International Journal of Education Humanities and Social Science

ISSN: 2582-0745
Vol. 4, No. 06; 2021

APPLICATION OF A PYTHON-BASED VOCABULARY TEACHING IN ADVANCED ENGLISH

Xiaolan Gan
School of Foreign Languages, Sichuan University of Science and Engineering, China

ABSTRACT
Lack of vocabulary is the main reason why English majors are weak in listening, speaking, reading, writing and translating, especially in listening and translation. In this study, a Python-based teaching method is integrated into Advanced English teaching, to be more exact, a Python-based vocabulary teaching program is developed and applied in Advanced English teaching. The auxiliary function of this program in Advanced English vocabulary teaching is verified by the pre-tests and post-tests taken by the experiment group and the control group. The experimental results show that the Python-based vocabulary teaching program is of great assistance to vocabulary teaching in Advanced English teaching.

Key Words: Lack of vocabulary; Python-based vocabulary teaching; Teaching experiment.

1. INTRODUCTION
Advanced English (formerly known as "intensive reading" in senior grade) is one of the core courses of English majors in senior grade in Chinese colleges and universities. It is a course designed to improve students' comprehensive English skills, especially reading comprehension, grammar, rhetoric and writing abilities. Ji (1981) first pointed out that there were two problems in intensive reading teaching: unclear teaching focus and unscientific teaching methods. Since then, researchers have tried to solve the two problems through introspection (such as Lu, 1994; Liu, 1995; Su, 1996; Zhu, 2002; Li, 2005; Wu, 2009; Zhang, 2010; etc.), relevant theories (such as Li, 1998; Sha, 2007; Cai, 2008; Li, 2008; Wan, 2011; Li, 2012; Luo, 2014; Deng, 2015; Fan, 2020; etc.) or various teaching methods (such as Mo, 2003; Yang, 2003; Liu, 2006; Chu &Liu, 2007; Zhao, 2007; Yang, 2008; Chen, 2009; Hu, 2020; Feng, 2011; Li, 2011; Lai, 2014; Xu &Wei, 2018; etc.). After 40 years' exploration, many new teaching methods have been poured into Advanced English teaching. However, the problems of unclear teaching focus and unscientific teaching methods of Advanced English have not been effectively solved.

Gan (2021) conducted a targeted questionnaire survey on the English juniors' Advanced English learning status in a university in Sichuan province of China. And this survey found that lack of vocabulary is the main reason why the English juniors are weak in listening, speaking, reading, writing and translation, especially in listening and translation. Gan further proposed that teachers should increase vocabulary input and explain more interpretation skills in course teaching; they should increase the students' training of vocabulary; and they can integrate artificial intelligence into Advanced English classroom teaching.

ISSN: 2582-0745
Vol. 4, No. 06; 2021

Therefore, this study attempts to integrate artificial intelligence into Advanced English teaching, develop a Python-based vocabulary teaching program, and verify the auxiliary function of this program in Advanced English vocabulary teaching through the teaching experiment between the experiment group and the control group.

2.RESEARCH METHODOLOGY

2.1 Research Questions

In view of the fact that the main goal of this study is to verify the auxiliary role of a Python-based vocabulary teaching program in Advanced English vocabulary teaching, the main questions discussed in this study are as follows:

(1) Whether the Python-based vocabulary teaching program can assist the vocabulary teaching in Advanced English?

(2) If yes, to what extent does the Python-based vocabulary teaching program play an auxiliary role in the vocabulary teaching in Advanced English?

2.2 Participants

This study has carried out a quasi-experimental study in two natural classes of English juniors in a university in Sichuan, China. Among them, a Python-based vocabulary teaching was implemented in the experimental class, while traditional vocabulary teaching was implemented in the control class.

There are 31 students in the two classes respectively. The Advanced English course is taught by the same teacher, and the hours of Advanced English courses in both classes are equal every week.

