CALL Based Tasks for False Beginners: The Effects of Top-down Processing and Multi-sensory Tasks on Their Reading Skills

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This paper discusses the effects of CALL based tasks concerning word recognition and text reading in multimedia classrooms for false beginners. The false beginners in this study are a group of Japanese EFL university-level learners whose language proficiency is limited. Previous experiments on false beginners' word recognition revealed that their decoding and ability to learn target vocabulary spelling was insufficient despite six years of English language instruction. Experiments in training students in English phonology and orthography revealed that using a multimedia classroom was effective. The enthusiasm of the participants was observed during the training for lexical processing of English words. This prompted the researcher to use the multimedia classroom with multi-sensory tasks along with top-down processing for reading comprehension activities. Helping students to be independent learners by using personal computers gives clues about how false beginners can become lifelong, autonomous L2 language learners.

本稿は、英文読解における擬似初心者のCALL教室使用のタスク効果について論じる。タスクは、単語認知と文章理解の2種類である。本研究における擬似初心者（False Beginners）とは、英語熟達度の低い、日本人大学生EFL学習者を言う。擬似初心者を被験者とした単語認知に関する実験では、中学校と高等学校で英語を学んだにもかかわらず、単語の解読（decoding）と綴り学習が十分にできていないことが明らかになった。この結果を基にした、マルチメディア教室使用の英単語認知の訓練では、英語の音韻と綴り学習の両方に効果が見られた。この訓練での擬似初心者の熱心な取り組みから、次にマルチメディア教室の特性を生かして多感覚機能を使った読解活動を実施した。彼らが、パーソナルコンピューターを使い、目標言語で色々な情報を集める方法を体得すれば、自発的な第二言語の生涯学習に繋がるはずである。

University English teachers in Japan often complain that their students' English proficiency levels are getting lower and lower every year. They struggle to find more effective teaching methodologies. This study provides ideas about how teachers can help lower-level students at university effectively using a multimedia classroom. In thisresearch, lower-level students at university are called false beginners, defined as a group of Japanese EFL (English as a foreign language) learners aged 19 to 22 whose language proficiency remains limited despite six years of formal English courses. With the decrease of the 18-year-old population, universities have begun to accept the entry of lower-level students more than ever before in the university classroom. It is a critical issue for language teachers to systematize the assessment of learners' English proficiency levels and seek more effective teaching methodologies.

From the previous experiments conducted by the researcher, it became clear that false beginners' difficulty in learning English started from the very beginning of second language acquisition, word recognition. It is common for teachers at high schools in Japan to use the method of teaching words first, then grammar or sentence structures,

and finally discourse. The researcher, however, conjectured whether false beginners might learn reading comprehension in a reverse way in order to compensate for their deficiency of lexical processing.

What makes language learners false beginners?

Previous experiments on lexical processing of English words (Nakamura 1998, 2001) were based on the assumption that false beginners' backsliding starts at the beginning of target language learning when learners acquire word recognition skills. It has been demonstrated in various research concerning L1 acquisition that insufficient decoding of single words of the target language influences L1 children's reading skills (Perfetti 1995, Stanovich 1991, Van Den Bosch et al. 1995).

Previous Findings

These are the findings of the previous experiments of oral reading and dictation of single words with students in the ninth grade:

1. Backsliding in false beginners occurs in comprehension. Their level in this area is equivalent to that of the ninth graders

2. False beginners can read a passage aloud better than ninth graders when most of the words in the passage are regular words[1)].

3. False beginners' reading of regular words with an irregular spelling-to-sound correspondence[2)] is a signal of their insufficient access to a semantic system.

4. When their learning of spelling is insufficient, phonetic information from the L1 and L2 compensates for the deficiency and helps them access meaning.

Nakamura (1998, 2001)

Based on these findings, the researcher did two experiments for word recognition training for false beginners. One was phoneme segmentation task in the LL classroom, and the other was sound-to-spelling training with CALL based tasks.

