOD

Design and Subjects

This study follows a quasi experimental -pretest/posttest design. Ary et al. (1990) describes that there are many situations in educational research in which it is not possible to conduct a true experiment. Neither full control over the scheduling of experimental condition nor the ability to randomize can be always realized, for instance, in research conducted in a classroom setting it may not possible for experimenter to assign randomly to groups. In this case one must use design that will

provide as much as control possible. These designs are known as quasi-experimental design (page 336).

The subjects of this study are the fourth semester cadets of Nautical Department who are studying Maritime English at the Surabaya Merchant Marine School. As they have been set into two parallel classes before the researcher executes her experiment so it is not possible to reorganize the class randomly to accommodate the experimenter's need. In order to be able to control the treatment as much as possible, the experimenter handles both experimental and control group by herself during this study.

Materials

A package of interactive multimedia computer program used in the present study is designed by Marine Soft® based on International Maritime Organization (IMO) model course 3.27, a guideline to develop curriculum for Maritime English course to achieve the standards of English sets out in the Standard Training for Certification and Watch keeping (STCW 1995) convention.

The courseware provides learners with reading and listening activities and annotation for target words. Reading materials and definition of target words (glossary) are developed in the version of Adobe Acrobat Reader®, learners can access them from home screen or clickable shortcut found on the screen. The listening material is presented in form of dialogue on a video program.

The courseware also facilitates learners with vocabulary exercises on each sub unit, and vocabulary tests and an assessment in the end of each unit. The test items are the combination of recall test (filling in the blank, completing a dialogue with specific term, etc.) and recognition test (multiple choice, matching by dragging and dropping a word with a picture, matching a word with its synonym, and arranging text in order, etc.). They are developed in various modes such as narrative statement followed by still and motion picture and sound. In doing the exercises, learners are given three attempts to answer each test item or each assignment. Feedback statement such as "that's correct" or "sorry that's wrong" followed by particular music is given after the completion of each test item or assignment and the correct answer is informed after the last trial. In doing the tests and the assessments, learners are only given one attempt to answer each test item. The correct response is not informed directly but the result of the tests can be checked afterward. The time provided to complete each test item is 20 seconds.

Instruments

The learning outcomes as measured by written vocabulary tests on both of pretest and posttest are used as instruments of this experiment. The tests are constructed by the researcher herself. They comprise 50 vocabularies consisted of 25 items of recognition test (multiple choice) and 25 items of recall test (fill in the blank based on the hint given. Both of the experimental and the control groups get the same pretest and post-test. In order to get natural result, the subjects of the experiment are not informed in advance before those tests.

Procedures

The procedures to obtain the data are as follows:

1. Collecting and observing courseware materials: All resources related to hardware and software material such as: manual, handbook and other references correlated to courseware materials, are collected and studied by the researcher.
2. Administering Pretest: The test goes on before the treatment and it takes place for fifty minutes. Both experimental and control groups get the same pretest.
3. Conducting the treatment: The treatment extends over three weeks, each week consists of three time slots of 150 minutes for each group, pretest and posttest are included on this schedule. It is held on Computer Based Language Lab., Surabaya Merchant Marine School, Jl. Hang Tuah No. 5 Surabaya. Both experimental and control groups learn the same topic, SAR and Request Medical assistance. Group A (experimental group) is assigned to study the materials independently by means of CALL method, while group B studies the topic conventionally on printed material under the direction of a teacher. Assuming that the member of experimental group might not know how to use the courseware effectively, the researcher gives a 30-minutes short course prior to the treatment. The objective of this short course is to explain how to use the courseware in the most beneficial way and to encourage them to study independently by means of CALL method.
4. Administering Post-test: After completing the treatment, all participants get a post-test. The test items and the allocation of time given for the post-test are the same as those of pretest but the test items are rearranged randomly.