A normal test of the vocabulary pre-test scores of the two classes shows that the vocabulary test scores of the two classes are normally distributed since the absolute values of kurtosis and skewness are less than 1. By further comparing and analyzing the average scores of vocabulary pre-test between the two classes, it is found that the scores of vocabulary pre-tests between the two classes are equivalent and there is no significant difference ($P=0.137>0.05$). The above results are as shown in Table 1 and Table 2:

ISSN: 2582-0745
Vol. 4, No. 06; 2021

Table 1 Skewness and Kurtosis of pre-tests of two groups

		experiment	control
N	Valid	31	31
	Missing	0	0
Skewness		-.068	-.184
Std. Error of Skewness		.421	.421
Kurtosis		-.177	-.363
Std. Error of Kurtosis		.821	.821

Table 2 Independent Samples Test of pre-tests of two groups

		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
VAR00002	Equal variances assumed	2.249	.139	.724	60	.472	.41935	.57897	-.73876	1.57747
	Equal variances not assumed			.724	55.255	.472	.41935	.57897	-.74081	1.57952

ISSN: 2582-0745
Vol. 4, No. 06; 2021

2.3 Research Instruments

2.3.1 Non-standardized Test (Self-designed Test)

In order to meet the practical needs of teachers' daily teaching and scientific research, in this study, the teacher made her own tests according to the standardized test method, and carried out pre-tests and post-tests on the experimental class and the control class before and after the teaching experiment.

Table 3 is the blueprint for compiling examination questions, which not only designs how vocabulary tests are distributed in each chapter, the required proportion of the tested teaching objectives and the proportion in each chapter, but also plays an important role in determining the examination time limit, the number of examination questions, the type of examination questions, the scoring method and the distribution of scores.

Table 3 The Blueprint for Compiling Examination Questions

Contents / Units	Vocabulary Memorization	Vocabulary Understanding	Vocabulary Application	Total
Unit 1	1	1	2	4
Unit 3	1	1	2	4
Unit 6	1	1	2	4
Unit 8	1	1	2	4
Unit 10	1	1	2	4
Total	5	5	10	20

After a small-scale test and topic analysis, it is found that the reliability, validity, discrimination and difficulty of the topic are all good, which accords with the basic conditions for the effectiveness of the self-designed test.

2.3.2 A Python-based Vocabulary Teaching Program

In this study, according to the order of measuring vocabulary richness, measuring vocabulary frequency and calling wordnet to print the word meaning network of high-frequency words, a

ISSN: 2582-0745
Vol. 4, No. 06; 2021

Python-based vocabulary teaching program was implemented in the experiment class. Below, we take the third unit as an example to explain the specific teaching procedures:

Step 1: Read files and measure vocabulary richness.

```
import nltk
f = open("C:\my_corpus\AE\AE-2 lesson 3.txt","rb")
raw1= f.read().decode("utf8")
print(len(raw1)) # numbers of characters
tokens1= nltk.word_tokenize(raw1)
print(len(tokens1)) # numbers of tokens
print(len(set(tokens1))) # numbers of vocabulary
print(len(set(tokens1))/len(tokens1)) # lexical richness
```

Step 2: Read files and measure frequency distribution.

```
import nltk
f=open("C:\my_corpus\AE\AE-2 lesson 3.txt","rb")
raw1=f.read().decode("utf8")
tokens1=nltk.word_tokenize(raw1)
text1=nltk.Text(tokens1)
fdist1=nltk.FreqDist(text1)
print(fdist1)
print(fdist1.most_common(50))
print(fdist1.plot(50,cumulative=True))
print(fdist1.hapaxes())
```

Step 3: Read wordnet

```
import nltk
from nltk.corpus import wordnet as wn
print(wn.synsets("preconception"))
print(wn.synset("preconception.n.01").lemma_names())
print(wn.synset("preconception.n.01").definition())
```