The First Experiment

Participants

All participants in this study, mixed with male and female students, share Japanese as a mother tongue. Also, their knowledge of English has been mainly acquired through formal instruction in school since they started taking English courses at the age of twelve or thirteen. False beginners are still taking general English courses at the university after having taken approximately 800-900 hours of formal English classes since starting at junior high school.

Training for Word Recognition

The research question for these exercises (Training 1) was the following: Can the same tasks from Yopp's experiments be applied to Japanese students' L2 acquisition? The first experiment for word recognition was a print-to-sound training with phoneme segmentation on false beginners. This experiment refers to the results of research concerning the effects of different types of training on L1 children's acquisition of individual words. Yopp (1988) determined the

reliability and validity of ten tasks for phonetic awareness and concluded that sound isolation and phoneme deletion tasks contributed to the prediction of children's reading ability.

Training 1: Phoneme Segmentation Task in the LL classroom

Training 1 was a five week experiment of students whose English classes were held once a week in a language lab. On the first and the fifth weeks, participants took pre and post tests, and during the intervening three weeks they did a phoneme segmentation task for ten minutes at the beginning and at the end of each 90 minute lesson. Participants repeated the teacher's model pronunciation of the word simultaneously with the presentation of the pronunciation of each phoneme and the meaning of the word in Japanese on the computer display. For example, one such test item was LOSE---/lu:z/---/l/, /u:/, /z/---*ushinau*. An overhead camera (OHC) was used to visually present each stimulus word; microphones and headsets were used so students could listen to each word with its corresponding phonemes and Japanese meaning.

Results

50.2% of all the errors was that the participants tried to apply a regular reading to irregularly spelled words. For example, some said /frait/ instead of /fru:t/ when they saw the word, *fruit*.The frequencies of this type of error in pre and post tests were compared. Two factor analyses of variance showed that the training effects x word type interaction was significant, ($F(3, 65)=4.562$ $p<.01$) [3]. Post hoc comparison showed that there was a significant training effect in the group who practiced both regular and irregular words. For a dictation task, however, there were not significant effects on their knowledge of spelling of both regular and irregular words (regular words, $F(3, 65)=0.891$ n.s.; irregular words, $F(3, 65)=0.865$ n.s.).

Conclusion

Phoneme segmentation training was effective in improving phonological awareness in naming English words, but not in improving their English orthographical knowledge. Therefore, we designed the next training lesson; sound-to-spelling training with a CALL based task to exclusively improve the false beginners' orthographical knowledge.

The Second Experiment

Training 2: Sound-to Spelling Training with CALL Based Tasks

Training 2 was designed by modifying Training 1 in order to gain the same success in spelling acquisition. The researcher tried to make the tasks easier so that the participants' improvement of their orthographical knowledge can be observed clearly. First, we selected 40 words (20 regular and 20 irregular words) for pre and post tests in the word list used for a three week training session. In the first training session, we selected different words for tests from those used for the training. Second, we used a multimedia classroom so that each participant could take as much time as they needed. Third, the Japanese meaning for each word, English

letters for a word were visually presented on each student's display, and the pronunciation was orally presented through their headsets. Fourth, in pre and post tests, the participants spelled each word after repeating each word aloud after the teacher by using headsets and microphones (to avoid errors caused by mishearing).

This was a five-week experiment in English classes, held once a week, in a multimedia classroom equipped with personal computers as well as language lab equipment such as headset, microphone, etc. On the first and fifth weeks, participants took pre and post tests of spelling and meaning in Japanese. During the intervening three weeks, the first and second groups did task work; the first group rearranged randomly presented letters on the display using a mouse to spell out the word. The meaning shown in Japanese on the display and the word was pronounced into the students' headsets. The spelling of each word was then automatically corrected by a computer program. The task of the second group was similar to the task in the first training: print-to-sound processing. They practiced the pronunciation of the word by listening to model reading of it through a headset while referring to visually presented words and meaning on the display. The third group, a control group, did not participate in the training. A 30 second time limit was given to process each word, but participants were also allowed to try again if they made a mistake. In the pre, post tests, and the training sessions, the spoken order of the regular and irregular words was changed