Analyzing Data

To analyze the data, the following tests are applied:

1. Outlier test: Z score formula test is applied to find out whether extreme values present in the data. The normal distribution of the data is $-2.5<z<2.5$ (Santoso, 2006:26). By using SPSS version 13.0, the result indicates that z score obtained is more than -2.5 and less than 2.5. It means the distribution of the data collected from the experiment is normal.
2. Reliability of the test item: Alpha (Cronbach) formula test is applied to examine whether the test items are consistent in its measurement or not. Norusis (2000:400) states that Alpha (Cronbach) is a model of internal consistency based on the average of inter item correlation, and the coefficient alpha of alpha (Cronbach) is equivalent to Kuder Richardson 20 (KR-20) for the dichotomous data. The result of the test reveals that seven of fifty test items: item number 1, 7, 10, 15, 28, 32, and 50, should be dropped since their calculated r values are less than r-table.
3. T-test for independent variable: This test is used to examine the significance of the difference between two means for independent sample (Ary et al., 1990:194).

RESULTS AND DISCUSSIONS

In order to reach a conclusion, the result of vocabulary pretest and posttest is analyzed. The result obtained is shown on the table below:

Table 1: The result of the t-test for independent variable
Group A (CALL) vs. Group B (non-CALL)

Group Statistics

	GROUPE	N	Mean	Std. Deviation	Std. Error Mean
NCB_CA	NC_B	20	9.80	4.652	1.040
	C_A	22	18.23	7.217	1.539

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
NCB_CA	Equal variances assumed	2.021	.163	-4.447	40	.000	-8.43	1.895	-12.258	-4.597
	Equal variances not assumed			-4.537	36.220	.000	-8.43	1.857	-12.193	-4.661

Table 1 shows that the Levene's test for the equality of variance indicates that F=2.021 (sig. 0.163). As F score is bigger than 0.1, the variance of the two populations are assumed to be equal, therefore t-test using the equal variance assumed is applied. As t value for equal variance assumed is -4.447 (sig=0.000), it means there is high significance difference of vocabulary acquisition between group A who learns by means of CALL to group B who uses non-CALL or CALL is very effective to be used for vocabulary learning.

The results of this study are consistent with theories postulated by Baker, et al (1995) and Wood (2001) that computer-assisted intervention is potential for assisting learners increasing word knowledge since it has many attractive features to perform student active learning, individualize vocabulary instruction, have systematic review and recall, and to learn with fun.

Since the courseware material used in this study is the combination of written annotations with exercises, tests and an assessment in various modalities (text, still picture and video), it is found that the results obtained are consistent with previous studies such as:

1. Chun and Plass (1996): The results indicated that words with visual annotations were remembered better than words annotated with text alone because of dual coding factor where learners are able to construct referential connection between two forms of mental representation, the verbal and visual. In this study, although the courseware presents written annotations only but it is followed by exercises, tests, and an assessment using visual mode. The combination of text on the glossary and visual on exercises, tests, and assessment might also be able to construct referential connection between verbal and visual mental representation that makes words are remembered better.

2. Lyman-Hager and Davis (1997): The result of their study showed that the group who used computer program to read the text significantly outperformed the group who used the gloss reading in the print form because computerized gloss is more appealing and predominant than traditional glossing in the printed material. Furthermore, its capacity permits us to store more extensive glossing than a printed format does. The present study also showed that the group who used computer program to read the text also significantly outperformed his counterpart.
3. Kost, Foss, and Lenzini (1999): Learners who use textual gloss combined with pictures gained more words knowledge than those who use the textual gloss alone and the pictorial gloss alone because two different representations allow plotting of the picture into one mental model and thereby provide a "stronger bond" than the plotting of the words. The result of the present study is consistent to the above mentioned theory postulated that two or more different representations are able to provide "stronger bond" of the memory.
4. Al-Seghayer (2001): The investigation yielded a conclusion that printed text coupled with video was more effective than the other modes. A theory that may explain these results was: video better helps learners build image, curiosity increases concentration, and video's combination of modalities (motion picture and sound) facilitate recall.

CONCLUSION

This study yielded the conclusion that individual learning via multimedia provides written annotation combined with exercises and test in several modes (text, picture, and video) gains significantly high benefit on vocabulary acquisition. Among the possible factors that may explain these results are the following: the presentation of materials is appealing and facilitate students to perform student active learning, and various modes presented in CALL program are effective to facilitate recall.