ISSN: 2582-0745
Vol. 4, No. 06; 2021

```
print(wn.synset("preconception.n.01").examples())
print(wn.synset("preconception.n.01").hyponyms())
print(wn.synset("preconception.n.01").hypernyms())
```

2.4 Research Procedures

In this study, before the experiment, the experimental class and the control class were tested with the same self-designed test questions. The experiment then started in March 2021 and ended in July 2021. During this 16-week study, the experimental class used a Python-based vocabulary teaching program in the language lab, while teachers supervised and provided necessary guidance and help. We provide the stand-alone Python-based vocabulary teaching program software for students, and students can also use it after class. After the 16-week study, this study conducted a unified self-designed test again for the experimental class and the control class.

2.5 Data Collection

In this study, the self-designed test questions were tested before and after the the teaching experiment, and the test scores were used as important experimental data for statistical analysis by SPSS.25.

3.RESULTS AND DISCUSSIONS

3.1 Post-test and Post-test Comparisons

Before the experiment in March, this study conducted a non-standardized test on the experimental class and the control class, and found that there was no significant difference between the two classes. The specific results are shown in Table 2 mentioned. At the end of the experiment in July, this study once again conducted a non-standardized test on the experimental class and the control class, and made statistical analysis according to the students' post-test scores. The specific results are shown in Table 4 and Table 5.

Table 4 Skewness and Kurtosis of post-tests of two groups

		experiment	control
N	Valid	31	31
	Missing	0	0
Skewness		.060	.032
Std. Error of Skewness		.421	.421
Kurtosis		-.522	-.671

ISSN: 2582-0745
Vol. 4, No. 06; 2021

Std. Error of Kurtosis	.821	.821

Table 5 Independent Samples Test of post-tests of two groups

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
VAR00002	Equal variances assumed	7.178	.010	11.414	60	.000	5.58065	.48893	4.60263	6.55866
	Equal variances not assumed			11.414	50.507	.000	5.58065	.48893	4.59884	6.56245

Table 4 shows the results of measuring the skewness and kurtosis of the vocabulary post-test scores of the experimental class and the control class. According to the fact that the absolute values of skewness and kurtosis are less than 1, it can be judged that the post-test scores of the two natural classes are in normal distribution. On this basis, this study continues to carry out independent sample mean test on post-test results, and the analysis results are shown in Table 5.

Comparing Table 2 and Table 5, this study found that the average score difference between the experimental class and the control class increased from 0.41935 points to 5.58065 points, amounting to an increase of 5.1613 points. That is to say, after the implementation of the Python-based vocabulary teaching experiment, the results of the experimental class are obviously better than those of the control class. Moreover, the statistical data is $P<0.05$ (Sig.=0.010) which indicates the post-test scores of the experimental class and the control class have statistically significant differences.

ISSN: 2582-0745
Vol. 4, No. 06; 2021

3.2 Pre-test and Post-test Comparisons

In order to further analyze the experimental results, this study also conducted a normal test and paired sample T test on the vocabulary pre-test and post-test scores in the experimental class and the control class respectively. The analysis results of the experiment class are shown in Table 6 and 7; while the analysis results of the control class are shown in Table 8 and 9.

Table 6 Skewness and Kurtosis of Pre-test and Post-test of the Experiment Group

		experiment-before	experiment-after
N	Valid	31	31
	Missing	0	0
Skewness		-.068	.060
Std. Error of Skewness		.421	.421
Kurtosis		-.177	-.522
Std. Error of Kurtosis		.821	.821

Table 6 is the result of measuring the skewness and kurtosis of the vocabulary pre-test and post-test scores of the experiment class. According to the absolute values of skewness and kurtosis are less than 1, it can be judged that the pre-test scores of the experiment class are in normal distribution. On this basis, this study continues to test the average value of paired samples for the pre-and post-test scores of the experiment class, and the analysis results are shown in Table 7.