Results and Discussion

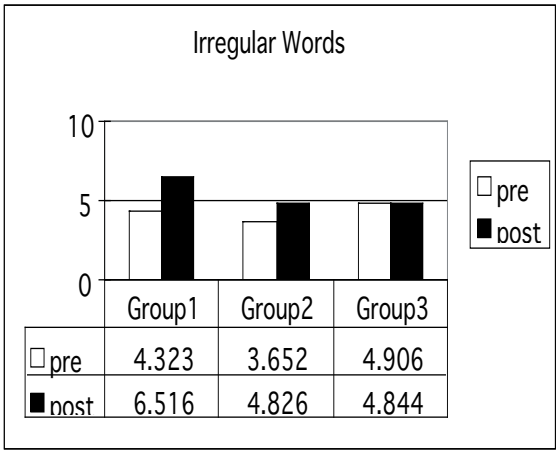
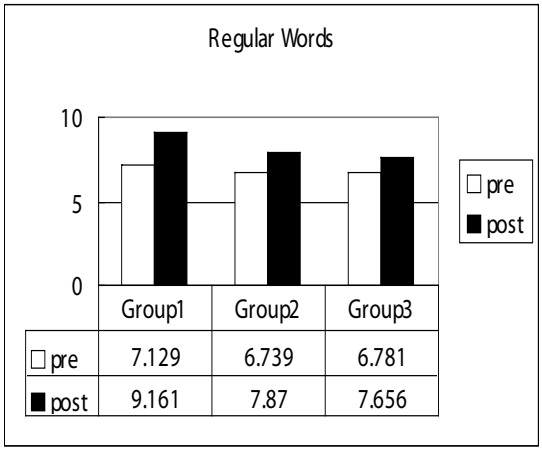


Figure 1. Dictation and meaning scores of orally presented irregular words (Nakamura & Matsuoka 2003)



	Group1	Group2	Group3
pre	7.129	6.739	6.781
post	9.161	7.87	7.656

Figure 2. Dictation and meaning scores of orally presented regular words (Nakamura & Matsuoka 2003)

Figures 1 and 2 compare dictation and meaning scores of orally presented regular words and irregular words respectively. Dictation scores were counted only when the spelling and the translation of a word were correct. The numbers in Figures 1 and 2 represent the mean scores of dictation and the meaning scores of orally presented regular and irregular words of pre- and post-test.

The findings based on the statistical analysis of variance are as follows:

1. There were significant training effects on those who took the training using CALL based tasks; on the other hand, there was no significant difference between the control group's pre and post test scores, ($F(1, 83)=2.256$, n.s.).

2. It is more difficult for false beginners to learn the spellings of irregular words than regular words.

In conclusion, post hoc comparison revealed that the first group who did the task to rearrange randomly presented letters to spell out a word gained better spelling test scores on irregular words than the second group who had done a phonological awareness task. Nonetheless, the result of Training 1 shows that a phoneme segmentation task helped false beginners obtain phonological awareness of English words. However, gaining orthographical knowledge does not seem so easily acquired.

It was an encouraging finding that we observed false beginners' enthusiasm for using CALL based tasks during the training for word recognition. The participants seemed to concentrate more on the visual display while learning words in a multi-media classroom. However, more vocabulary is need in order to comprehend authentic English texts, and if teachers used traditional teaching methods (focusing on words, then grammar or sentence structures, and then discourse), then progress might be slow. Moreover, those who took such instruction in high school tend to look at every word while trying to recall lexical meaning of each word. Instead of such bottom-up processing, students, young adults, may be able to learn how to use their background knowledge about the topics while glancing through the whole text, and retain memory of what they have just read. The multi-media classroom, in which the students showed much interest and excitement about using personal computers, would enable the students to learn how to use their multi-sensory system, i.e., reading passages, looking at the illustrations which tell readers the scheme of the passage,

and listening at the same time. Therefore, the researcher aimed the next training session for false beginners' reading comprehension by using the multi-sensory system in order to enhance the participants' working memory in a multi-media classroom, and helping them to use their background knowledge while reading.