SUGGESTIONS

These suggestions are addressed particularly for future researchers who have the same interest on this domain.

1. The number of subjects used in the present study is limited, therefore it is suggested that similar study will use bigger number of subjects since the involvement of bigger number will give more representative result.
2. The present study is concerned with the teaching of ESP, it is recommended that a replication of similar study will be concerned with the teaching of different domains or the teaching of EGP.

REFERENCES

Ary, Donald; Jacobs, Cheser Lucy and Asghar Razavieh. 1985. *Introduction to Research in Education.* New York: Holt, Rinehart & Winston, Inc.

Al-Seghayer, Khalid. 2001. "The Effects of Multimedia Annotation Modes on L2 Vocabulary Acquisition: A comparative Study". *Language Learning and Technology, (Online*), Vol 5 No.1 January 2001. Pp. 202-232, (http://llt.msu.edu/vol5num1/alseghayer/default.html, retrieved on July 10, 2009)

Chapelle, C. and Jameson J. 1986. "Computer Assisted Language Learning as a predictor of Success in Acquiring English as a Second Language". *TESOL Quarterly*. Vol.20 No.1, March 1986. Pp. 27-46.

Chun, D. and Plass, J. 1997. "Research on Text Comprehension in Multimedia Environment". *Language Learning Technology (Online*). Vol 1 No.2, pp. 60-81. (retrieved on November 30, 2000). (http://llt.msu.edu/vol1num2/chun_plass/default.html). Retrieved on July 10, 2009.

Groot, Peter. 2000. "Computer Assisted Second Language Vocabulary Acquisition". *Language Learning and Technology (Online)*. Vol.4 No.1, May 2000. Pp. 60-81.
(http://llt.msu.edu/vol4num1/groot/default.html). Retrieved on June 20, 2009.

IMO. 2000. *Model Course 3.17: Maritime English*. London: International Maritime Organization.

Jones, Linda. 2004. "Testing L2 Vocabulary recognition and Recall Using Pictorial and Written Test Items*" Language Learning and Technology (Online)* Vol 48 No, 3, September 2004. Pp. 122-143. (http://llt.msu.edu/vol48num3//jones/default.html). Retrieved on August 9, 2010.

Kvanli, Alan; Paur, Robert J.; Keeling, Kellie B. 2003. *Introduction to Business Statistics: A Microsoft ® Excel Integrated Approach, 6e*. Thomson South Western.

Koren, Shira, 1999. "Vocabulary Instruction through Hypertext: Are there Advantages over Conventional Method of Teaching*". TESL-EJ Journal*. Vol.4 No. 1 July 10, 1999.

Lehr, Fran; Osborn, Jean; & Hiebert, Elfrieda. 2000. "A Focus on Vocabulary". *Honolulu: Pacific Resources for Education and Learning*. (http://www.prel.org/products/re_/ES0419.htm). Retrieved on July 10, 2009.

Levy, M. 1999. "Computer Assisted Language Learning: Context and Conceptualization". *ELT Journal*. Vol.53 No.4, October 1999, pp. 334-337.

Meara, P. 1995 "The importance of an Early emphasis on L2 Vocabulary" *The Language Teacher Journal,* Vol 19 No.2, pp. 8-10.

Nagy, E.W., Herman, P. and Anderson, R.C. 1985. "Learning Words from Context*"*. *Reading Research Quarterly*, Vol 20. Pp. 233-253.

Norusis, Marija J.2000. *SPSS® 10.0 Guide to Data Analysis*. New Jersey: Prentice Hall.

Santoso, Singgih. 2003. *Mengatasi Berbagai Masalah Statistik dengan SPSS versi 11.5*. Jakarta: Elex Media Komputindo.

Warschauer, M. and Healy, D. 1998. "Computers and Language Learning: An overview". *Language Teaching*. Vol.31, 1988. Pp. 3-20.

Wood, J. 2001. "Can Software Support Children's Vocabulary Development?" *Language Learning and Technology (Online*). Vol.5 No.1, January 2001. Pp. 166-201. (http://llt.msu.edu/vol5num1/wood/default.html). Retieved on July 14, 2009.