Table 7 Paired Samples Test of Pre-test and Post-test of the Experiment Group

Paired Differences							
			95% Confidence Interval of the Difference				
Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)

ISSN: 2582-0745
Vol. 4, No. 06; 2021

Pair 1	experiment-before - experiment-after	-5.387	2.290	.411	-6.227	-4.547	-13.097	30	.000

According to Table 7, this study found that the average score of the post-test scores of the experimental class increased by 5.3871 points compared with the pre-test scores. That is to say, after the Python-based vocabulary teaching experiment was carried out, the results of the experimental class were obviously improved. Moreover, the statistical data is $P<0.05$ (Sig. =0.000), and there are statistically significant differences in the pre-and post-test scores of the experimental class.

In order to further prove that Python vocabulary teaching experiment has greatly improved the post-test scores of the experimental class, this study continues to compare the pre-test scores and post-test scores of the control class. The statistical results of the control class are shown in Table 8 and Table 9.

Table 8 Skewness and Kurtosis of Pre-test and Post-test of the Control Group

		control-before	control-after
N	Valid	31	31
	Missing	0	0
Skewness		-.184	.032
Std. Error of Skewness		.421	.421
Kurtosis		-.363	-.671
Std. Error of Kurtosis		.821	.821

Table 8 is the result of measuring the skewness and kurtosis of the vocabulary pre-test and post-test scores of the control class. According to the absolute values of skewness and kurtosis are less than 1, it can be judged that the pre-test scores of the control class are in normal distribution. On this basis, this study continues to test the average value of paired samples for the pre-and post-test scores of the control class, and the analysis results are shown in Table 9.

ISSN: 2582-0745
Vol. 4, No. 06; 2021

Table 9 Paired Samples Test of Pre-test and Post-test of the Control Group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	control-before - control-after	-.22581	1.72645	.31008	-.85908	.40746	-.728	30	.472

According to Table 9, this study found that compared with the pre-test results, the average score of the post-test results of the control class decreased by 0.22581 points. That is to say, after the implementation of traditional vocabulary teaching for one semester, the results of the control class declined slightly. Moreover, the statistical data is P>0.05 (Sig. =0.472), and there is no statistically significant difference in the post-test scores of the control class.

4. CONCLUSION

Vocabulary is the cornerstone of English learning. The current situation of Advanced English teaching is that students' abilities of memorizing, understanding and applying vocabulary are weak, which requires teachers to adopt scientific and appropriate methods to strengthen those abilities in teaching. In this study, through a semester-long Python-based vocabulary teaching experiment, the experimental data were analyzed before and after the test between groups and within groups. The results of paired sample analysis before and after the test in the experimental class and independent sample analysis after the test in the experimental class and the control class all showed that the experimental class with Python-based vocabulary teaching improved significantly compared with the control class with traditional vocabulary teaching. In other words, Python vocabulary teaching plays an auxiliary role in vocabulary teaching of Advanced English classes, and it also has a greater auxiliary role.

Acknowledgement

This research was supported by the Scientific Research Fund of Sichuan University of Science and Engineering (B40101351)

REFERENCES

Cai Q. & H. Zhang. (2008). The Practice and Research of Cooperative Learning in English Major Teaching-A Study on the Cultural Background of Advanced English Text. *Journal of Hebei Normal University (Educational Science Edition)*, 50 (2). pp. 67-71.

Chen Zh. L. (2009). Information Literacy and Task-based Advanced English Teaching under the Network Environment. *Educational Research and Experiment*. No. S1. pp. 106-108.

ISSN: 2582-0745
Vol. 4, No. 06; 2021

Chu X. Q. & C. M. Liu. (2007). Corpus Method for Autonomous Learning of Advanced English Vocabulary. *Audio-visual Teaching of Foreign Languages*, 117 (5): 12-17.

Deng X. M. (2015). Metaphorical Ability and the Expansion of Vocabulary Depth Knowledge and Discourse Construction in Advanced English. *Foreign Languages*, 31 (4). pp. 128-133.