The Study

Training for reading comprehension in multimedia classroom

The next training for reading comprehension was designed based on two basic reading skills, which are necessary for comprehension: top-down processing and using the multi-sensory system. Advocating the idea of top-down processing, some researchers think that even if they train language learners' word recognition exclusively, their reading comprehension does not always improve (Fleisher, L., Jenkins, J. R., & Pany, D. 1979). Other researchers suggest that it is necessary to show the scheme of the passage and help students use their background knowledge and former experiences, i.e., top-down processing, instead of focusing only on the linguistic information in the text like the bottom-up processing. This interactive way of teaching helps learners to comprehend texts better (Stanovich 1980, Tabossi 1988).

The other reading skill used for this study is helping students comprehend the meaning of passages, as well as words, by using their multi-sensory system in the mind. Eden (2004), and Haynes (2004) maintain that using the multi-sensory approach helps learners who have trouble decoding individual words' meanings.

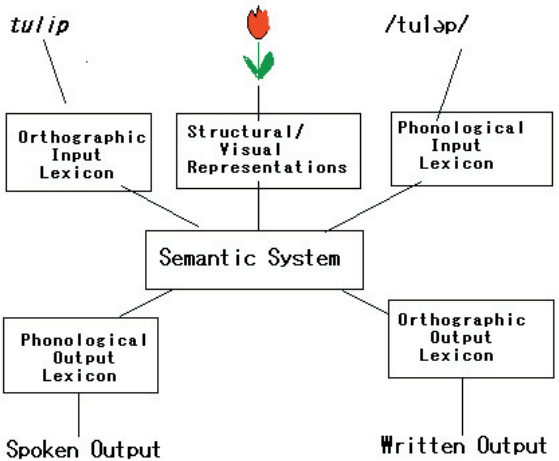


Figure 3. Schematic representation of the major components of lexical processing. Hillis & Caramazza (1991)

Hillis & Caramazza suggest the above model to explain how multi-sensory system such as sound, illustrations, and print are interconnected by a semantic component in the lexical system when these modalities are once input into the system. This model was used to explain word recognition; however, the following training experiment for top down processing: reading comprehension, was planned based on the idea that false beginners may be able to comprehend a text more easily when these three modalities are presented at the same time. A multimedia classroom makes it possible

for language learners to use various modalities such as listening, reading, and understanding meaning while viewing illustrations.

Moreover, it has been discussed that the activation of working memory plays an important role for reading comprehension (Osaka 2000, Kadota 2002). Therefore, the research question of task A: a multi-sensory, top-down reading task, shows whether or not using a multi-sensory reading task in a multimedia classroom would improve students' short-term memory which is a vital component of reading comprehension. The English language proficiency levels of the participants (n=34) are between STEP 3 and pre-STEP 2 levels. Procedures for this training are stated below.

Task A: A multi-sensory, top-down processing task

During the first semester, a ten-week experiment of students whose English classes were held once a week in a multi-media classroom was conducted. On the first and last weeks, participants took pre and post tests from STEP 3 for reading comprehension. They were told to write what they remembered about one of the English passages they had read by writing what they remembered in Japanese after a 90-minute lesson. The Japanese letters they wrote were counted and the participants of this task to a control group of students who were in a traditional reading class based on translation were compared. Also, the character counts in the first and last class were compared. During the intervening eight weeks they took reading lessons using a multi-media classroom.

For the reading lesson, participants read a story about an American couple, Sam and Suzan, and their children, which was taken from a textbook (Mikulecky & Jeffries 1998). The sequence of the story would enable readers to predict what would happen.

The procedure for one lesson is as follows:

1. In order that participants may have the scheme of the text, they discuss their prediction of the story by looking at illustrations on a display in groups. Then, they share their opinions to the class. The discussion is done in Japanese, their mother tongue.
2. The teacher reads the story aloud showing the illustration, telling participants to check their predictions. The teacher tries to use a dynamic reading style according to the content, especially for the conversation parts, because it has been proved that prosody including intonation and tone of voice play an important role in conveying meaning (Kadota 2002).
3. The participants are required to silently read the text as quickly as possible, and record their reading time. A timer is shown by OHC. Then, they answer the comprehension questions on the next page without looking at the text to improve their working memory.
4. They check their answers, and make a graph on how many words they could read per minute.
5. Then, they read the story aloud using microphones, while the teacher monitors their reading. Their goal is to make the time for silent reading shorter than that for reading aloud.

6. The next week, the teacher shows the illustration of the previous reading on the OHC, and tells the participants to write in Japanese what they remembered about the story.

The indexes of readability of the instruments for this experiment, pre- and post-reading from STEP 3 test, and passages for faster reading from the textbook, *Reading Power,* Longman, were compared.

Table 1. Indexes of Readability

	Pre- & Post Reading: STEP 3	Passages for Faster Reading
Passive Sentences	8%	3%
Flesch Reading Ease	76.6	81.7
Flesch-Kincaid Grade Level	5.1	4.0

In Flesch reading ease, the lower the number, the more difficult it is, and in Flesch Kincaid Grade Level, the higher the number, the more difficult it is. The figures in Table 1 indicate that passages for faster reading are easier than pre- and post reading tests from STEP 3, which is targeted for those who finished three years of instruction of English at school in Japan. Since the aim of this training is to improve false beginners' top-down processing skills, passages used for training exercises should not have difficult words and sentence structures, which would hinder their reading comprehension.

Results

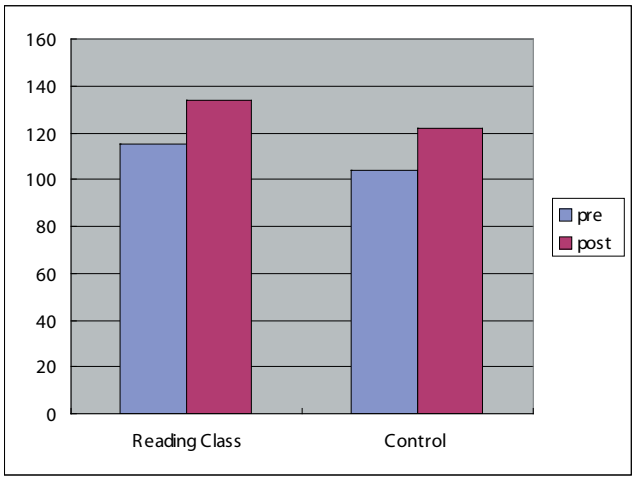


Figure 5. Comparison of working memory

There was not any significant difference in reading comprehension test results between the two learner groups, a reading class group (n=29), and a control group (n=34) ($F(1, 60)=0.634$ n.s.).

The control group is from another reading class, in which they are required to translate every sentence into Japanese. In my class, I avoid the traditional translation method. From these results, students can be at least persuaded that they don't have to translate in reading comprehension class because by using my multi-sensory lesson the results are

the same, and it is more enjoyable. The two groups' reading times should also have been compared because their silent reading times must have improved according to the graphs.

Discussion of Task A: A Multi-Sensory, Top-Down Processing Task

The results of previous experiments on word recognition have revealed that false beginners cannot process single words sufficiently. The results of reading comprehension task A, however, showed that they might be able to scan and skim the text if they had done pre-based activities which used their background knowledge about the topic and used the three modalities: viewing illustrations, listening, and reading the text.

For reading comprehension task A, the researcher selected easy texts in order to improve false beginners' reading skills. The following questions occurred: Should false beginners read only easy texts because their proficiency levels are low? Is it possible that false beginners can manage to read authentic articles on the Internet, and learn to do it independently, which might help them to become lifelong autonomous L2 language learners? These are the research questions for reading comprehension task B: reading for information. Here the readers did not always have to read every single word. The students started the reading activities by scanning in the second semester.