Fan L. J. (2020). Research on the Teaching Mode of "Learning Community" in Advanced English from the Perspective of Communication Theory. *Heilongjiang Higher Education Research*. No. 1. pp. 157-160.

Feng Y. F. (2011). Construction and Implementation of the Research-based Classroom Teaching Mode of Advanced English for English Majors Based on Multimedia and Network Technology. *Foreign Languages*, 27 (6): 137-141.

Gan X.L. (2021). A SURVEY OF ADVANCED ENGLISH TEACHING. *International Journal of Education Humanities and Social Science*, 4(5): 268-278.

Hu T.N. (2010). An Analysis of Web-based Advanced English Autonomous Learning. *China Adult Education*, 249 (8): 191-192.

Ji J.G. (1982). Some Views on Intensive Reading Teaching for Senior English Majors. *Journal of Ningxia University (Social Science Edition)*. No.3. pp. 51-56.

Lai H.L. (2014). Research on Independent and Innovative Learning Supported by Online Teaching Platform-taking Advanced English Course for English Majors as an Example. *Audio-visual Education Research*, 35 (3): 88-92.

Li H. Y. (2008). Research on Advanced English Classroom Teaching Mode Based on Discourse Theory System. *Foreign Language Teaching Theory and Practice*, 122(2). pp. 40-44.

Li J. (2011). Application of Corpus Indexing Software in Advanced English Teaching. *Audio-visual Education in China*, 293 (6): 99-104.

Li X. (2012). Introduction of Metacognitive Strategies in Advanced English Teaching. *Foreign Languages*. No. S1. pp. 184-186.

Liu C. M. & X. Q. Chu. (2006). Research-based Advanced English Classroom Teaching Based on Task-based Teaching Method and Network Technology. *Audio-visual Teaching of Foreign Languages*. No. 2. pp. 27-31.

Liu Zh. J. (1995). How to teach Advanced English well. *Journal of Foreign Languages (Journal of Heilongjiang University)*. No. 2. pp. 70-72.

Lu Sh. M. (1994). Some Views on Intensive Reading Teaching for Senior Students. *Foreign Language Research*. No. 1. pp. 59-61.

ISSN: 2582-0745
Vol. 4, No. 06; 2021

Luo R. J., N. Ma. & J. Shen. (2014). Advanced English Teaching Based on BPST "Cultural Appreciation" Target Model. *Foreign Languages*. No. 2. pp. 190-192.

Mo L. L. (2003). Use of CAI Courseware for Advanced English Courses. *Audio-visual Teaching of Foreign Languages*. No. 6. pp. 46-49.

Wan B.H. (2011). Emphasis on Analysis and Appreciation-Teaching Advanced English from the Perspective of Stylistics. *Foreign Languages*. No. S1. pp. 148-151.

Wu J. Zh. (2009). Thoughts on Advanced English Course for English Majors. *Education and Career*. No. 24. pp. 133-134.

Xu X. Q. & B. Wei. (2018). Investigation on Online Learning and Evaluation of Advanced English. *Audio-visual Teaching of Foreign Languages*, 184(6): 24-28, 34.

Yang H. X. & Sun J. L. (2008). Discussion on Advanced English Teaching Mode Based on Multimedia Network Technology. *Continuing Education Research*, 124 (12): 45-46.

Yang Zh. T. (2003). Exploration of Advanced English Teaching under Multimedia Network Environment. *Audio-visual Teaching of Foreign Languages*. No. 6. pp. 57-60.

Zhang F. (2010). Advanced English Teaching Strategies Based on Problem Solving. *Shandong Foreign Language Teaching*. No. 4. pp. 19-23.

Zhao X. (2007). Investigation and Analysis of Constructive Learning Mode of Advanced English Based on Network Environment. *Audio-visual Education Research*, 174 (10): 63-66,70.

Zhu Ch. Zh. (2002). A Probe into Advanced English Teaching. *Foreign Language and Foreign Language Teaching*. No. 6. pp. 32-33.