Task B: Reading for Information

After the beginning of the second semester in October, the students started reading English texts on the Internet. At first, they looked overwhelmed with so much authentic English that they were advised not to read every word but to try to scan and skim the texts, which is more effective method when trying to find information on English sites.

Table 2. Activities for Reading for Information

Activities for Scanning	
GetHiroshima http://www.gethiroshima.com/jp	Participants accessed the English language site for residents in Hiroshima, and got information about the local area.
Yahoo Singapore	Group work: participants worked together to do research about Singapore. They selected the topic of their own.
English Language Courses Abroad	Pair work: participants collected information about English language courses abroad and exchanged information with their partners.
Online Shopping	Participants accessed Yahoo America, and made a shopping list looking at shopping catalogues.

The teacher observed that the participants were absorbed in online shopping. In addition, they seemed to enjoy having a look at the site of GetHiroshima since most of them are familiar with the town they live in. On the other hand, some could get information about English language schools abroad quickly, but not all of them could manage. Therefore, a

questionnaire about the activities for reading tasks was given to the participants and the results were analyzed statistically.

Students' Feedback about the Tasks in the Reading Class

In the last class of December, students (n=38) answered a questionnaire about reading activities they had done since April. They were asked to indicate the extent to which they think each activity was useful or not.

Seven questions for task A and five for task B were indicated, and the students were asked to respond to each question on a 4-point scale from strongly disagree to strongly agree. Table 3 summarizes the mean scores and standard deviations (SDs) of the twelve questions for the reading activities.

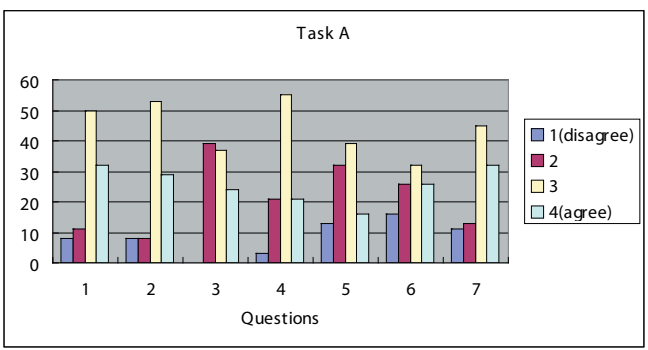


Figure 6. Students' feedback about task A

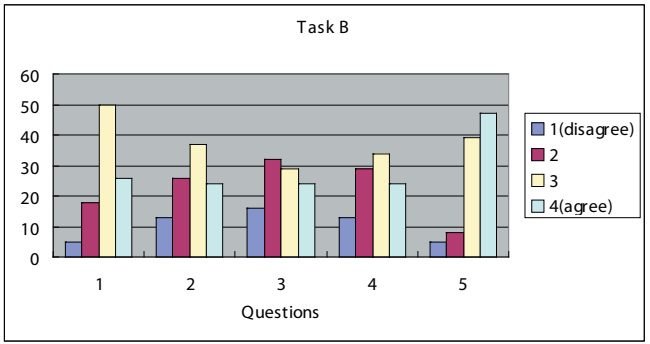


Figure 7. Students' feedback about task B

As for task A, the comparison of the ANOVA results showed that there were not significant differences among activities (F (37, 6)=0.926 n.s.). However, post hoc comparison of the results for task B revealed that the students think that the online shopping activity was the most useful of all the reading activities on the Internet (See Appendix 1). This is because the students are used to doing it in their mother tongue, and the procedure is therefore not as complicated as the other activities.

Moreover, 70% of the students agree and almost agree that the multi-sensory reading task was useful (F(37, 1)=18.713, p<0.0001), and 67% of them agree and almost agree that reading activities on the Internet was useful for the present and would also benefit them in future English language learning (F(37, 1)=12.078, p<0.0013). These results indicate that false beginners think that it was useful accessing authentic English sites as well as reading easy texts with

Table 3. Means and SDs of Reading Activities

	1 (disagree)		2		3		4 (agree)	
	M.	SDs	M.	SDs	M.	SDs	M.	SDs
1. Predicting the story looking at a picture was useful for text comprehension.	0.079	0.27	0.105	0.307	0.5	0.5	0.316	0.465
2. Listening to a story looking at a picture was useful for text comprehension.	0.079	0.27	0.079	0.27	0.526	0.499	0.289	0.454
3. Timed reading silently was useful for text comprehension.	0.000	0.000	0.395	0.489	0.368	0.482	0.237	0.425
4. Answering comprehension questions without looking at the text was useful for text comprehension.	0.026	0.160	0.211	0.408	0.553	0.497	0.211	0.408
5. Making a progress graph was useful for text comprehension.	0.132	0.338	0.316	0.465	0.395	0.489	0.158	0.365
6. Timed reading aloud was useful for text comprehension.	0.158	0.365	0.263	0.440	0.316	0.465	0.263	0.44
7. Recalling the story by looking at a picture on the next week was useful for present and future text comprehension.	0.105	0.307	0.132	0.338	0.447	0.497	0.316	0.465
8. Skimming articles in Time for Kids was a useful reading activity at present and in the future.	0.053	0.223	0.184	0.388	0.5	0.5	0.263	0.440
9. Getting information from GetHiroshima was a useful reading activity at present and in the future.	0.132	0.338	0.263	0.44	0.368	0.482	0.237	0.425
10. Group work on Singapore through Internet was a useful activity at present and in the future.	0.158	0.365	0.316	0.465	0.289	0.454	0.237	0.425
11. Pair work for getting information about study abroad was a useful activity at present and in the future.	0.132	0.338	0.289	0.454	0.342	0.474	0.237	0.425
12. Making a shopping list through Internet was a useful activity at present and in the future.	0.053	0.223	0.079	0.270	0.395	0.489	0.474	0.499

basic vocabulary used for the multi-sensory reading task in spite of the fact that their proficiency levels are almost the same as those of ninth or tenth graders. Therefore, it is suggested that teachers should seek or/and develop more appropriate reading materials for low level English language learners at universities in Japan.

For open-ended questions about the reading class in the questionnaire, some students said that they got a fresh idea about how to read English passages because the reading activities in the class were different from what they learned in high school. Others said that they were perplexed to have a look at the English site at first, and thought that it was impossible to read authentic articles, but gradually they learned how they could find necessary information. Moreover, others said that they would be excited if they could actually enjoy shopping while accessing English sites abroad on their own instead of making a shopping list in the classroom. This comment suggests the possibility of them being autonomous L2 language users in the future.

Conclusion

Easy access to the Internet using a personal computer has changed the L2 language learning environment. One hopes if false beginners learn how to do read independently through some activities introduced in this course, they may be able to become lifelong autonomous L2 language learners even after graduation.

Participants still take the reading comprehension training using the multi-sensory approach in this reading class. A post-test should be given to them again at the end of the school year, and the reading test results are to be analyzed to see if there is any difference between the experimental and control groups then.

The participants' enthusiasm in reading for information through the Internet encouraged the researcher to maintain that university students should not use the same textbooks the ninth graders are using even though their proficiency levels are the same. Therefore, various reading texts should be introduced by carefully designed teaching methodologies. CALL based tasks can provide learners with plentiful reading materials. Moreover, false beginners in this study are adults, and they must have more background knowledge about the topic and experiences like in their mother tongue.

Yet, it is true that some of the false beginners feel discouraged to find so many words they do not know in English texts. Further investigation of this study will be to observe how false beginners' knowledge of lexical information and background knowledge about the topic of the text are interconnected to each other.

Notes

1) Regular words are words with a regular spelling-to-sound correspondence such as WINDOW. Irregular words with irregular spelling-to-sound correspondences such as LOSE.

2) More examples of regularization of irregular words with meaning errors are LUSE---/louz/ instead of /lu:z/, and CHILD---/t□ild/ instead of / t□aild /.

3) For the statistical analysis in this study, ANOVA4 on the web (Kiriki, 2002) was used.

References

Eden, G. (2004). Developmental dyslexia in the United States of America. In the handout of oral presentation at RIKEN BSI and Oxford-Kobe Seminars, Joint International Symposium.

Fleisher, L., Jenkins, J. R., & Pany, D. (1979). Effects on poor readers' comprehension of training in rapid decoding. *Reading Research Quarterly.* XV/1, 30-48. .

Haynes, C. W. (2004) Japanese Academy of Learning Disabilities 13th Annual Convention.

Hillis, A. E., & Caramazza, A. (1991). Mechanisms for accessing lexical representations for output: evidence from a category-specific semantic deficit. *Brain and Language* 40, 106-144.

Kadota, S. (2002).『英語の書きことばと話しことばはいかに関係しているか』(*How phonology works in L2 reading comprehension.*) Kuroshio-shuppan.

Kiriki, K. (2002). ANOVA4 on the Web. http://www.hju.ac.jp/~kiriki/anova4/ (February 24, 2005)

Mikulecky, B. S., & Jeffries, L. (1998). *Reading power*. 2nd ed. Longman.

Nakamura, T. (1998). What makes language learners false beginners?: Data analysis of word vocalization performance. *Annual Review of English Language Education in Japan,* 9, 149-157.

Nakamura, T. (2001). Japanese EFL learners' cognitive processing of English regular and irregular words.『広島大学大学院教育学研究科紀要』第一部　第５０号。

Nakamura, T. & Matsuoka, H. (2003). The effects of a CALL based task on false beginners' acquisition of irregularly spelled words in English. *Annual Review of English Language Education in Japan.* Vol. 14, 211-219.

Osaka, N. 2000.『脳とワーキングメモリー』(*Brain and working memory.*) Kyoto University Press.

Perfetti, C. A. (1995). Cognitive research can inform reading education. *Journal of Research in Reading.* 18.2, 107-115.

Stanovich, K. (1980). Toward an interactive-compensatory model of individual differences in the development of reading fluency. *Reading Research Quarterly, 16,* 32-71.

Stanovich, K. (1991). Word recognition: changing perspectives. In R. Barr, M. I. Kamil, P. Mosenthal, & P. D. Pearson, (Eds.) *Handbook of reading research.* Vol. 2 (pp. 418-452). New York: Longman.

Tabossi, P. (1988). Accessing lexical ambiguity in different types of sentential contexts. *Journal of Memory and Language*, 27, 324-340.

Van Den Bosch, K., Van Bon, W. H. J., & Schreuder, R. (1995). Poor readers' decoding skills: Effects of training with limited exposure duration. *Reading Research Quarterly*, 30(1), 110-125.

Yopp, H.K. (1988). The validity and reliability of phonetic awareness tests. *Reading Research Quarterly*, 23 (2), 159-177.1988

Appendix 1. Ryan's Multiple Comparison Results

pair	r	nominal level	t	p	sig.
5-2	5	0.005	3.268	0.00135	s.
5-3	4	0.0067	3.268	0.00135	s.
1-2	4	0.0067	0.363	0.71703	n.s.
5-4	3	0.01	3.268	0.00135	s.
1-3	3	0.01	0.363	0.71703	n.s.
4-2	3	0.01	0.000	1.00000	n.s.
1-4	2	0.02	0.363	0.71703	n.s.
5-1	2	0.02	2.905	0000424	s.
4-3	2	0.02	0.000	1.000000	n.s.
3-2	2	0.02	0.000	1.000000	n.s.

Mse=0.099787, df=148, significance level=0.50000

1: Time for Kids; 2: GetHiroshima; 3: Singapore; 4: Study Abroad; 5: Online Shopping